

**Information Technology for Development
of Small and Medium-sized Exporters
in Latin America and East Asia**

Mikio Kuwayama
Yasushi Ueki
Masatsugu Tsuji
EDITORS



The views expressed in this document, which has been reproduced without formal editing, are those of the authors and do not necessarily reflect the views of the Organizations.

United Nations Publication

LC/W.27

Copyright © United Nations, October 2005. All rights reserved

Printed in United Nations, Santiago of Chile

Applications for the right to reproduce this work are welcomed and should be sent to the Secretary of the Publications Board, United Nations Headquarters, New York, N.Y. 10017, U.S.A. Member States and their governmental institutions may reproduce this work without prior authorization, but are requested to mention the source and inform the United Nations of such reproduction.

Acknowledgements

This report is an output of the project entitled “Comparative Study on the East Asian and Latin American IT Industry”, which was executed by the Division of International Trade and Integration of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) in collaboration with the Institute of Developing Economies of the Japan External Trade Organization (IDE/JETRO). The project was financed by the Thematic Trust Fund: Information and Communication Technology (ICT) for Development of the United Nations Development Programme (UNDP).

The report provides an overview of the present status of information technology (IT) and its use to promote international trade. It focuses on experiences in IT usage by small- and medium-sized enterprises (SMEs) in the Asia-Pacific and Latin American and Caribbean regions. Special emphasis is placed on SME exporters in the 13 countries covered by the study, which were selected from among the member countries of the Forum for East Asia - Latin America Cooperation (FEALAC). The primary objectives of the study were: (i) to enhance intra- and interregional business ties in IT-based supply chains in each FEALAC member country; (ii) to develop SMEs through IT usage; (iii) to promote interregional cooperation between SMEs in the two regions; and (iv) to reduce poverty through SME development.

SMEs play essential roles, especially in developing countries, as job creators and social stabilizers, as well as sources of innovation. In so doing, they contribute both to poverty alleviation and to the overall economic development process. The majority of SMEs are still confronted with formidable obstacles when seeking to start or expand their businesses (especially those related to international trade), but the IT revolution is providing SMEs with effective tools which they can use, in conjunction with appropriate government policy measures, to overcome many of the hurdles they face.

These studies of 13 FEALAC member countries –six from Asia (Japan, People’s Republic of China, Republic of Korea, Singapore, Thailand and Viet Nam) and seven from Latin America (Argentina, Brazil, Chile, Colombia, El Salvador, Mexico and Peru)– have addressed the following issues: the contribution made by SMEs to the economy; IT usage by SMEs; and IT-related policies designed to promote SME participation in international trade. In addition, for each country examined, several case studies were conducted in order to identify successful IT business practices used by SMEs. The present volume provides a synthesis and summaries of the 13 individual country studies. The complete version of each country study will be made available shortly on the ECLAC International Trade and Integration Division’s website: www.eclac.cl/comercio.

The findings of these country studies indicate that an increasing number of SMEs are gaining access to ITs, even in developing countries, although a wide digital divide remains, especially between microenterprises/small firms, on the one hand, and medium-sized firms, on the other. The case studies conducted at the sector and firm levels demonstrate that, by utilizing ITs effectively, some SMEs have succeeded in improving their management capacities, adding more value to their products and services, and/or accessing foreign markets.

In order to share the findings of these studies and promote debate on these issues, ECLAC and IDE/JETRO held the International Seminar on Information Technology for the Development of Small and Medium-sized Exporters in East Asia and Latin America on 23-24 November 2004 at ECLAC headquarters in Santiago, Chile. The seminar, which was attended by a large number of experts from both regions, was opened with inaugural addresses by Ms. Alicia Bárcena, Deputy Executive Secretary of ECLAC; Ms. Irene Philippi, Resident Representative in Chile of UNDP; and Ambassador Mitsuhiro Kagami, Ambassador of Japan to the Republic of Nicaragua and former Executive Vice President of JETRO. We are very grateful to all participants for their stimulating comments and contributions to the event.

Following the international seminar, project findings have been presented at the FEALAC Economy and Society Working Group meeting (Buenos Aires, Argentina, 25 November 2004), which was organized by the Governments of Argentina and Japan as the co-chairs of the Working Group, and at the Symposium on the Promotion and Application of Information and Communication Technologies (ICT) for Micro, Small and Medium-sized Enterprises' Competitiveness (Lima, Peru, 8-9 July 2005), which was organized by the Government of Peru in coordination with the Centre for the Promotion of Small and Micro-enterprise (PROMPYME). It is our sincere hope that the project studies and the involvement of project participants in these events will contribute to the creation of a cooperative framework for SME development within FEALAC.

The experts who participated in this project and international seminar shared the opinion that governments, international organizations and other bodies concerned with ITs, international trade and development issues should set up coordination mechanisms to help them translate broad government policy frameworks into concrete actions and streamline the currently vast and inefficient array of IT promotion policies. The views expressed in this document are those of the authors and do not necessarily reflect the views of the project's executing agencies.

We would like to thank UNDP, especially Mr. Raul Zambrano, Development Policy Adviser, and Atsushi Yamanaka, ICTD Specialist, of the UNDP Bureau for Development Policy, and Ms. Josefa Errázuriz Guilisasti, Operations Coordinator with the Office of the Resident Representative in Chile of UNDP, for their coordination efforts.

We are particularly grateful to Ambassador Akio Hosono, the Ambassador of Japan to the Republic of El Salvador, who developed the concept for this research project in collaboration with Ambassador Kagami and the Ministry of Foreign Affairs of Japan. Special thanks are also due to Mr. Mikio Kuwayama, Officer-in-Charge of the ECLAC International Trade Unit, who effectively coordinated the entire project, and to Professor Masatsugu Tsuji, with the University of Hyogo, and Mr. Rodrigo Cárcamo Olmos, Project Consultant, for their contribution to this project's implementation. Mr. Yasushi Ueki, Expert on Mission from IDE/JETRO to ECLAC, not only contributed to several chapters of the report but also coordinated the technical aspects of the project with consultants and IDE/JETRO.

We would like to express our appreciation to the many ECLAC staff members who worked on this project. We are also grateful to the staff of IDE/JETRO, especially Ms. Tamayo Ito for her research assistance and Ms. Masako Hasegawa, Mr. Shuji Uchikawa, Ms. Tomoko Kubota and Mr. Toshihiro Kudo for their administrative assistance.

September 2005

José Luis Machinea
Executive Secretary
Economic Commission for Latin America
and the Caribbean

Akifumi Kuchiki
Executive Vice President
Japan External Trade Organization

List of Authors

LATIN AMERICA

Argentina		
Ernesto Mario Rodríguez Rodríguez	Multilateral Advisory Services S.A., Universidad de Buenos Aires, and Universidad de San Andrés	
Brazil		
Antonio José Junqueira Botelho	Departamento de Engenharia Industrial and NEP Genesis, Pontifícia Universidade Católica do Rio de Janeiro, and Innovastrat Consulting	
Paulo Bastos Tigre	Instituto de Economia, Universidade Federal do Rio de Janeiro, and Innovastrat Consulting	
Chile		
Rodrigo Cárcamo Olmos	PROCHILE, Gobierno de Chile	
Yasushi Ueki	Institute of Developing Economies (IDE/JETRO), and International Trade and Integration Division, ECLAC	
Colombia		
André Kublik Walther	Devnet Internacional, and Estudio Net Ltda.	
El Salvador		
Merlín Alejandrina Barrera López	Corporación de Exportadores de El Salvador, (Independent Consultant)	
Mexico		
Juan Antonio Ramírez Bustos	AFCOT S.A. De C.V.	
Peru		
Carlos Daniel Durand Chahud	Instituto Competitividad y Tecnología and Cámara de Comercio de Lima	
ASIA		
China		
Xingmin Yin	China Centre for Economic Studies, Fudan University, Shanghai	
Japan		
Masatsugu Tsuji	Graduate School of Applied Informatics, University of Hyogo and Professor Emeritus, Osaka University	
Republic of Korea		
Yoo Soo Hong	Korea Institute for International Economic Policy	
Singapore		
Wong Poh Kam	NUS Entrepreneurship Centre, National University of Singapore	
Annette Singh	NUS Entrepreneurship Centre, National University of Singapore	
Thailand		
Chanin Mephokee	Faculty of Economics, Thammasat University	
Kaipichit Ruengrichaiya	Faculty of Economics, Thammasat University	
Viet Nam		
Ngyuyen Thanh Ha	VIETBID (Law Firm and Investment and Technology Consultancy Center)	

Contents

Acknowledgements	3
List of Authors	5
EXECUTIVE SUMMARY	17
PART I:	23
Summary Report for the Research Project	
RESULTS OF THE PROJECT	
1. BACKGROUNDS AND METHODOLOGY	25
2. AN OVERVIEW OF THE FEALAC ECONOMY	27
3. INFORMATION TECHNOLOGY IN THE GLOBALIZED ECONOMY	41
(1) IT Infrastructure	41
(2) Human Resources and Literacy	45
(3) Research and Development	45
(4) Other Trade and Business Conditions	49
4. IT USAGE AND DEVELOPMENT OF SMES	51
(1) IT and Business Conditions in the Selected Countries	51
(2) Informatization at the Firm Level	51
(a) Current State of Informatization by Layer	53
(b) Current State of Informatization in the Studied Countries	55
China	55
Japan	56
Republic of Korea	57
Singapore	58
Thailand	59
Viet Nam	60
Argentina	61
Brazil	62
Chile	63
Colombia	64
El Salvador	65
Mexico	65
Peru	66
5. INTERNATIONAL TRADE AND DEVELOPMENT OF SMES	68
(1) Business Environment of SMEs	68
(a) Contribution of SMEs to National Economies	68
(b) Internationalization of SMEs	68
(c) Obstacles for SMEs to Export	70
(2) SME Development Through IT: Key Findings from the Case Studies	72
(a) Motives to introduce IT	73
(b) Patterns of International Trade by SMEs and IT applications to promote SME development	73

(c)	Processes to expand access to markets abroad	75
(d)	Barriers to diffuse e-commerce, SCM and other e-transactions	76
Box 1	Computerized Systems for International Trade and Customs Integration in El Salvador and Guatemala	77
Box 2	Sweet's, a Better Practice of a Salvadorian SME	78
6.	POLICY ISSUES CONCERNING IT UTILIZATION IT FOR DEVELOPMENT OF SMES AND INTERNATIONAL TRADE	78
(1)	Promotion of IT utilization	78
(a)	Obstacles to IT usage	78
(b)	Key Policy issues	79
(2)	Policy Elements for Development of Smaller Exporters	80
(3)	International Cooperation	82
7.	CONCLUSION	82
(1)	Policy areas to be focused on	82
(a)	Improvement of access to information on international trade	82
(b)	Capacity Building	83
(c)	Formation of Virtual Clusters	83
(d)	Trade Facilitation	84
(e)	Improvement of Infrastructure for e-business	84
(2)	Policy Suggestions to and Future Policy Issues for the FEALAC	84
(a)	Policy suggestions: Establishment of a portal site	85
(b)	Future policy agenda	85
References	86
Annex 1		
Practical Examples of IT Usage by SMEs		
	China	87
	Japan	89
	Republic of Korea	90
	Singapore	92
	Thailand	92
	Viet Nam	94
	Argentina	95
	Brazil	96
	Chile	96
	Colombia	97
	El Salvador	98
	Mexico	98
	Peru	99
Annex 2		
	Major Policy Issues related to Direct Exports	101
Annex 3		
	Invitation Program for Young Leaders of the FEALAC Member Countries, SMEs Promotion and IT (from February 20 to March 2, 2005) –10 SUGGESTIONS FROM YOUNG LEADERS– ..	103
Annex 4		
	Policy Framework for Development of SME and IT in the Researched Countries	105
	China	105
	Japan	106
	Republic of Korea	109
	Singapore	110
	Thailand	111
	Viet Nam	112
	Argentina	113

Brazil	114
Chile	117
Colombia	120
El Salvador	122
Mexico	124
Peru	125
PART II:	127
Latin America	
Asia	
ARGENTINA	
I. Introduction	129
II. Present status of the IT market and of IT usage by SMEs	130
A. Market Estimates	130
B. Penetration of IT and E-commerce by SMEs	131
III. SMEs' development in the IT revolution	132
A. Overview of the relative importance of SMEs in the overall economy	132
B. Case studies on use of e-commerce and supply chain management	134
1. Córdoba technology cluster (Polo Tecnológico de Córdoba)	134
2. Dupont Apex programme	137
3. Profiling export-oriented industries	138
4. Belgrano Department (Province of Santa Fe)	141
C. Problems faced by SMEs in participating in the trade-oriented value chain	142
1) Problems that SMEs encounter in participating in IT networks	142
2) Barriers that inhibit SMEs from participating effectively in supply chains and trade networks	143
IV. Government Policies Designed for SMEs, IT, and International Trade	143
A. IT policies in the country's overall strategy	143
B. Policies to support SMEs	145
1. Export promotion	145
2. Trade facilitation	146
3. FDI promotion	147
4. Business promotion	147
C. Special measures to rectify the "digital divide" between firms	151
1. Human resources	151
2. Technical aspects	151
3. Financial aspects	151
4. Infocentres	152
D. E-government targeting SMEs and trade promotion	152
1. Overall strategy/structure of E-government	152
2. Applications	152
a. E-procurement	152
b. Customs and other trade-related procedures	152
c. E-finance, and/or e-payment	152
d. Other	153
E. Institutional issues	153
1. Standardization, such as EDI and cryptographic codes, and Public Infrastructure	153
2. Intellectual property rights	153
V. Conclusion	154
References	157
BRAZIL	
I. Introduction	159
II. Current situation of the IT market and IT use by SMEs	159
A. Market estimates	159
B. Penetration of IT and e-commerce among small and medium-sized enterprises (SMEs)	161

III. SME development in the IT revolution	162
A. Overview of the relative importance of SMEs in the economy at large	162
B. Case studies on the use of e-commerce and supply chain management (SCM) in selected industries	163
1. The ornamental stones cluster in the state of Espírito Santo	163
2. Aeronautics industry suppliers in São José dos Campos	168
C. Problems for SMEs to participate in the trade-oriented value chain	172
IV. Government policies designed for SMES, IT, and international trade	173
A. IT policies in the country's overall development strategy	173
B. Policies to support SMEs	174
1. Export promotion	174
2. Trade facilitation	175
3. FDI promotion	176
4. Business promotion	176
C. Special measures to correct the 'digital divide' among companies	176
1. Human resources	176
2. Technical aspects	177
3. Financial aspects	177
4. Infocenters	177
5. Other	178
D. E-government aimed at SMEs and trade promotion	178
1. Overall strategy/structure of e-government	178
2. Some e-government applications	179
E. Institutional issues	179
1. Standardization and public key infrastructures	179
2. Intellectual Property rights	180
V. Regional networks	181
A. Existing regional networks or websites	181
B. New networks or websites in the planning stage	182
C. Possibility of inter-regional links	183
VI. Conclusion and recommendation	183
1. Lessons learned	183
2. Assessment of experiences in export promotion and IT policies for SMEs	184
3. Assessment of the present situation of regional networks	185
References	186
CHILE	
I. Introduction	189
II. The current situation in the IT market and IT use by SMEs	189
A. Market Estimates	189
1. Overview of the digital economy	190
2. Internet	190
3. E-commerce	190
B. Penetration of IT and e-commerce by SMEs	191
1. IT use by Chilean firms	191
2. IT use by SMEs	191
III. SME development in the IT revolution	193
A. Overview of the relative importance of SMEs in the economy at large	193
1. The recent condition of SMEs	193
2. SME exports	193
2.1. Current situation	193
2.2. The weakness of Chilean SMEs	194
B. Case studies on the use of e-commerce and supply chain management (SCM) in selected industries	195
1. Background to the policy issue in Chile	195
2. Case 1: Development of food safety systems	195
2.1. The need for food safety management	195
2.2. Food-safety management and traceability system	196
2.3. The concept of traceability and international movements	197

2.4. The framework for developing food safety management systems in Chile . . .	198
2.5. Development of a traceability system for the fresh fruit sector in Chile . . .	199
2.6. Development of a platform for food traceability	201
3. Case 2: Development of the software and IT service sectors	201
3.1. Recent conditions of the software and IT service sectors in Chile	201
3.2. Comparative advantages and disadvantages	202
3.3. National vision and strategy for developing the software sector	203
3.4. Development of the software cluster in Valparaíso	203
IV. Government policies designed for SMEs, IT, and international trade	207
A. IT policies in the country’s overall development strategy	207
B. Policies to support SMEs	208
1. Export promotion	209
2. Trade facilitation	209
3. FDI promotion	210
4. Business promotion	211
4.1. Basic framework for the business promotion policy	211
4.2. Incubation business policy	211
C. Special measures to correct the digital divide between firms	211
1. Human resources	212
2. Technical aspects	212
3. Infocentres	213
D. E-government targeting SMEs and trade promotion	213
1. Overall strategy/structure of e-government	213
2. E-government applications for corporate service	213
V. Conclusion and recommendation	215
(1) Measures against barriers to foreign market participation	215
(2) Trade facilitation measures	216
(3) IT policy and measures for promoting e-commerce and other IT applications	216
References	217
COLOMBIA	
I. Introduction	219
II. Current ICT market situation and ICT use by SMEs	220
A. Market Estimates of ICT investment levels	220
1. Telephony	220
2. Internet	221
3. Hardware and software	221
4. E-commerce	221
B. ICT and E-commerce Penetration by SMEs	221
III. SMEs in the ICT Revolution	222
A. SMEs within the economy	222
B. Case studies for e-commerce and supply chain management in SMEs	223
1. Zebra Electrónica	223
2. Itansuca Ltda.	226
3. Artesanías de Colombia and SIART	230
IV. Government policies for SMEs, ICTs, and international trade	233
A. E-government, SMEs and trade promotion	233
1. Connectivity agenda	233
2. Rationalization and Automatization Proceedings Programme (PRAT)	234
B. Promoting ICT use in SMEs	234
C. Policies to support SMEs	235
1. Export promotion	235
2. Facilitating trade	236
3. Foreign investment	236
D. Special measures to bridge the digital divide	236
1. COMPARTEL	236
2. Telecentros	236
V. Conclusion	237
Recommendations	238
References	240

EL SALVADOR	
I.	INTRODUCTION 243
II.	PRESENT STATUS OF INFORMATION TECHNOLOGY IN THE SALVADORAN MARKET, AND ITS USE BY SMEs 243
	A. MARKET ASSESSMENT 243
	B. Penetration of IT and E-Commerce Among SMEs 245
III.	DEVELOPMENT OF SMEs WITHIN THE IT REVOLUTION 245
	A. Overview of the relative importance of SMEs in the overall economy 245
	B. Case studies on the use of e-Commerce and supply chain management (SCM) in selected industries 246
	1. CASE STUDY: HealthCo Products Company 247
	2. CASE STUDY: Software Alliance Company 249
	C. Problems SMEs face in participating in the trade-oriented value chain 251
IV.	GOVERNMENT POLICIES DESIGNED FOR SMEs, IT, AND INTERNATIONAL TRADE 252
	A. IT policies in the country’s overall development strategy 252
	B. Policies to support SMEs 252
	1. Export promotion 252
	2. Trade facilitation 253
	3. FDI promotion 254
	4. Business promotion 254
	C. Special measures to correct the “digital divide” between companies 254
	1. Human resources 254
	2. Technical aspect 254
	3. Financial aspects 254
	4. Infocentres 255
	5. Others 255
	D. E-Government targeted to SMEs and trade promotion 255
	1. Overall strategy/structure of e-government 255
	2. Some applications 256
	E. Institutional Issues 257
	1. Legal and institutional framework 257
	2. E - government 257
	3. Industry and commerce 257
	4. Development of human resources 257
	5. ICT infrastructure 257
V.	REGIONAL NETWORKS 258
VI.	CONCLUSIONS AND RECOMMENDATIONS 258
	A. Conclusions 258
	B. Recommendations 259
	References 260
MEXICO	
I.	Introduction 263
II.	The current IT market and IT use by SMEs 263
	A. Market Estimates 263
	B. IT penetration and E-commerce among SMEs 266
III.	SME development in the IT revolution 267
	A. Overview of the importance of SMEs for the overall economy 267
	B. Case studies on E-commerce and SCM in selected industries 269
	1. Infocentre of the Quintana Roo Hotel Association 269
	2. CEMEX 273
	3. FreightMinds 274
	C. Problems encountered by SMEs in participating in export-oriented value chains 275
IV.	Government policies to promote SMEs, IT, and foreign trade 276
	A. IT policies in the country’s development strategy 276
	B. Policies to support SMEs 277
	1. Export promotion 277
	2. Trade facilitation 277
	3. FDI promotion 278

4.	Business promotion	278
5.	Mexican immigrant nostalgia market	278
C.	Special measures to narrow the digital divide	279
D.	E-government initiatives to promote SMEs and trade	281
E.	Institutional Issues	282
V.	Regional networks	284
VI.	Conclusions and recommendations	285
	References	288
PERU		
I.	Introduction	291
II.	The current situation in the IT Market and IT use by SMEs	291
A.	Market Estimates	291
B.	ICT USE BY PERUVIAN ENTERPRISES	292
III.	SME development in the IT revolution	293
A.	Overview of the relative importance of SMEs in the overall economy	293
B.	Case Studies	295
1.	Gamarra Textile Cluster	295
2.	EXPORTIMO S.A.C. (Wood Sector)	298
3.	Case of Export Promotion: www.perumarketplaces.com at PROMPEX	299
C.	Problems for SMEs participating in the trade-oriented value-chain	300
IV.	Government policies designed for SMEs, IT and international trade	301
A.	IT policies in the country's overall development strategy	301
B.	Policies to support SMEs	301
C.	Policies and strategies for the development of human skills	304
D.	E-government aimed at SMEs and trade promotion	307
V.	Conclusion and recommendation	308
1.	Lessons learned on IT and information usage by SMEs	308
2.	Policy and measures for SMEs and trade	309
3.	Policy for promoting e-commerce	310
	References	314
CHINA		
I.	Introduction	317
II.	The current IT market and IT use by SMEs	318
A.	Market data	318
B.	IT use by firms	319
III.	SME development in the IT revolution	323
A.	An overview of the role of SMEs in Chinese industry	323
B.	Case studies on use of e-commerce and SCM in various industries	326
1.	Xinmin Textile Technology	327
2.	Software export cluster in Hangzhou	328
3.	The case of Cixi electronics firms	330
4.	The case of the Ningbo electronics cluster	331
5.	The case of Suzhou IT firms	331
6.	The case of Shanghai Guochi Import & Export	333
IV.	Government policies vis-à-vis SMEs, IT and international trade	334
A.	IT POLICIES IN CHINA'S DEVELOPMENT STRATEGY	335
B.	Policies to support SMEs	336
1.	Export promotion	336
2.	Trade facilitation	336
3.	FDI promotion	337
4.	Growth of small high-tech firm	337
C.	Special measures to bridge the digital divide among companies	338
1.	Growth in the supply of human resources	338
2.	Technical assistance	339
3.	Financial-support packages	339
4.	SMEs development centres	339
D.	E-Government for SMEs and trade promotion	340

E.	Spread of public key infrastructures	340
F.	Policy recommendations	341
V.	Conclusions and recommendation	342
1.	Maintaining a balance between hardware purchases and software development	342
2.	Additional government efforts to encourage the transition to an information society	342
3.	Effect of SME-export-promotion policies	343
4.	Elimination of institutional barriers in e-commerce	343
5.	Raising the skills of SME human resources	343
References	344
 JAPAN		
I.	Introduction	345
II.	The current IT market and IT use by SMEs	346
1.	Current use of IT by SMEs	346
2.	E-commerce and SMEs	347
3.	Supply chain management as practised by SMEs	347
III.	SME Development in the IT Revolution	348
A.	The role of SMEs in the Japanese economy	348
B.	Case studies on IT use in two SME clusters: Higashi-Osaka and Ohta Ward	348
1.	Description of the selected SME clusters: “Horizontal” and “Vertical”	348
2.	IT usage in the two clusters	349
3.	Comparison of IT usage in the two clusters	349
4.	Policy recommendations	353
C.	Empirical analysis of factors that encourage IT use, based on survey data	353
1.	Factors that affect IT use and development	353
2.	Indices of IT development	355
3.	Estimation models	356
4.	Summary of the estimations	356
5.	Problems of IT use identified based on empirical research	357
5.1.	Classification of SMEs by development of IT	357
5.2.	Obstacles, and the degree of IT development	358
5.3.	Policies advantageous to IT use as suggested by empirical research	358
D.	Case study: Dan, an SME supply chain that promotes exports	359
1.	Profile of the firm	359
2.	Supply chain	359
3.	Overseas shops and international supply chain	360
IV.	Government IT policies vis-à-vis SMEs	361
A.	IT policies within Japan’s overall development strategy	361
B.	Policies to support SMEs	361
1.	Export promotion	361
2.	Trade Facilitation	361
3.	FDI promotion	361
4.	Business promotion	362
C.	Special measures to narrow the digital divide between companies	362
1.	Human resources	362
2.	Technical issues	363
3.	Financial aspects	363
4.	Infocentres	363
D.	E-Government initiatives vis-à-vis SMEs and trade promotion	363
1.	Overall strategy and structure of e-government	363
2.	Some applications	363
E.	Institutional issues	364
1.	Standardization	364
2.	Public key-enabled security services	365
3.	Intellectual property rights	365
V.	Regional networks	365
A.	Existing regional networks	365
1.	Nationwide networks	366
2.	Regional networks	366
B.	Networks under development	369

1. Government	369
2. Local governments	369
3. Cooperation among industry, government and academia	369
C. Possibility of interregional linkages	370
1. National matching sites	370
2. Supply chain management	370
VI. Final remarks	370
References	373

REPUBLIC OF KOREA

I. Introduction	375
II. Present Status of IT Market and IT Usage by SMEs	375
A. IT Industry and Markets in Korea	375
B. E-business	378
III. Development of SMEs within the IT Revolution	381
A. Overview of the Relative Importance of SMEs in the Overall Economy	381
B. Case Study on Usage of e-commerce and Supply Chain Management (SCM) in Selected Industries	384
1. Pattern One: Partnership between Large Firms and SMEs	384
2. Pattern Two: Cooperation and Networking among SMEs	386
3. Pattern Three: Support Services. Cases of Tpage and Handysoft	388
C. Problems SMEs Face in Participating in the Trade-Oriented Value Chain	391
IV. Government Policies Designed for SMEs, IT, and International Trade	392
A. IT policies in the country's overall development strategy	392
B. Policies in Support of SMEs	394
C. Special Measures to Correct the 'Digital Divide' between Companies	399
1. Human Resources	399
2. Technical Aspects	400
3. Financial Aspects	400
4. Infocenters	400
D. E-Government Aimed at SMEs and Trade Promotion	401
1. Overall Strategy/Structure of e-Government	401
2. Some Applications	401
E. Institutional Issues	402
1. Standardisation, such as Codes for EDI and Cryptography	402
2. Key Public Infrastructures	402
3. Intellectual Property Rights (IPRs)	402
4. Others	402
V. Conclusions and recommendations	403
References	404

SINGAPORE

I. Introduction	405
II. Present situation of IT market and IT usage by SMEs	405
A. Market Estimates	405
B. Penetration of IT and e-commerce by SMEs	405
III. SME development in the IT revolution	413
A. Overview of the relative importance of SMEs in the overall economy	413
B. Case studies on e-commerce and supply chain management (SCM) in selected industries	413
1. RichLand Logistics Services	413
2. Uniseal Waterproofing	415
IV. Government policies designed for SMEs, IT, and international trade	417
A. Policies to support SMEs	417
1. Overall policy direction for SMEs and entrepreneurship in Singapore	417
2. Organizations involved in supporting SMEs and entrepreneurship in Singapore	419
3. Specific programs supporting entrepreneurship in Singapore	420
B. Special measures to correct the 'digital divide' among companies	421
C. E-Government aimed at SMEs and trade promotion	422
V. Conclusions and recommendations	423
References	425

THAILAND

I.	Introduction	427
II.	Present situation of IT market and IT usage by SMEs	428
	A. Use of IT in Thailand	428
	B. Participation of SMEs in IT	431
III.	SME Development in the IT Revolution	433
	A. Importance of SMEs in the Thai Economy	433
	B. Case studies	435
	1. Chatchawal Orchid Co., Ltd.	435
	2. Victor Packaging Co., Ltd.	436
	3. Nuntiya Care Stone Co., Ltd. (NCS Group)	437
IV.	Government policies	438
	A. IT policies	438
	1. IT-2000: The first national IT policy	438
	2. The impact of IT-2000	439
	3. From IT-2000 to IT-2010	440
	4. IT Master Plan (2002-2006)	441
	B. Policies in support of SMEs	442
	1. Ministry of Industry and the promotion of SMEs	442
	2. Institute for Small and Medium Enterprises Development (ISMED)	443
	3. Office of SMEs Promotion (OSMEP)	445
	4. SMEs Development Bank (SMEs Bank)	447
	5. Board of Investment Office (BOI)	448
V.	Conclusions and recommendations	449
	References	451

VIET NAM

I.	Introduction	453
II.	Present Situation of IT market and IT usage by SMEs	454
	1. ICT Penetration	454
	2. Use of IT by Government	455
	3. Usage of computers by small, private SMEs	455
	4. SMEs and e-commerce	458
III.	SME development in IT renovation	459
	A. Overview of the relative importance of SMEs in the overall economy	459
	B. CASE STUDIES ON THE USAGE OF E-COMMERCE	460
	1. VCCI and its website	460
	2. Vietrade and its website	464
IV.	Government policies designed for SMEs, IT, and international trade	466
	A. IT policies in the Viet Nam's overall development strategy	466
	1. Current IT policies	466
	2. Policies and strategies for future development	467
	B. Policies to support SMEs	468
	C. E-government aimed at SMEs and trade promotion	470
V.	Conclusion and Recommendations	472
	References	474

EXECUTIVE SUMMARY

Yasushi Ueki
Masatsugu Tsuji

This report is the product of a research project titled “Comparative Study on East Asian and Latin American Information Technology (IT) Industries”, carried out in 2004 and 2005 by the International Trade and Integration Division of the United Nations Economic Commission for Latin America and the Caribbean (ECLAC) in Santiago, Chile, in collaboration with the Institute of Developing Economies Japan External Trade Organization (IDE/JETRO) in Chiba, Japan. The project it was financed by the Thematic Trust Fund – Information and Communication Technology (ICT) for Development, United Nations Development Programme (UNDP), established by the Government of Japan.

The main purpose of the project was to study and document the experiences of IT usage by small- and medium-sized enterprises (SMEs) in Asia-Pacific and Latin America and to identify and analyze the policies, instruments and institutions created for SMEs digitalization having in mind the ultimate goal of: (i) enhancement of the intra- and inter-regional business ties in the IT-based supply chain in each Forum for East Asia - Latin America Cooperation (FEALAC) member country; (ii) development of SMEs through IT use; (iii) promotion of inter-regional cooperation between SMEs in the two regions; and (iv) reduction of poverty through development of SMEs.

This volume includes 13 country studies selected from FEALAC member countries – six from Asia (China, Japan, Republic of Korea, Singapore, Thailand, Viet Nam) and seven from Latin America (Argentina, Brazil, Chile, Colombia, El Salvador, Mexico and Peru) – which are summary reports of the background papers. Each country report addresses the following issues: i) SMEs’ contribution to the economy; ii) IT usage by SMEs; iii) case studies on development of IT and SMEs; and iv) government policies designed for SMEs, IT, and international trade. Before the writing of this report, the International Seminar “Information Technology for Development of Small- and Medium-sized Exporters in East Asia and Latin America” was held during November 23-24 at ECLAC, in which the commissioned and invited experts presented their study results, debated actively, and exchanged experiences and opinions regarding usage of IT for promoting international trade by SMEs.

We now present summaries of the current situations of informatization in these countries, policies adopted and institutions created to entrance IT informatization by SMEs, and policy suggestions that came out of the seminar.

Present IT Conditions

IT conditions at the country level

There is a clear correlation between income level and penetration ratios of IT products and services. The 13 surveyed countries include high-income nations such as Japan, the Republic of Korea and Singapore, and developing countries such as El Salvador, Thailand and Viet Nam. In accordance with this correlation, we can observe large gaps among the selected countries in IT diffusion at

the country level. The leading IT-diffused countries among the FEALAC members are Australia, Japan, Republic of Korea, New Zealand and Singapore. Cambodia, Laos and Myanmar, conversely, are the least-digitized countries.

Among the 13 countries, the penetration ratios of telecommunications services, PCs and Internet for Japan, Republic of Korea and Singapore are the highest in the FEALAC region and are a level similar to the OECD average. Those for Chile ranked fourth among the FEALAC and first in Latin America, although there are still large disparities between the ratios for Chile and OECD average levels. China has a massive number of IT consumers, but its diffusion rates remain at a low average level.

Informatization of Firms

It is difficult to make a strict cross-country comparison on informatization of SMEs by using official figures, due to differences in the definition of SMEs among countries and institutions as well as difference in the methods and timing of IT indicator measurements. Especially in less developed countries in Asia and Latin America, faithful government statistics are not always available. For these reasons, we were not able to carry out comparative studies on the present IT usages by SMEs in the researched countries. We could only overview the present states of IT usage by firms in the surveyed countries within the limits of data availability. The data we obtained were mainly furnished by governments, chambers of commerce, consultancy firms, and universities.

Penetration ratio of personal computers. Introduction of PCs by the corporate sector is entering into the mature phase in developed countries. Even in semi-developed countries, almost all of the large firms have installed PCs, even though there are large gaps in their adoption between micro and medium-sized enterprises.

Penetration ratio of the Internet. As with PC usage, almost all large firms in IT-developed and semi-advanced countries have introduced the Internet. The gap in adoption of the Internet is also observable between medium and small enterprises. The severer situations were observable in less-developed countries, where less than a quarter of the surveyed entrepreneurs access the Internet daily, and many of them utilize public Internet access. On the other hand, there is a significant difference in progress in the diffusion of broadband Internet, even among companies connected to the Internet.

Internet applications. E-mail and information collection are the two major intended purposes of Internet use. Websites are gaining importance as a medium to advertise companies and their products and services. Around 20-30% of SMEs have established websites in some semi-developed countries. Nevertheless, large gaps in website ownership exist among different sizes of firms and industrial sectors even in semi-developed countries. E-commerce is in the initial development stage and growing at a fast rate. B2B dominates and accounts for more than 90% of the total e-commerce transactions in many countries. A small number of large enterprises have adopted e-commerce. SMEs who use it still seem to be the exception.

Development of SMEs

Contribution of SMEs to National Economies

The definition of SMEs is not harmonized internationally. There may be differences in the definition between governmental affiliates even within a country. But based on our sources, SMEs account for more than 95% of firms in most of the surveyed economies. They create a significant amount of employment – 50 to 85% of the total. Compared to the significant importance of SMEs in terms of number of firms and employment, their contributions to production and value creation are moderate.

Internationalization of SMEs

Generally speaking, SMEs are domestic-oriented. The majority of their businesses are not nationwide, but rather focused on local and small niche markets. On the other hand, a small number of SMEs have succeeded in developing export markets and ground their competitiveness in their strong domestic bases. In addition, the export orientation of SMEs depends on industrial structure and cost competitiveness in their home countries. More Japanese and Korean SMEs have reoriented their business strategies from export to foreign direct investment to Asia as a result of the deterioration of manufacturing cost competitiveness in their parent countries.

Contributions to exports by SMEs are diversified among the studied countries. In comparison with Latin America, the Asian SMEs in the manufacturing sector seem to be more export-oriented. Data on small and medium-sized exporters (SMEXs) in three Latin American countries (Argentina, Brazil and Chile) clarify the present situation of internationalization of SMEs. The first is a high concentration of export value in larger firms. The second is that most exports by smaller firms are shipped to the neighboring countries in addition to the United States and Europe. The third is a higher level of technology incorporated in exported products.

Obstacles to Export for SMEs

Latin American SMEs do not participate in international markets as much as Asian firms. The studies in Latin American countries pointed out the main barriers to export as: (1) weakness in their firms' quality management, information management, marketing strategy, customer management, and so on; (2) lack of human capital and access to credit; (3) small production capacity insufficient to achieve economies of scale; (4) lack of access to information relating to markets, regulations, technical norms, and so forth in foreign countries; (5) high freight costs and complexity and slowness of trade-related procedures.

Key Findings from the Case Studies

Motives to introduce IT

ITs have long been considered effective tools to overcome obstacles for SMEs to facilitate international trade. The main objectives for private firms to introduce IT found in the case studies are, among others, to: (1) improve information access; (2) improve internal administrative management; (3) improve product management and quality control; (4) enhance productivity by improving internal management as listed above; (5) facilitate collaboration with other companies and seek economies of scale; and (6) acquire new business opportunities.

On the other hand, the main motives for public institutions to promote IT policies and introduce IT are to:

- (1) improve SMEs' competitiveness and develop industrial clusters
- (2) promote partnerships between large firms and SMEs, and among SMEs
- (3) decrease costs related to trade procedures for both the private and the public sectors
- (4) increase productivity and transparency of the public sector
- (5) facilitate implementations of trade promotion policies and trade agreements. The public sector is encouraged to utilize IT for two very different reasons:
 - (a) to implement their policies for economic and social, and national regional development more efficiently and effectively, and
 - (b) to improve their internal management.

Patterns of IT usage by SMEs

The SMEs and the public policy bodies examined in the case studies make use of IT applications mainly for the following purposes: corporate management and strategy; establishment and coordination of partnership between large and small firms; partnership among small firms; sector-specific services and policies; websites for information provision and business matching; public websites for trade promotion and facilitation; and adoption of IT in the non-IT sectors.

Business-matching services are expected to be a low-cost and convenient measure for SMEs to expand their customer bases. Such online marketing channels can partially substitute for offline ones. Some cases of SMEs that make contacts with a client successfully demonstrate that firms combine traditional marketing channels and IT effectively to build up relations of trust with their clients. Face-to-face contacts are fundamental as the first step, and trade fairs provide good opportunities for SMEs to encounter potential clients and reinforce bonds with existing clients. A few minutes of communication can be enough to attract persons met at a trade fair showroom to the SMEs' websites. These persons will then visit the websites to gain more information on the companies and their products. E-mails and other telecommunications methods are complementarily used to start deals and coordinate Supply Chain Management (SCM).

Barriers to diffusion of e-commerce, SCM and other e-transactions

Various impediments are responsible for the current limited use of e-transactions by SMEs. Among many potential users, there is a serious *lack of confidence in e-commerce*. For this reason, firms make complementary usage of video conference and other communication methods such as telephone, e-mail, and face-to-face communications. The second is related to a “*chicken and egg*” argument. A scarcity of IT administrative systems and a lack of experience make firms hesitate to utilize e-commerce and SCM and to fully digitize all of the administrative works related to business transactions. *High costs and fees to start e-commerce by utilizing e-marketplaces* are a severe hindrance, especially for SMEs that are incapable of developing their own IT systems. *Insufficient human resources and digital infrastructure* are always concerns when we discuss development of SMEs.

Prioritized Policy Areas

Improvement of access to information on international trade

There is an urgent need to develop IT infrastructure, especially in less developed countries. Among Internet users, information sharing, retrieval, and collection are the main uses of the Internet. Once firms obtain Internet access, they can benefit from these processes. “One-stop service” or establishment of a portal site is the best way to improve information access. What is important is to design the portal from the users' standpoint. A portal site specialized in a specific industry, or Vortal (Vertical Portal), is often useful.

Capacity Building

In order to utilize IT as a tool to promote international trade, capacity building is required in the fields of both IT and international trade. In order for an SME to introduce IT successfully, its management executives need to understand information on IT usage and its benefits, and share such information with their employees, in order to facilitate adoption and implementation of new management systems. On the other hand, trade-related tasks require not only comprehensive knowledge of overseas markets but also the enforcement capabilities to do business negotiation, acquire certificates of quality standards, and to process cumbersome procedures. Foreign language and business culture are also recognized as important areas of capacity building.

Formation of Virtual Clusters

Group cooperation among SMEs can be an effective scheme to foster export industry and promotion. It enables small firms to achieve scale economy and enhance bargaining power. These benefits make it feasible for SMEs to invest in IT and involve themselves in e-commerce.

In the Internet age, SMEs will be able to find business opportunities from forming Internet-based network-type business groups that are more flexible than traditional pyramidal supply chains composed of a large firm on top of the first- and lower-tier suppliers. With the network-type association based on the Internet, it is possible not only to network firms placed within an industrial accumulation but also to create a “virtual cluster” that links up with cooperative networks in different regions.

Trade Facilitation

Burdensome trade-related procedures are substantial barriers for SMEs to export their products. Inefficient handling of trade-related documents that are overseen by governmental departments raises the total cost of international trade.

Trade facilitation requires extensive countermeasures against these problems. The subjects to be examined are, for example: improvement of access to information on trade-related policies and regulations; simplification of trade-related procedures; mutual recognition of sanitary and phytosanitary measures; digitalization of trade-related procedures such as customs clearance, sanitary and phytosanitary measures, and certificates of origin; and establishment of “single window systems” that interconnect various computerized systems related to international trade and transportation.

Improvement of Infrastructure for E-business

Harmonization of business rules based on legal and dispute-settlement systems and common technical standards are required to facilitate international e-commerce. The governmental sector can provide SMEs with incentives and opportunities to gain experience with electronic transactions by computerizing tax collection, public procurement, and other public services.

Recommendations

Taking into consideration the results of the International Seminar and Country Studies, the first step toward promoting international cooperation between the FEALAC member states should be to establish a portal site or sites specialized in SMEs, international trade, and foreign investment. This site should include at least (1) files for communication of effective practices, case studies, and news and information related to SMEs; (2) lists of contact persons; and (3) links to institutions in charge of SMEs development and international trade and FDI promotion.

In order to deepen inter-regional integration in the medium and long term, the FEALAC member states should deal with issues identified through the research project to improve business infrastructure and supporting programs for SMEs. The study group recognized the following policy agenda to be discussed at a FEALAC working group: establishment of a network of researchers and research institutions to observe SMEs; business e-learning; formation of virtual clusters; building business telecommunications infrastructure; harmonization of the technological standards, industrial standards and authentication, IT security, and legal and regulation systems; and trade facilitation.

**INFORMATION TECHNOLOGY FOR DEVELOPMENT
OF SMALL AND MEDIUM-SIZED EXPORTERS
IN LATIN AMERICA AND EAST ASIA**

**PART I:
SUMMARY REPORT FOR THE RESEARCH
PROJECT**

RESULTS OF THE PROJECT

Masatsugu Tsuji
Yasushi Ueki
Rodrigo Cárcamo Olmos

1. BACKGROUNDS AND METHODOLOGY

Trade promotion, regional integration and development of an information society are increasing in importance as development policy issues for individual governments and for international society as well. These can be recognized as independent concerns as well as mutual ones. At any rate, information technologies (ITs) are enablers, promoters, and facilitators of international trade, regional integration and economic development.

Some Asian economies such as the Hong Kong Special Administrative Region, Japan, Republic of Korea, and Singapore, are well known as advanced countries in information and other high technologies. They lead the IT industry and have already developed world-class IT infrastructure. Developing countries in Asia such as China, Indonesia, Malaysia, Philippines, Thailand and Viet Nam are incorporated into intra-regional and global supply chains of IT products and services based on IT established by multinational firms, and encourage IT development policies in order to gain full benefits from the IT revolution. Stocks of well-trained engineers and experiences in the manufacturing sector are helping these countries to facilitate the adoption of IT in non-IT sectors. In addition, closer economic ties based on the existing industrial organization and IT infrastructure are being enhanced, as the governments in Asia-Pacific adopt policies toward bilateral and intra-regional free trade agreements (FTAs and RTAs).

In contrast to the IT situation in Asia-Pacific, the IT penetration ratio in Latin America is still low. For example, although Chile has developed one of the best IT environments in the region, the IT penetration indicators of Chile are inferior to those for IT-advanced Asian countries. Nevertheless, the revitalization of economic activities in Asia after the economic crisis in the second half of the 1990s provided Latin America with good business opportunities.

In fact, it is observed that Asian economies are increasing in importance for Latin American countries as export markets, especially for primary products and their processed goods, as well as suppliers of manufactured goods. In addition, Latin American countries believe that they can learn from Asian countries' successes in economic development, which are led by export promotion of high-tech products that include IT-related goods and services.

Although the present situation reflects the comparative advantages of each region, increase of international trade between the regions has had different effects among the various Latin American countries. Exporters of primary products such as petroleum and metallic minerals gain the largest benefits from increases in Asian demand for their products. In these sectors, the beneficiaries are mainly large and multinational firms in Brazil, Chile, Peru, Venezuela and so on. On the other hand, producers of light industry products and labor-intensive assemblies face serious competition from Asian countries such as China. This is the case with the textile industry in Central America, and with electronic appliances such as home electric appliances, audio-visual equipment

and computers in Mexico. The value chains of these products are composed of large and medium-sized enterprises.¹

Food-related products are very important export items not only for large and multinational firms but also for small and medium-sized enterprises (SMEs) in both Asian and Latin American countries. In this sense, the two regions are rivals mostly in the export markets of developed countries. Nonetheless, the difference in seasons between Northern and Southern hemispheres make it possible to establish a complementary relation between the regions. In addition, there is a possibility for them to create a cooperative framework for responding to food-related regulations imposed by developed countries, international standards established by international organizations, and consumer needs in export markets.

From the present situations mentioned above, we can identify at least two policy issues that are common to Asia-Pacific and Latin America. The first is how to develop a cooperative framework between the two regions in order to develop closer economic ties. Each region has already initiated political dialogues or cooperation in economic areas within the other, or between itself and Europe/United States, in accordance with its historical, cultural and economical background. As an intra-regional structure between the two, the Asia-Pacific Economic Cooperation (APEC) is the most established mechanism; however, only Chile, Peru and Mexico participate in it from Latin America. Blank areas for APEC in Latin America are filled by the Forum for East Asia-Latin America Cooperation (FEALAC),² which is a formal mechanism for dialogue and cooperation among 15 countries from Asia-Pacific and 17 countries from Latin America. In addition to the inter-and intra-regional cooperation, bilateral and regional free trade agreements (FTAs) are gaining momentum.

The second policy issue is how to make it possible for SMEs to reap the full benefits of globalization and FTAs. The increase in international trade between the two regions is one of the results of globalization driven by the multi-lateral trade system and diffusion of advanced IT. Globalization is often criticized as a phenomenon that widens the gaps between winners and losers, the rich and the poor, and large/multinational firms and SMEs.

As international trade between Asia-Pacific and Latin America, especially from Latin America to Asia, has expanded in recent years, FEALAC is increasing in importance in creating a closer linkage between the two regions. Latin American countries especially identify the Forum as an important channel to Asia-Pacific and an alternative to APEC for its non-member states, while Asia-Pacific countries find the potentials benefits from Latin America to be their unexplored markets and primary resource suppliers. In addition, as FEALAC is composed of 15 Asian-Pacific and 17 Latin American countries, most of which are developing countries, the Forum has a potential to be a platform for sharing issues and experiences common to developing countries, exploring a cooperative mechanism, and building a complementary relation based on each region's comparative advantages.

On the other hand, information technologies are identified by international society as a tool to solve these issues effectively and efficiently. The Declaration of Principles endorsed at the first phase of the World Summit on the Information Society (WSIS) held in Geneva from 10-12 December 2003 clarified that Information and Communication Technologies (ICT) are an important enabler of growth through efficiency gains and increased productivity, in particular for SMEs. It also spelled out that equitable distribution of the benefits from ICT-supported productivity gains and applied innovations across economic sectors contributes to poverty eradication and social development, and that policies that foster productive investment and enable

¹ Effects of China's increasing presence on Latin America were analyzed from the perspective of the impact of China's accession to World Trade Organization (WTO) by ECLAC (2004) *Latin America and the Caribbean in the World Economy, 2002-2003*, May 2004.

² Website of FEALAC (www.focalae.org).

firms (notably SMEs) to make the changes needed to seize the benefits from ICT, are likely to be the most beneficial.

Facing the situations mentioned above, FEALAC considers the development of SME exporters as one of its priorities, and IT as a key enabler to solving the trade obstacles faced by SMEs. However, there is still a severe lack of basic information on the current situation of SMEs, IT penetration to SMEs, the best practices of IT introduction for SMEs, and the results and evaluation of IT policies specifically focused on SMEs. To this end, analysis is required on the present situation of international trade and IT usage by SMEs and the sharing of business practices by SMEs. In addition, from the perspective of trade promotion by SMEs between Asia-Pacific and Latin America, a comparative study is helpful in order to: fulfill the knowledge gap on respective strengths and weaknesses of IT industry and IT usages by SMEs in the two regions; make business communities aware of the necessity of closer relations between SMEs in the two regions; and scrutinize the potential of IT as an instrument of trade promotion and industrial development for SMEs in the two regions. This report is the result of ECLAC's efforts to conduct such an analysis.

2. AN OVERVIEW OF THE FEALAC ECONOMY

As mentioned above, FEALAC is composed of 32 economies with a great diversity in terms of population, economic scale, geographic location, development stage, and so on, although the more populated and developed countries are concentrated in Asia-Pacific. It is estimated that more than 2.5 billion people, or 41% of world population (in 192 countries) live in FEALAC: 33% of world population lives in Asia-Pacific, and 8% in Latin America in 2002 (World Health Organization (WHO) estimates). This uneven distribution of population should be reflected in differences in economic scale and international trade between Asian-Pacific and Latin American FEALAC member states, even though the dynamics of economic activities will be affected by other factors.

Gross Domestic Product (GDP)

The total FEALAC GDP in current prices is estimated to be US\$ 9,252 billion for 2003, or more than one quarter of the world GDP, Asia-Pacific accounts for more than 20% of the world GDP, while Latin America contributes 4.6% of the total.³ In addition, the economy of the Forum was dynamic during the 1990s, although its sub-regions faced recessions and serious economic crises. From 1990 to 2003, world real GDP grew 1.36 fold in size. During the same period, that of FEALAC expanded 1.49 fold: 1.40 for Asia-Pacific and 1.39 for Latin America (table 1).

Even though the economies in Asia-Pacific and Latin America expanded at similar rates from 1990, Asia-Pacific countries grew faster from 1995 to 2003 and accomplished a remarkable recovery from the economic crises at the end of the 20th century. Nevertheless, the economy of Asia-Pacific has expanded at a slightly growth rate during 1995 and 2003 than world average and substantially faster than Latin America countries (table 1).

FEALAC includes both developed and developing countries with large differences in the size of economy, from Japan's US\$ 4,317 billion, China's US\$ 1,410, and Mexico's US\$ 615 billion in 2003, to Nicaragua's US\$ 4.1, Cambodia's US\$ 3.9 and Laos' US\$ 2.0 billion (U.N. estimates). In terms of per capita GDP in 2003, some FEALAC countries such as Japan (US\$ 33,819), are among the richest in the world, while others such as Cambodia (US\$ 278) are in the incipient stage of economic development (figure 1).

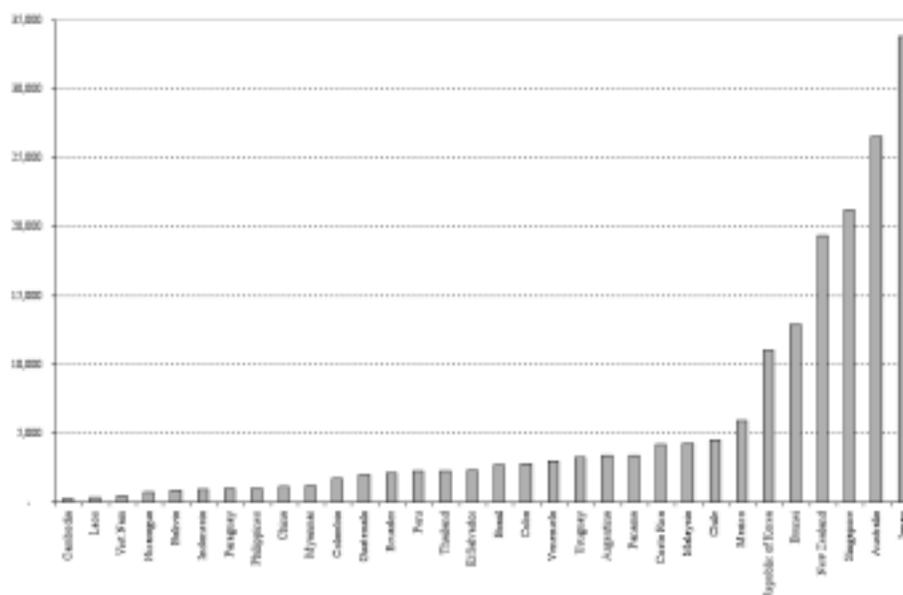
³ Japan's GDP accounted for 12% of the world total. Other major countries are: China (3.9%); Mexico (1.7%); Australia (1.5%); South Korea (1.5%); and Brazil (1.3%).

TABLE 1
GROSS DOMESTIC PRODUCTS IN FEALAC
(U.N. Estimates)

	GDP (current prices) in 2003		Real GDP Growth (in 1990 prices, US\$)		
	US\$ Billion	% of World	2003/1990	2003/1995	2003/2000
World	35,925	100.0%	1.36	1.25	1.07
FEALAC	9,252	25.8%	1.49	1.25	1.08
Asia-Pacific	7,584	21.1%	1.40	1.26	1.09
Latin America	1,668	4.6%	1.39	1.18	1.01

Source: United Nations Statistics Division (UNSD).

FIGURE 1
GDP PER CAPITA ESTIMATES 2003
(current prices, US\$)



Source: United Nations Statistics Division (UNSD).

International Trade⁴

The FEALAC countries are highly integrated into the international trading system. FEALAC accounted for 28% of world exports and 24% of imports in 2003. As the large countries are located in Asia, total exports from the Asian members occupied 22.8% of the world exports and 19.5% of the imports; Latin America made up 5.0% of exports and 4.3% of imports (table 2-(3)). Furthermore, trade originating from and destined for FEALAC has expanded faster than world trade (tables 2-(2), (3)).

The high percentages of trade in GDP in the member states reflect their high dependencies on international trade, and the sensitivity of their economies to it. Although those percentages tend to be smaller in large developed countries such as Australia, Japan and Brazil, the averages for FEALAC are much higher than for the world (figure 2). Countries involved strongly in international

⁴ Kuwayama, Mattos, and Contador (2000) and Kuwayama (2004) observed trades and foreign direct investments (FDIs) in Asia and Latin America from the perspective of south-south integration and cooperation.

trade are relatively smaller, have closer economic ties with their neighbors, and are active in intra-regional trades. These include most of the countries in Asia and Central America (figure 2).

TABLE 2
INTERNATIONAL TRADE IN THE WORLD AND FEALAC

(1) INTERNATIONAL TRADE VALUES (US\$ MILLION)

		World Trade		FEALAC				FEALAC ASIA				FEALAC Latin America			
				World	FEALAC	F-Asia	F-LA	World	FEALAC	F-Asia	F-LA	World	FEALAC	F-Asia	F-LA
Export	1990	3,225,448	721,039	228,329	199,919	28,410	604,275	201,591	188,758	12,832	116,764	26,738	11,160	15,578	
	1995	4,848,474	1,307,779	507,589	435,144	72,446	1,094,865	449,938	417,593	32,345	212,914	57,652	17,551	40,101	
	2000	6,173,384	1,734,501	613,355	523,565	89,790	1,395,377	546,784	506,479	40,305	339,124	66,571	17,086	49,485	
	2001	5,966,572	1,605,709	577,318	490,175	87,143	1,278,831	510,736	472,725	38,011	326,877	66,582	17,451	49,131	
	2002	6,092,285	1,642,427	585,127	507,417	77,710	1,316,042	523,597	488,668	34,928	326,385	61,530	18,749	42,781	
	2003	7,108,584	1,977,640	724,347	638,490	85,857	1,621,742	652,418	613,592	38,826	355,897	71,929	24,898	47,031	
Import	1990	3,336,437	655,660	240,678	210,058	30,619	565,493	217,962	202,237	15,726	90,167	22,715	7,822	14,894	
	1995	4,911,509	1,233,826	517,145	454,483	62,662	1,016,117	454,876	431,631	23,246	217,709	62,269	22,852	39,417	
	2000	6,361,226	1,553,735	658,888	581,502	77,385	1,210,562	567,029	543,796	23,233	343,173	91,859	37,707	54,152	
	2001	6,154,511	1,476,684	630,362	553,136	77,226	1,138,709	532,965	509,599	23,366	337,975	97,397	43,537	53,860	
	2002	6,257,048	1,461,160	641,944	571,548	70,396	1,152,268	551,738	527,703	24,035	308,892	90,206	43,845	46,361	
	2003	7,374,108	1,755,740	802,125	717,347	84,778	1,437,905	702,572	668,626	33,946	317,834	99,553	48,721	50,832	
Balance	1990		65,380	-12,349	-10,140	-2,209	38,782	-16,372	-13,478	-2,893	26,597	4,023	3,339	684	
	1995		73,953	-9,556	-19,339	9,783	78,748	-4,939	-14,038	9,099	-4,795	-4,617	-5,301	684	
	2000		180,766	-45,533	-57,937	12,404	184,815	-20,245	-37,317	17,072	-4,048	-25,288	-20,621	-4,667	
	2001		129,024	-53,044	-62,960	9,917	140,122	-22,229	-36,875	14,646	-11,098	-30,815	-26,086	-4,729	
	2002		181,267	-56,817	-64,130	7,314	163,774	-28,141	-39,034	10,893	17,493	-28,676	-25,096	-3,580	
	2003		221,900	-77,778	-78,857	1,078	183,837	-50,154	-55,034	4,880	38,063	-27,624	-23,823	-3,801	

Note 1: 28 FEALAC member states. F-Asia (Australia, Brunei Darussalam, China, Indonesia, Japan, Rep. of Korea, Lao People's Dem. Rep., Malaysia, New Zealand, Philippines, Singapore, Viet Nam, Thailand); F-LA (Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay, Venezuela). Figures for Hong Kong and Macao, are not included in those for China.

Note 2: Not available: (1990: Cuba, Viet Nam); (1995: Brunei, Cuba, Viet Nam); (2000: Brunei); (2002: Cuba, Thailand); (2003: Cuba, Paraguay, Viet Nam).

Source: UNSD, Commodity Trade Statistics Database (Comtrade).

(2) INTERNATIONAL TRADE GROWTH (1990 = 1)

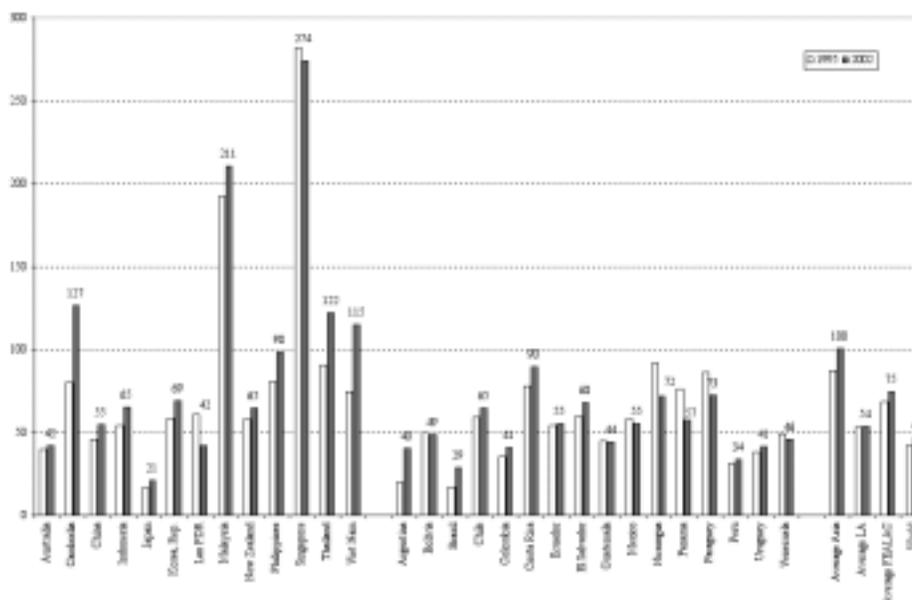
		World Trade		FEALAC				FEALAC ASIA				FEALAC Latin America			
				World	FEALAC	F-Asia	F-LA	World	FEALAC	F-Asia	F-LA	World	FEALAC	F-Asia	F-LA
Export	1990	1	1	1	1	1	1	1	1	1	1	1	1	1	
	1995	1.5	1.8	2.2	2.2	2.5	1.8	2.2	2.2	2.5	1.8	2.2	1.6	2.6	
	2000	1.9	2.4	2.7	2.6	3.2	2.3	2.7	2.7	3.1	2.9	2.5	1.5	3.2	
	2001	1.8	2.2	2.5	2.5	3.1	2.1	2.5	2.5	3.0	2.8	2.5	1.6	3.2	
	2002	1.9	2.3	2.6	2.5	2.7	2.2	2.6	2.6	2.7	2.8	2.3	1.7	2.7	
	2003	2.2	2.7	3.2	3.2	3.0	2.7	3.2	3.3	3.0	3.0	2.7	2.2	3.0	
Import	1990	1	1	1	1	1	1	1	1	1	1	1	1	1	
	1995	1.5	1.9	2.1	2.2	2.0	1.8	2.1	2.1	1.5	2.4	2.7	2.9	2.6	
	2000	1.9	2.4	2.7	2.8	2.5	2.1	2.6	2.7	1.5	3.8	4.0	4.8	3.6	
	2001	1.8	2.3	2.6	2.6	2.5	2.0	2.4	2.5	1.5	3.7	4.3	5.6	3.6	
	2002	1.9	2.2	2.7	2.7	2.3	2.0	2.5	2.6	1.5	3.4	4.0	5.6	3.1	
	2003	2.2	2.7	3.3	3.4	2.8	2.5	3.2	3.3	2.2	3.5	4.4	6.2	3.4	

TABLE 2 (continued)
(3) SHARES OF FEALAC'S INTERNATIONAL TRADE

		F-World/ World Trade	F-FEALAC/ World Trade	F-Asia-W/ World Trade	F-LA-W/ World Trade	FEALAC -World = 100			FEALAC ASIA-World = 100			FEALAC LA-World = 100					
						World	FEALAC	ASIA	F-LA	World	FEALAC	ASIA	F-LA	World	FEALAC	ASIA	F-LA
Export	1990	22.4%	7.1%	18.7%	3.6%	100%	31.7%	27.7%	3.9%	100%	33.4%	31.2%	2.1%	100%	22.9%	9.6%	13.3%
	1995	27.0%	10.5%	22.6%	4.4%	100%	38.8%	33.3%	5.5%	100%	41.1%	38.1%	3.0%	100%	27.1%	8.2%	18.8%
	2000	28.1%	9.9%	22.6%	5.5%	100%	35.4%	30.2%	5.2%	100%	39.2%	36.3%	2.9%	100%	19.6%	5.0%	14.6%
	2001	26.9%	9.7%	21.4%	5.5%	100%	36.0%	30.5%	5.4%	100%	39.9%	37.0%	3.0%	100%	20.4%	5.3%	15.0%
	2002	27.0%	9.6%	21.6%	5.4%	100%	35.6%	30.9%	4.7%	100%	39.8%	37.1%	2.7%	100%	18.9%	5.7%	13.1%
	2003	27.8%	10.2%	22.8%	5.0%	100%	36.6%	32.3%	4.3%	100%	40.2%	37.8%	2.4%	100%	20.2%	7.0%	13.2%
Import	1990	19.7%	7.2%	16.9%	2.7%	100%	36.7%	32.0%	4.7%	100%	38.5%	35.8%	2.8%	100%	25.2%	8.7%	16.5%
	1995	25.1%	10.5%	20.7%	4.4%	100%	41.9%	36.8%	5.1%	100%	44.8%	42.5%	2.3%	100%	28.6%	10.5%	18.1%
	2000	24.4%	10.4%	19.0%	5.4%	100%	42.4%	37.4%	5.0%	100%	46.8%	44.9%	1.9%	100%	26.8%	11.0%	15.8%
	2001	24.0%	10.2%	18.5%	5.5%	100%	42.7%	37.5%	5.2%	100%	46.8%	44.8%	2.1%	100%	28.8%	12.9%	15.9%
	2002	23.4%	10.3%	18.4%	4.9%	100%	43.9%	39.1%	4.8%	100%	47.9%	45.8%	2.1%	100%	29.2%	14.2%	15.0%
	2003	23.8%	10.9%	19.5%	4.3%	100%	45.7%	40.9%	4.8%	100%	48.9%	46.5%	2.4%	100%	31.3%	15.3%	16.0%

Note: F-World (FEALAC Export to/ Import from the World), F-FEALAC (Intra-FEALAC Trade), F-Asia-W (FEALAC Asia's Export to/ Import from the World), F-LA-W (FEALAC Latin America's Export to/ Import from the World).

FIGURE 2
TRADE (% OF GDP) IN 1995 AND 2002



Note: Laos (2002), Singapore (1995, 2002) (% of GNP). Data labels for 2002.

Source: World Bank, World Development Indicators (WDI), Asian Development Bank (ADB) (Laos, Singapore).

The importance of trade development is evident when observing the recovery process from the recent sharp recessions experienced around the years 1997-1999 in both regions. Asia, which accomplished rapid recoveries, maintained and increased both inter-and intra-regional exports/imports; exports and imports by Latin America, which followed a more moderate recovery process, stagnated in 2001. The negative effect of the recession had a significant impact on intra-regional trade in Latin America.

Intra-regional trade plays an important role in each region, but especially in Asia. In 2003, 37.8% of exports from and 45% of imports to FEALAC Asia were intra-regional. These numbers have increased considerably since 1990. In contrast to the situation in Asia, intra-regional trade in

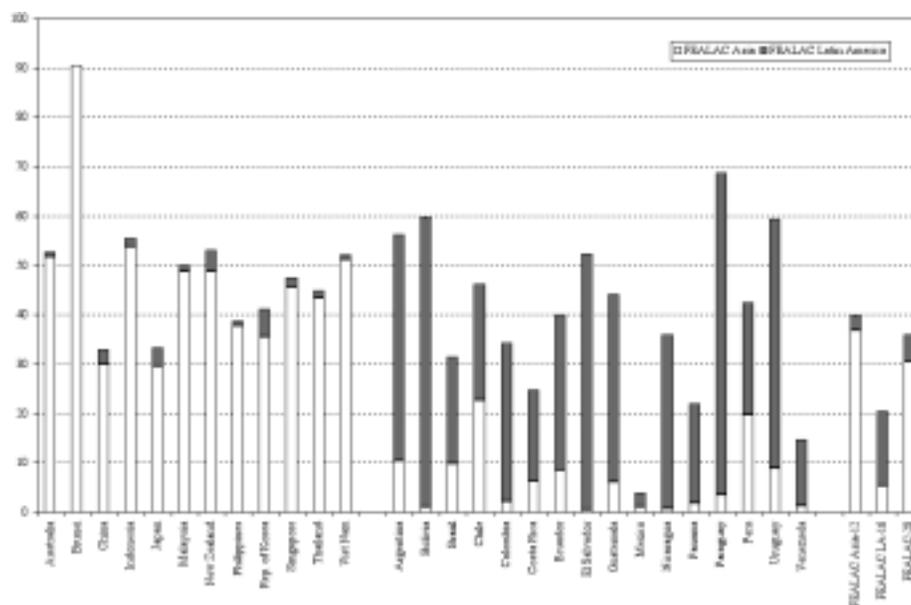
FEALAC Latin America is moderate. Less than 15% of that region's exports and 16% of its imports were intra-regional in 2003; those figures are almost as the same as those for 1990. By contrast, the percentages of Latin America's imports from Asia have expanded from 8.7% in 1990 to 15.3% in 2003, reaching the same level as the intra-regional values (table 2).

As shown in figure 3 and 4, there are marked differences in the importance of inter-regional trade at the country level. In summary, inter-regional exports and imports are important for Latin America, especially South American countries such as Argentina, Brazil, Chile, Ecuador, Peru, and Uruguay, while those Asia account for a lesser portion of total trade.

By products classified by technology, Asia imports basically primary products more and more from Latin America and exports manufactured products. The percentage of high-tech product exports from Asia to the world increased by 10% from 1990 to 2003. During the same period, the percentage of primary product exports from Latin America to Asia has grown to represent more than half of the total exports to Asia. In addition, low-tech exports from Asia to Latin America also expanded in share (table 3).

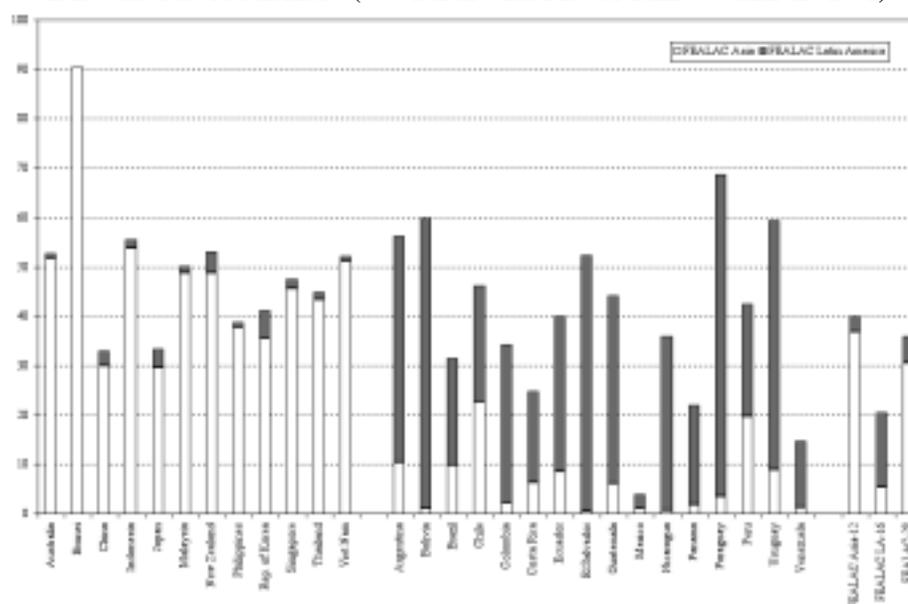
The high percentages for intra-regional exports of intermediate and high technology products in Asia may reflect intra-regional interdependence on the manufacturing sector. Although Latin American exports of high-tech products have increased in the 1990s, production bases are concentrated in Brazil, Costa Rica (location of Intel), and Mexico. In addition, the limited high tech exports coming from the production networks in Latin America go mainly to the regional and United States (U.S.) markets. One exception is Intel in Costa Rica, from which microprocessors are exported to IT product production centers such as China, Malaysia, the Philippines and Singapore. This company may account for a significant part of the increase in high-tech exports from Latin America to Asia.

FIGURE 3
EXPORT TO FEALAC (% OF EXPORT TO THE WORLD IN 2001)



Source: UNSD, Commodity Trade Statistics Database (Comtrade).

FIGURE 4
IMPORT FROM FEALAC (% OF IMPORT FROM THE WORLD IN 2001)



Source: UNSD, Commodity Trade Statistics Database (Comtrade).

TABLE 3
EXPORTS FROM FEALAC BY PRODUCT CATEGORY

Origin	Destination	Commodity Description	1990	1995	2000	2003	1990	1995	2000	2003
			(US\$ million)				(% of Total)			
FEALAC-Asia	FEALAC-Asia	Primary Products	42,205	49,400	61,681	66,300	22.6%	11.9%	12.2%	10.9%
		Manufactures based on NR	34,187	63,119	75,498	89,845	18.3%	15.2%	14.9%	14.7%
		Low Technology	25,060	61,205	68,989	83,196	13.4%	14.8%	13.6%	13.7%
		Intermediate Technology	51,667	122,400	123,406	162,174	27.6%	29.6%	24.4%	26.6%
		High Technology	29,244	104,688	163,393	190,780	15.6%	25.3%	32.3%	31.3%
		Others	4,630	13,157	13,096	17,131	2.5%	3.2%	2.6%	2.8%
		Total	186,993	413,969	506,062	609,426	100.0%	100.0%	100.0%	100.0%
FEALAC-LA	FEALAC-LA	Primary Products	824	1,104	1,086	1,631	6.5%	3.4%	2.7%	4.2%
		Manufactures based on NR	957	1,355	3,273	3,056	7.5%	4.2%	8.1%	7.9%
		Low Technology	1,412	3,555	6,201	6,680	11.1%	11.0%	15.4%	17.2%
		Intermediate Technology	6,987	19,997	20,647	18,198	55.1%	62.0%	51.2%	46.9%
		High Technology	2,370	5,700	8,811	7,841	18.7%	17.7%	21.9%	20.2%
		Others	138	553	280	1,363	1.1%	1.7%	0.7%	3.5%
Total	12,688	32,265	40,299	38,769	100.0%	100.0%	100.0%	100.0%		
World	World	Primary Products	74,281	85,816	104,242	110,829	12.3%	7.8%	7.5%	6.8%
		Manufactures based on NR	74,568	126,786	155,500	183,428	12.4%	11.6%	11.2%	11.3%
		Low Technology	98,644	178,181	219,521	266,557	16.3%	16.3%	15.7%	16.4%
		Intermediate Technology	214,046	359,466	422,202	500,818	35.5%	32.8%	30.3%	30.9%
		High Technology	127,438	312,287	459,546	512,041	21.1%	28.5%	33.0%	31.6%
		Others	14,430	31,853	32,890	47,302	2.4%	2.9%	2.4%	2.9%
Total	603,407	1,094,389	1,393,901	1,620,975	100.0%	100.0%	100.0%	100.0%		

TABLE 3 (continued)
EXPORTS FROM FEALAC BY PRODUCT CATEGORY

Origin	Destination	Commodity Description	1990	1995	2000	2003	1990	1995	2000	2003
			(US\$ million)				(% of Total)			
FEALAC-LA	FEALAC-Asia	Primary Products	5,163	7,490	9,069	12,819	46.3%	42.7%	53.1%	51.4%
		Manufactures based on NR	3,346	6,441	4,575	6,499	30.0%	36.7%	26.8%	26.1%
		Low Technology	845	1,108	704	1,370	7.6%	6.3%	4.1%	5.5%
		Intermediate Technology	1,603	2,228	1,517	3,042	14.4%	12.7%	8.9%	12.2%
		High Technology	169	250	1,194	1,165	1.5%	1.4%	7.0%	4.7%
		Others	34	34	27	36	0.3%	0.2%	0.2%	0.1%
	Total	11,160	17,551	17,086	24,931	100.0%	100.0%	100.0%	100.0%	
	FEALAC-LA	Primary Products	5,256	8,734	11,699	11,921	33.7%	21.8%	23.6%	24.9%
		Manufactures based on NR	3,469	11,067	12,291	11,493	22.3%	27.6%	24.8%	24.0%
		Low Technology	2,152	5,753	6,583	6,032	13.8%	14.3%	13.3%	12.6%
		Intermediate Technology	3,903	12,078	14,429	14,500	25.1%	30.1%	29.2%	30.3%
		High Technology	635	1,940	3,776	3,298	4.1%	4.8%	7.6%	6.9%
		Others	164	528	706	589	1.1%	1.3%	1.4%	1.2%
	Total	15,578	40,101	49,485	47,833	100.0%	100.0%	100.0%	100.0%	
	World	Primary Products	57,040	65,409	92,348	107,708	48.9%	30.7%	27.2%	30.2%
		Manufactures based on NR	25,354	47,950	56,521	56,559	21.7%	22.5%	16.7%	15.8%
		Low Technology	11,237	25,294	40,367	40,590	9.6%	11.9%	11.9%	11.4%
Intermediate Technology		18,691	51,514	87,063	91,768	16.0%	24.2%	25.7%	25.7%	
High Technology		3,036	19,047	57,676	53,677	2.6%	8.9%	17.0%	15.0%	
Others		1,407	3,700	5,148	6,839	1.2%	1.7%	1.5%	1.9%	
Total	116,764	212,914	339,124	357,139	100.0%	100.0%	100.0%	100.0%		
FEALAC	FEALAC	Primary Products	53,448	66,729	83,535	92,671	23.6%	13.2%	13.6%	12.9%
		Manufactures based on NR	41,960	81,983	95,638	110,892	18.5%	16.3%	15.6%	15.4%
		Low Technology	29,469	71,620	82,477	97,278	13.0%	14.2%	13.5%	13.5%
		Intermediate Technology	64,159	156,704	160,000	197,914	28.3%	31.1%	26.1%	27.5%
		High Technology	32,419	112,579	177,174	203,084	14.3%	22.3%	28.9%	28.2%
		Others	4,965	14,271	14,109	19,120	2.2%	2.8%	2.3%	2.7%
	Total	226,420	503,886	612,932	720,959	100.0%	100.0%	100.0%	100.0%	
	World	Primary Products	131,321	151,225	196,590	218,537	18.2%	11.6%	11.3%	11.0%
		Manufactures based on NR	99,922	174,736	212,021	239,987	13.9%	13.4%	12.2%	12.1%
		Low Technology	109,881	203,475	259,889	307,146	15.3%	15.6%	15.0%	15.5%
		Intermediate Technology	232,737	410,980	509,265	592,586	32.3%	31.4%	29.4%	30.0%
		High Technology	130,473	331,334	517,222	565,718	18.1%	25.3%	29.8%	28.6%
		Others	15,837	35,553	38,037	54,140	2.2%	2.7%	2.2%	2.7%
	Total	720,171	1,307,303	1,733,025	1,978,114	100.0%	100.0%	100.0%	100.0%	

Note: Product category is based on technology intensity classification developed by Lall (2000). NR (Natural Resources).

Source: UNSD, Comtrade.

Foreign Direct Investment (FDI)

As Kuwayama et al. (2000) points out, the considerable growth in world foreign direct investment (FDI) observed over the last twenty years, which happened in parallel with expansion of world trade, suggested existence of a “positive circle” between trade and FDI. Export-oriented FDI provoked by open markets seems to generate such positive relations.

Developing countries have been increasingly absorbing world FDI – about 30% of the world total, up from 25% in 1990 (table 4). In the 1970s, Latin America accounted for 40% of the FDI inflows into developing countries. In the second half of the 1990s, when national firms had been privatized, Latin America returned as one of the major choices for investors. Brazil and Mexico

have been important recipients of foreign investments; however, FDI inflows have recently increased in Argentina, Chile, Venezuela, and Colombia, together with small countries in Central America (table 5).

The dominant position of Latin America was replaced by Asia in the 1990s. FEALAC Asia received about half of the FDI flowing into developing countries in the first half of the 1990s, and more than 40% in the second half of the decade. Although that percentage dropped to 28.8% in 2000 after the Asian crises, it recovered quickly to 44.6% in 2002 (table 4). By country, FDI inflow into China accelerated from the first half of the 1990s and maintains its momentum in the new century. The semi-industrialized countries in the Association of Southeast Asian Nations (ASEAN) such as Indonesia, Malaysia, the Philippines, Thailand and Viet Nam gained more investment in the 1990s. In addition to the countries mentioned, developed countries such as Australia, Japan, New Zealand, Republic of Korea and Singapore are major FDI recipients.

A relatively newer phenomenon is the increase of FDI outflow from developing countries, especially South-South FDI (various issues of UNCTAD's World Investment Report). FDI outflows from developing countries as a percentage of the world total peaked in the mid-1990s, followed by a decrease to below 10% caused by the economic crises at the end of the 1990s. A leading investor is FEALAC Asia, which accounts for more than 25% of the total FDI flows originating from developing countries. Latin America is the second largest developing-country region in terms of investment, making up more than 10% of the total South-South FDI (table 4).

TABLE 4
FDI INFLOWS AND OUTFLOWS 1980-2003
(Billions of dollars)

	FDI Inflows (annual average)					FDI Outflows (annual average)				
	1970-79	1980-89	1990-94	1995-99	2000-03	1970-79	1980-89	1990-94	1995-99	2000-03
World (1)	24.1	93.9	204.0	598.0	861.0	28.3	93.3	234.8	603.1	779.3
Developing countries (2)	6.1	21.4	65.0	178.6	200.5	0.4	5.7	28.1	64.9	59.6
(1)=100	25.3%	22.7%	31.9%	29.9%	23.3%	1.3%	6.1%	12.0%	10.8%	7.6%
FEALAC-LA	2.5	6.2	15.6	58.3	55.0	0.1	0.7	2.9	8.5	7.1
(1)=100	10.2%	6.6%	7.6%	9.8%	6.4%	0.5%	0.8%	1.2%	1.4%	0.9%
(2)=100	40.3%	28.9%	24.0%	32.7%	27.5%	37.7%	12.7%	10.2%	13.1%	11.8%
FEALAC-Asia12	1.1	5.9	32.0	75.0	72.4	0.1	1.3	8.1	16.9	16.1
(1)=100	4.6%	6.3%	15.7%	12.5%	8.4%	0.2%	1.3%	3.5%	2.8%	2.1%
(2)=100	18.0%	27.5%	49.3%	42.0%	36.1%	17.4%	22.1%	28.9%	26.1%	27.0%

Note: FEALAC-Asia12 does not include Australia, Japan and New Zealand.

Source: UNCTAD FDI database.

TABLE 5
FDI INWARD TO FEALAC 1980-2003
(Billions of dollars)

	FDI Inflows (annual average)					Inward FDI Stock					% of World 2003
	1970-79	1980-89	1990-94	1995-99	2000-03	1980	1990	1995	2000	2003	
FEALAC Asia-Pacific 15	2.5	10.7	40.9	88.0	91.6	45.2	209.1	479.3	860.9	1,195.7	14.5%
Australia	1.0	3.7	5.5	6.9	9.7	13.2	73.6	95.9	108.7	174.2	2.1%
Brunei Darussalam	0.0	(0.0)	0.0	0.7	1.0	0.0	0.0	0.6	3.9	7.4	0.1%
Cambodia	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.4	1.5	1.9	0.0%
China	0.0	1.6	16.0	42.1	48.5	1.1	20.7	134.9	348.3	501.5	6.1%
Indonesia	0.2	0.3	1.7	2.6	(2.0)	10.3	38.9	50.6	60.6	57.2	0.7%
Japan	0.1	0.2	1.4	3.9	7.5	3.3	9.9	36.7	50.3	89.7	1.1%
Korea, Republic of	0.1	0.3	0.8	4.1	4.7	1.3	5.2	9.5	37.1	47.5	0.6%
Laos	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.5	0.6	0.0%
Malaysia	0.3	1.0	4.4	5.2	2.5	5.2	10.3	28.7	52.7	59.0	0.7%
Myanmar	0.0	0.0	0.2	0.6	0.2	0.0	0.3	1.2	3.9	4.4	0.1%
New Zealand	0.2	0.9	2.0	2.2	2.0	2.4	7.9	25.6	23.1	38.0	0.5%
Philippines	0.1	0.2	0.9	1.7	1.1	1.3	3.3	6.1	12.8	11.5	0.1%
Singapore	0.3	1.9	5.2	11.6	12.3	6.2	30.5	65.6	112.6	147.3	1.8%
Thailand	0.1	0.5	2.0	4.4	2.5	1.0	8.2	17.7	30.1	36.9	0.4%
Viet Nam	0.0	0.0	0.8	1.9	1.3	0.0	0.3	5.8	14.6	18.6	0.2%
FEALAC Latin America 17	2.5	6.2	15.6	58.3	55.0	41.6	95.2	161.5	396.6	486.7	5.9%
Argentina	0.1	0.6	3.0	10.6	3.5	5.3	8.8	28.0	67.6	35.1	0.4%
Bolivia	0.0	0.0	0.1	0.7	0.7	0.4	1.0	1.6	5.2	6.7	0.1%
Brazil	1.3	1.7	1.5	18.3	20.5	17.5	37.1	41.7	103.0	128.4	1.6%
Chile	0.1	0.4	1.2	5.3	3.5	0.9	10.1	15.5	45.4	46.8	0.6%
Colombia	0.1	0.5	0.8	2.8	2.2	1.1	3.5	6.4	10.9	19.1	0.2%
Costa Rica	0.0	0.1	0.2	0.5	0.5	0.7	1.4	2.7	5.2	6.9	0.1%
Cuba	(0.0)	0.0	0.0	0.0	(0.0)	(0.0)	0.0	0.0	0.1	0.1	0.0%
Ecuador	0.1	0.1	0.3	0.6	1.2	0.7	1.6	3.6	7.1	11.2	0.1%
El Salvador	0.0	0.0	0.0	0.3	0.2	0.2	0.2	0.3	2.0	2.6	0.0%
Guatemala	0.1	0.1	0.1	0.2	0.2	0.7	1.7	2.2	3.4	4.3	0.1%
Mexico	0.6	2.4	6.2	11.9	17.2	8.1	22.4	41.1	97.2	165.9	2.0%
Nicaragua	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.4	1.4	2.0	0.0%
Panama	0.1	(0.0)	0.2	0.8	0.5	2.5	2.2	3.2	6.7	8.1	0.1%
Paraguay	0.0	0.0	0.1	0.2	0.1	0.2	0.4	0.7	1.3	0.9	0.0%
Peru	0.0	0.0	0.8	2.4	1.4	0.9	1.3	5.5	11.1	12.7	0.2%
Uruguay	0.0	0.0	0.1	0.2	0.3	0.7	1.0	1.4	2.1	1.6	0.0%
Venezuela	(0.1)	0.2	0.8	3.4	2.9	1.6	2.3	7.0	26.9	34.2	0.4%
Developing countries	6.1	21.4	65.0	178.6	200.5	302.0	548.0	916.7	1,939.9	2,280.2	27.7%
World	24.1	93.9	204.0	598.0	861.0	692.7	1,950.3	2,992.1	6,089.9	8,245.1	100.0%

Source: UNCTAD FDI database.

Both North-South and South-South FDI have been motivated by push and pull factors. The push factors include: 1) increased competition, or limited growth opportunities in domestic markets; 2) efficiency-seeking following an erosion of export competitiveness, as well as tariff and non-tariff “barrier hopping” and; 3) procurement of raw materials. Major pull factors for FDI consist of: 1) low labor costs; 2) market access to both domestic and export markets; and 3) familiarity with the local business environment (e.g. through trading relations), geographic proximity, ethnic and cultural ties. Asymmetric information about foreign markets can increase costs of both FDI and international trade especially for relatively small companies (Aykut and Ratha, 2003, and UNCTAD, 2004).

Asian investors are encouraged by their growing capabilities, strong export orientation, and the need to access technology, brand names and strategic assets abroad. These are true of most of the major Asian investors. In addition, in case of China, the country hungers for access to natural resources in Asia and other regions, including Latin America. In Latin America, the largest FDI stocks are found in Mexico and Brazil, whose outward investments have fluctuated significantly, followed by Chile, Argentina and Venezuela (UNCTAD, 2004).

By sector, East Asia and Pacific countries have accumulated FDI mainly in the manufacturing sector; the percentage of the manufacturing for Latin America is much smaller (table 7). A similar pattern is observed among FEALAC member countries. This FDI distribution reflects differences in the comparative advantages of the two regions. At the same time, Latin America has not been involved in manufacturing supply chains.

TABLE 6
FDI OUTWARD FROM FEALAC 1980-2003
(Billions of dollars)

	FDI Outflows (annual average)					Outward FDI Stock					% of World 2003
	1970-79	1980-89	1990-94	1995-99	2000-03	1980	1990	1995	2000	2003	
FEALAC Asia-Pacific 15	1.9	18.0	37.3	44.6	58.0	26.6	254.3	376.0	522.2	661.1	8.1%
Australia	0.2	2.3	2.4	3.9	8.9	2.3	30.5	52.8	98.8	117.1	1.4%
Brunei Darussalam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0%
Cambodia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0%
China	0.0	0.4	2.4	2.2	3.0	0.0	2.5	15.8	25.8	37.0	0.5%
Indonesia	0.0	0.0	0.9	0.4	0.1	0.0	0.1	1.3	2.3	2.7	0.0%
Japan	1.6	14.0	25.8	23.8	32.7	19.6	201.4	238.5	278.4	335.5	4.1%
Korea, Republic of	0.0	0.4	1.5	4.3	3.4	0.1	2.3	10.2	26.8	34.5	0.4%
Laos	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.3	0.0%
Malaysia	0.0	0.2	0.8	2.2	1.4	0.2	2.7	11.0	21.3	29.7	0.4%
Myanmar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
New Zealand	0.0	0.4	0.9	(0.0)	0.2	0.5	6.4	7.6	7.2	8.7	0.1%
Philippines	0.0	0.0	0.2	0.1	(0.0)	0.2	0.2	1.2	1.6	1.0	0.0%
Singapore	0.1	0.2	2.1	7.0	7.9	3.7	7.8	35.0	56.8	90.9	1.1%
Thailand	0.0	0.0	0.2	0.6	0.2	0.0	0.4	2.3	2.6	3.3	0.0%
Viet Nam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
FEALAC Latin America 17	0.1	0.7	2.9	8.5	7.1	45.9	55.8	71.2	105.9	125.7	1.5%
Argentina	(0.0)	(0.0)	0.6	2.2	0.3	6.0	6.1	10.7	21.1	21.3	0.3%
Bolivia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Brazil	0.1	0.2	0.6	1.3	0.7	38.5	41.0	44.5	51.9	54.6	0.7%
Chile	0.0	0.0	0.4	1.5	1.8	0.0	0.2	2.4	11.2	13.8	0.2%
Colombia	0.0	0.0	0.1	0.5	0.5	0.1	0.4	1.0	3.0	3.5	0.0%
Costa Rica	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.0%
Cuba	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Ecuador	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.3	0.3	0.0%
El Salvador	0.0	(0.0)	(0.0)	0.0	(0.0)	0.0	0.1	0.1	0.1	0.1	0.0%
Guatemala	0.0	0.0	0.0	(0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Mexico	0.0	0.1	0.4	0.7	1.9	0.0	1.1	2.6	7.5	13.8	0.2%
Nicaragua	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
Panama	0.0	0.3	0.4	1.7	1.0	0.8	4.2	4.9	4.0	8.7	0.1%
Paraguay	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.0%
Peru	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.6	0.5	0.8	0.0%
Uruguay	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.3	0.0%
Venezuela	0.0	0.1	0.4	0.6	0.7	0.0	2.2	3.9	5.8	8.0	0.1%
Developing countries	0.4	5.7	28.1	64.9	59.6	60.2	128.6	308.6	793.3	858.7	10.5%
World	28.3	93.3	234.8	603.1	779.3	559.6	1,758.2	2,897.6	5,983.3	8,196.9	100.0%

Source: UNCTAD FDI database.

TABLE 7
SECTORAL COMPOSITION OF FDI STOCK IN DEVELOPING COUNTRIES IN 2002

	Primary	Manufacturing	Services
Developing Countries	14	39	47
Africa	53	19	29
East Asia & Pacific	5	62	34
Europe & Central Asia	58	33	9
Latin America & the Caribbean	18	27	54

Source: World Bank (2004).

**TABLE 8
INWARD FDI TO THE SEVEN FEALAC MEMBERS**

	Indonesia		Japan		Malaysia		Colombia		Chile		Mexico		Peru	
	1997-2004 approved US\$ million	% of Total	FY1989-2003 JPY100 million	% of Total	1999-2003 Approved Ringgit Malaysia	% of Total	1992-2003 Registered US\$ million	% of Total	1990-2004 US\$ million	% of Total	1994-2003 US\$ million	% of Total	Stock as of Dec 2004 US\$ million	% of Total
FEALAC ASIA TOTAL	76,754.2	62.1%	5,904	3.30%	39,950,592,582	51.1%	264.8	1.3%	3,813.1	7.1%	4,940.4	3.77%	563.5	4.4%
Australia	3,938.2	3.2%	245	0.14%	523,590,164	0.7%	34.1	0.2%	2,014.8	3.8%	57.1	0.04%	2.25	0.0%
Brunei	0.2	0.0%	30	0.02%	3,270,453,416	4.2%	7.3	0.0%	58.7	0.1%	54.9	0.04%	122.16	0.9%
China	6,606.2	5.3%	91	0.05%	233,633,747	0.3%	0.1	0.0%	0.9	0.0%	0.9	0.00%	102.15	0.8%
Indonesia	13,444.5	10.9%	26	0.01%	9,135,991,070	11.7%	199.1	1.0%	1,595.8	3.0%	3,476.1	2.66%	102.15	0.8%
Japan	3,810.2	3.1%	685	0.38%	3,277,601,546	4.2%	23.9	0.1%	36.5	0.1%	641.6	0.49%	39.44	0.3%
Korea, Republic of														
Laos			0	0.00%			0.0	0.0%	22.9	0.0%	1.0	0.00%		
Malaysia	6,868.9	5.6%	17	0.01%	1,770,000	0.0%	0.0	0.0%	79.9	0.1%	50.7	0.04%	6.85	0.1%
Myanmar	0.1	0.0%	0	0.00%	20,662,200	0.0%	0.0	0.0%			0.7	0.00%		
New Zealand	121.3	0.1%	43	0.02%	34,627,457	0.0%	(0.7)	0.0%	4.4	0.0%	640.3	0.49%	20	0.2%
Philippines	195.0	0.2%	8	0.00%	7,152,816,195	9.1%	0.0	0.0%			17.0	0.01%		
Singapore	10,756.5	8.7%	4,711	2.64%	356,454,808	0.5%	1.0	0.0%			0.1	0.00%		
Thailand	161.1	0.1%	5	0.00%	2,880,000	0.0%								
Viet Nam	0.6	0.0%												
FEALAC LATIN AMERICA	394	0.3%	474	0.27%	59,500,000	0.1%	2,686.2	12.9%	1,370.1	2.6%	981.8	0.75%	1,828.1	14.2%
Argentina	0.3	0.0%			16	0.01%	28.3	0.1%	471.4	0.9%	33.8	0.03%	63.23	0.5%
Bolivia			0	0.00%			0.8	0.0%	1.0	0.0%	0.2	0.00%	4.68	0.0%
Brazil	179.8	0.1%	9	0.00%			34.6	0.2%	211.5	0.4%	78.3	0.06%	17.41	0.1%
Chile			1	0.00%			215.6	1.0%			125.8	0.10%	613.79	4.8%
Colombia			0	0.00%			32.7	0.2%	22.3	0.0%	50.6	0.04%	192.44	1.5%
Costa Rica							0.2	0.0%	1.3	0.0%	20.0	0.02%		
Cuba							0.2	0.0%			3.5	0.00%		
Ecuador			0	0.00%			107.5	0.5%	1.2	0.0%	8.1	0.01%	40.57	0.3%
El Salvador							0.0	0.0%			2.8	0.00%		
Guatemala							0.8	0.0%			12.1	0.01%		
Mexico							371.6	1.8%	308.4	0.6%			36.79	0.3%
Nicaragua							0.2	0.0%			0.2	0.00%		
Panama			448	0.25%	59,500,000	0.1%	1,469.6	7.1%	121.4	0.2%	522.6	0.40%	706.26	5.5%
Paraguay	213.3	0.2%					1.9	0.0%	(0.1)	0.0%	1.8	0.00%		
Peru			0	0.00%			68.4	0.3%	22.0	0.0%	6.8	0.01%	142.74	1.1%
Uruguay							72.3	0.3%	87.5	0.2%	69.2	0.05%	10.23	0.1%
Venezuela							281.7	1.4%	122.1	0.2%	45.8	0.03%		
World Total	123,667.8	100.0%	178,654	100.0%	78,247,861,374	100.0%	20,837.5	100.0%	53,560.9	100.0%	130,920.7	100.0%	12,895.82	100.0%

Stocks registered as of Dec 2004

FDI Registered, not include Petroleum

FISCAL year accumulated

Excluding of Oil & Gas, Banking, Non Bank Financial Institution, Insurance and Leasing, Mining in Terms of Contracts or Work, Coal Mining in Terms of Agreement of Work, Investment which licenses issued by technical/sectoral agency, Portfolios as well as household investment.

Investment Coordinating Board, Indonesia

Secretariat of Economy, Mexico

Departamento Nacional de Planeación

Ministry of Finance, Japan

FISCAL year accumulated

Investment Coordinating Board, Indonesia

Foreign Investment Committee

Malaysian Industrial Development Authority

Ministry of Finance, Japan

FISCAL year accumulated

Investment Coordinating Board, Indonesia

Private Investment Promotion Agency

Secretariat of Economy, Mexico

Ministry of Finance, Japan

FISCAL year accumulated

Investment Coordinating Board, Indonesia

Note: This table was created based on FDI data classified by major investors for Indonesia, Malaysia and Peru. The figures do not necessarily include all of the investors at the country and regional level. Source: Produced by the Authors.

It is not easy to obtain thorough information on intra-FEALAC FDI, especially inter-regional FDI within FEALAC. This overview depends heavily on FDI inflows/outflows and stock data of a few selected member countries whose FDI data are available on websites.

Table 8 shows the small shares of both intra- and inter-regional FDI in the total intra-FEALAC FDI of the selected countries in Asia and Latin America, together with the relative importance of intra-regional FDI for developing countries such as Indonesia, Malaysia, Colombia and Peru. Sub-regional financial centers in Asia, such as Singapore and Hong Kong for Asia (studied by UNCTAD in 2004), and Panama and other tax heavens in the Caribbean, have been catalysts to promote intra-regional FDI. As is the case with international trade, Asia is a relatively important FDI source for Latin America, while Latin America is not an important source for Asia. One reason for this disparity is the large FDI contributions of the Asia-Pacific developed countries, namely, Japan, Australia, and New Zealand. Also, intra-regional FDI in Latin America remains small in comparison with developing Asia (table 8).

Intra and Inter-regional Integration

The closer trade and investment relations observed above have been facilitated or are complemented by political dialogues and harmonization of the trade and investment mechanisms based on bilateral and regional agreements.

Latin America has already established sub-regional agreements for integrating economies as well as bilateral agreements (table 9). Presently, the agreement network is expanding to the continental and hemisphere scales by conclusion of the Framework Agreement for the Creation of a Free Trade Area between the Andean Community (CAN) and Mercosur, and the on-going negotiation for the Free Trade Area of the Americas (FTAA).

In addition, more countries in the region have recently created FTAs with important trade partners from other regions such as the United States and European Union (EU). As a result, according to the estimates by ECLAC, countries in Latin America and the Caribbean have concluded 67 multilateral agreements that cover 62.5% of the total exports from the region. Reflecting the lesser importance of the intra-regional trade within Latin America, the figure for intra-regional trade decreased to 12% of the total exports, while that for inter-regional exports is 50.5%, although the number of intra-regional agreements is 33 and that of inter-regional is 34, respectively.

In contrast to Latin America, Asia-Pacific countries have been seeking a virtuous nexus between trade and investment to build intra-regional value chains in the manufacturing sector, which might result in closer economic ties within the Asia-Pacific region. For this reason, only 35 agreements, 24 of which are intra-regional, exist and 20.9% of the exports from Asia-Pacific region, which include non-FEALAC member states, go to the trade partners encompassed by the agreements. As a result of the relative high weight of intra-regional trade, exports to the countries that have signed the 24 intraregional agreements accounted for 19.1% of the total exports. The percentage for the 11 inter-regional ones is only 1.8%.

From the second half of the 1990s, the Asia-Pacific countries began putting more emphasis on bilateral and multilateral free trade agreements. Almost all of the semi-industrialized and developed countries in the region have started studies and negotiations to close FTAs with their neighbors. Greater attention to ASEAN by the large countries is also increasing the potential for the rapid increase of FTAs.

Contrary to the existing and predicted high-density linkage based on intra-regional FTAs, inter-regional FTAs are limited, but increasing in importance. The first inter-regional FTA within the FEALAC region was that between Chile and Republic of Korea that came into force in 2004. The Japan-Mexico Economic Partnership Agreement (EPA) was the second, and became effective in April 2005. Countries that are more enthusiastic about establishing inter-regional agreements are Australia, China, Japan, Republic of Korea and New Zealand from Asia, and Chile, Mexico, Peru and Panama from Latin America. The Summit Meeting of APEC held in Chile in 2004 provided strong momentum for inter-regional FTA negotiations.

Trade and FDI

Liberalization of trade and investment has decreased opportunities for barrier-hopping FDIs but increased opportunities for export-oriented ones. This has resulted in the formation of cross-border industrial clusters and increasing intra-regional trade, whose pattern should fundamentally depend on intra- and inter-regional divisions of labor derived from the international comparative advantage structure.

The observed relative unimportance of inter-regional trade and FDI reveals underdeveloped business opportunities. In the case of Latin America, even intra-regional trade and FDI have not yet been sufficiently developed, compared with Asia. In order to remove this disparity, governments can assist private firms. These firms are often located strategically to establish optimum specialization in accordance with the comparative advantages of the individual firm and country. Governments can, therefore, help these firms by promoting industrial development policies and research and development (R&D) activities, in parallel to improving business environments by fully utilizing the outcomes of multilateral, regional and bilateral trade negotiations or unilateral trade liberalization and investment efforts.

The nexus between trade and FDI can also be affected by broadly defined transaction costs that include transportation costs, as well as those caused by the administrative complexity in the FDI target country and communication with trading partners. On the other hand, companies must reduce costs and improve product quality, delivery and customer service in order to maintain good relationships with their clients in the increasingly globalized economy.

3. INFORMATION TECHNOLOGY IN THE GLOBALIZED ECONOMY

Facing with the importance of trade and FDI in the global economy, governments and the private sector have increasingly turned their attention to the development of electronic business (e-business). E-business, which is often divided into business-to-business (B2B), business-to-government (B2G), and business-to-consumer (B2C), is expected to reduce transaction costs, promote integration of the world economy, and create opportunities for developing new businesses in the technology sector.

The optimal strategy for e-business development involves various aspects that include initiatives for improving IT infrastructure and availability of IT for SMEs. The World Bank (2005) specified typical e-business initiatives as follows:

Awareness creation. Awareness of the benefits of ICT application among government, business and consumers can help to promote its growth. In this regard, B2G initiatives have a significant demonstrative role to play.

ICT infrastructure development. Increasing competition in the ICT infrastructure market, combined with initiatives for improving IT access in poor rural areas.

Human resource development. People's ability to effectively use ICT.

Legal infrastructure. A legal framework to build public and business trust in online transaction.

Macro-economic and financial infrastructure. Instruments should be put in place to ensure that e-business transactions can be completed and contracts honored, which involves areas as diverse as exchange rate policies, online payment regulation, or credit card infrastructure.

Logistical and trade infrastructure. Reliable domestic transport and delivery systems, as well as trade facilitation, customs efficiency, and port management services.

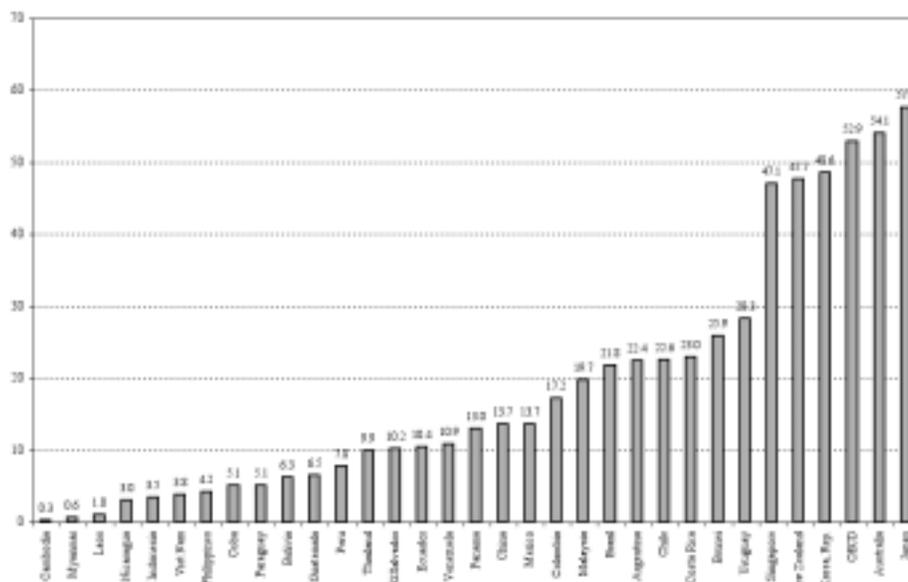
Promoting e-business among SMEs. Interventions may include ICT skills development, business incubation, and programs to increase access to financing.

Taking into consideration these components, we review some indicators related to the present situation of information technology and business environments.

(1) IT Infrastructure

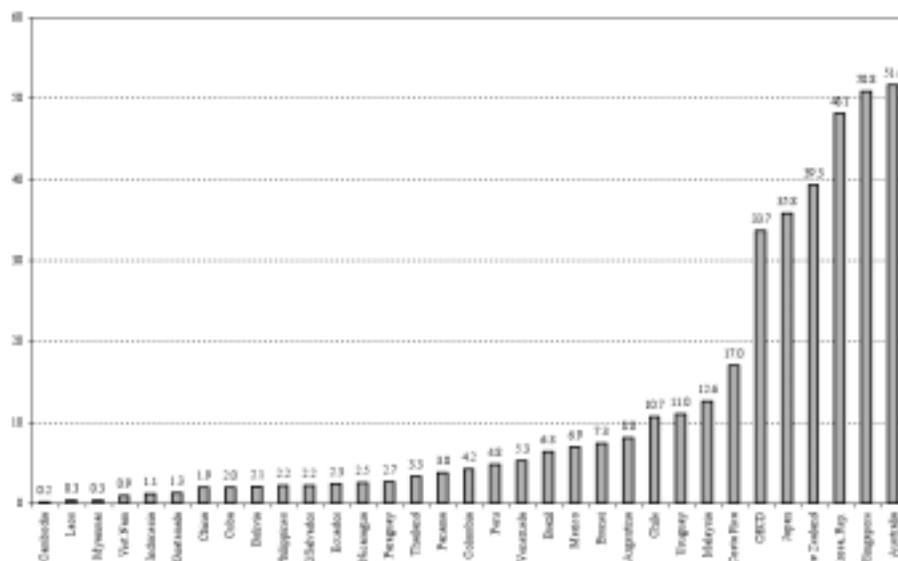
The figures below show clearly the gaps in the penetration rates of IT products and services between the top high-income group such as Australia, Japan, Republic of Korea, New Zealand and Singapore, and developing countries such as Bolivia, Cambodia, Laos, Nicaragua and Viet Nam (figures 5-8).

FIGURE 5
TELEPHONE MAIN LINES IN USE PER 100 INHABITANTS FOR 2001



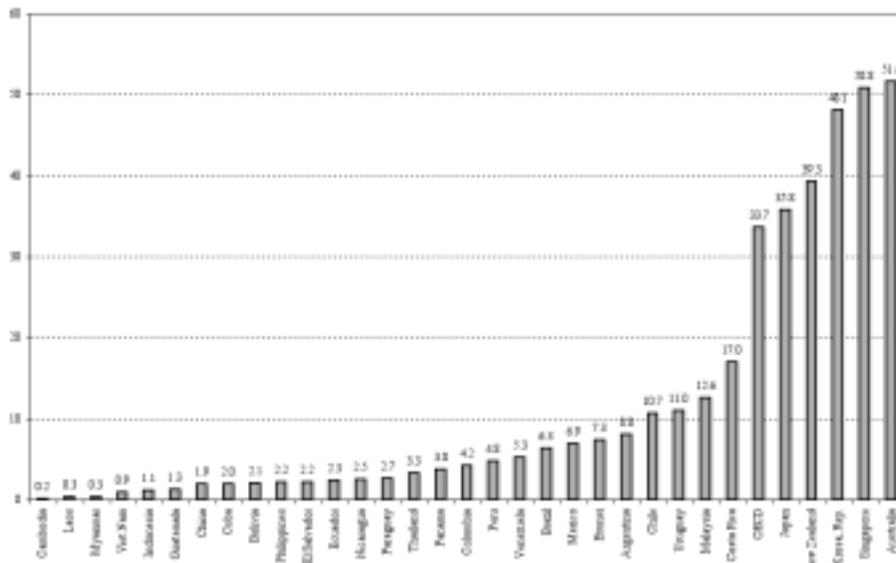
Source: International Telecommunications Union (ITU).

FIGURE 6
CELLULAR MOBILE TELEPHONE SUBSCRIBERS PER 100 INHABITANTS FOR 2001



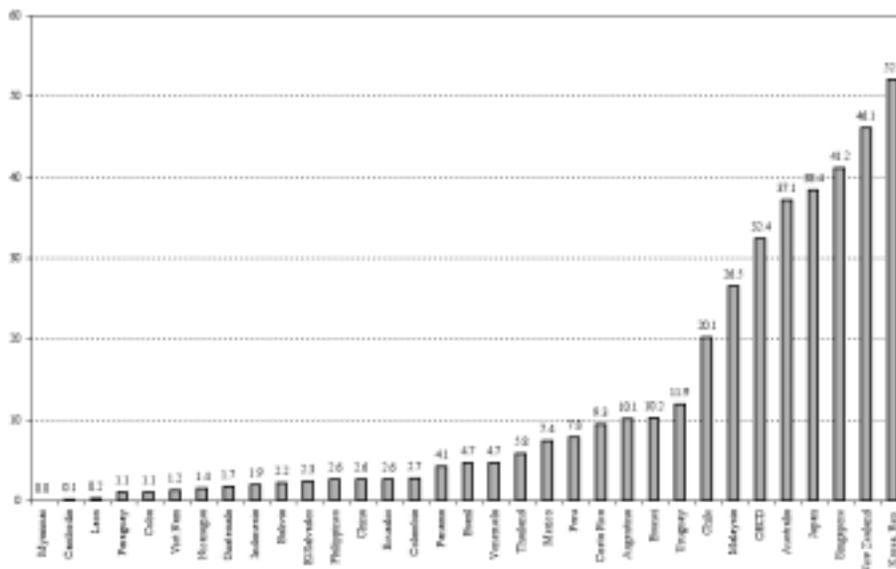
Source: International Telecommunications Union (ITU).

FIGURE 7
PERSONAL COMPUTERS PER 100 POPULATIONS FOR 2001



Source: International Telecommunications Union (ITU).

FIGURE 8
INTERNET USERS PER 100 POPULATIONS IN 2001



Source: International Telecommunications Union (ITU).

TABLE 10
LEVEL OF COMPETITION IN THE TELECOMMUNICATIONS SECTOR

Country	Local services	Domestic long dist	Intnl long dist	Data	Leased lines	Mobile digital	Cable TV	Internet services
Argentina(1)	C	C	C	C	C	C	C	C
Australia	C	C	C	C	C	C	C	C
Bolivia(2)	M	M	M	C	M	C	C	C
Brazil(1)	C	C	C	C	C	C	C	C
Brunei Darussalam	P	P	P	P	P	M		P
Cambodia(2)	P	P	P	P	P	P	P	P
Chile	P	C	C	C		C		C
China	P	P	P	P	P	P		
Colombia	P	C	C	C		P	C	C
Costa Rica	M	M	M	M	M	M	P	M
Cuba	M	M	M	M	M	M	P	C
Ecuador	M	M	M	C	C	P	C	C
El Salvador(1)	C	C	C	C	C	C	C	C
Guatemala(2)	C	M	C	C	C	C	C	C
Indonesia	P	P	P	C	C	C	C	C
Japan	C	C	C	C	C	C	C	C
Korea (Rep.)(1)	C	C	C	P	C	P	P	C
Lao P.D.R.(1)	P		M		M	C	M	C
Malaysia	C	C	C	C	C	C	C	C
Mexico	C	C	C	C	C	C	C	C
Myanmar	M	M	M	P	P	M		P
New Zealand	C	C	C	C	C	C	C	C
Nicaragua	M	M	M	C	C	C	C	C
Panama	C	C	C	C	M	P	P	C
Paraguay	M	M	M	C		C	C	C
Peru	C	C	C	C	C	C	C	C
Philippines(2)	C	C	C	C	C	C	C	C
Singapore	C		C	C	C	C	M	C
Thailand	P		M		C	P		C
Uruguay(1)	M	M	P	C	M	C	P	C
Venezuela(2)	C	C	C	C	C	C	C	C

Note 1: Key: M=Monopoly; D=Duopoly; P=Partial competition; C=Full competition

Note 2: (1)=2003 data; (2)=pre-2003 data

Source: ITU World Telecommunication Regulatory Database

The penetration ratios of telecommunications services, PCs and Internet for Japan, Republic of Korea and Singapore are at the highest level in the FEALAC region, and equivalent to the OECD average (arithmetic mean of the penetration ratios in the 30 OECD member states). Those for Chile ranked fourth in FEALAC and first in Latin America, although there are large disparities between the ratios for Chile and OECD levels. Peru's rankings for PC and Internet are relatively high in comparison with its low ranking for penetration of telecommunications services. China has a massive number of IT consumers, but diffusion rates in the country remain at a low average level.

Although the diffusion of IT depends on income level, regulatory environment in the telecommunications sector also plays a significant role. We have recognized that the penetration ratios remain low in some countries whose telecommunications markets are in situations of monopoly or restricted competition (table 10).

(2) Human Resources and Literacy

Human resources are fundamental to promoting IT usage, improving productivity of companies, and developing innovative products. Among the education indicators listed in table 11, literacy is almost indispensable to Internet use. The rate is relatively low in less-developed ASEAN countries such as Cambodia, Laos and Myanmar and El Salvador, Guatemala and Nicaragua in Central America. Although the youth literacy rates are higher than those for adults, these countries' literacy still remains lower than 90%, except in Myanmar, according to the estimates by UNESCO. Higher illiteracy rates will cause a deep-rooted digital gap, insoluble even in the middle term.

The secondary school enrollment ratios for Latin America have been estimated to exceed 50% except in Guatemala, and are higher than those for less-developed Asian countries. The rate for Cambodia is as the same as the tertiary school enrollment ratios for El Salvador. Similar tendencies to secondary education can be observed in the tertiary school enrolment ratios. In the developing countries, around 30% or less of the people proceed to tertiary school. The percentages in Latin America are much higher than Asia, where less than 10% of people in Cambodia, Laos and Viet Nam can achieve advanced education. The lack of well-educated workers will affect the speed with which the useful new tools of IT are absorbed into the social and business systems.

(3) Research and Development

Activities related to research and development (R&D) are closely linked with formation and reinforcing of countries' comparative advantages, and also one of the determinants of future trade and specialization patterns.

Table 11 provides a list of indicators related to resources put into R&D, alongside R&D results. The resources used for R&D are distributed unevenly in the world. The more developed FEALAC member states, led by Japan, Republic of Korea, Singapore and Australia, invested the largest percentages of their GDP in R&D, followed by medium income countries such as New Zealand, China and Brazil, and then by Malaysia, Chile and Cuba.

The number of researchers per million people reveals another reality. China alone accounts for more researchers than all of the Latin American countries excluding Argentina. As shown in table 12, China has the most researchers in FEALAC, and its gross expenditure on R&D, and its number of researchers is overwhelmingly large compared to Latin American countries. Nevertheless, the numbers for Brazil, Chile Cuba are higher than those for semi-industrialized Asian countries. One point of interest is Mexico's hunger for R&D capabilities. The country is a manufacturing base aimed at the U.S. market, but its R&D person per people is inferior to Malaysia and Thailand.

The indicators for R&D products may shed light on the expertise areas of the countries. From the number of scientific and technical journal articles published in the natural sciences, medicine, engineering/technology, and earth/space sciences. We found that researchers from Argentina, Brazil, Chile and Mexico have contributed appreciably to scientific fields. However patent applicants in Latin America are awarded mainly to outsiders, and R&D findings are not well combined with development of industrial products and services. Asian developing countries, in contrast, focus their R&D efforts more on practical areas that can result in creation of business opportunities.

TABLE 11
EDUCATION AND RESEARCH DEVELOPMENT INDICATORS

	Education			Research and Development				
	Literacy Rate (% of people ages 15 and above) /1 2000	School Enrollment, Secondary (% gross) /2,3 2000	School Enrollment, Tertiary (% gross) /2,4 2000	R&D Expenditure (% of GDP) 2000	Scientific and Technical Journal Articles 1999	Patent Applications, Total /6 2000	Patent Applications, Residents /6 2000	Researchers in R&D (per million people) /7 2000
Asia-Pacific 15								
Australia	160.7	63.2	1.54	15,186	80,721	10,367	3,445.9	
Brunei	87.3	12.1		20		<u>282.0</u>		
Cambodia	68.0	18.1	2.2		5			
China	90.9	68.2	12.7	1.00	16,197	122,306	25,592	550.5
Indonesia	86.8	56.8	14.4		172	60,363	0	
Japan	102.5	47.7	2.99	56,134	486,204	388,879	5,104.2	
Korea, Rep.	94.2	77.6	2.39	8,386	172,184	73,378	2,305.4	
Laos	64.8	37.6	3.2		2			
Malaysia	88.7	69.3	26.3	0.49	493	<u>6,451</u>	<u>179</u>	276.0
Myanmar	84.7	38.5	11.5		10			
New Zealand	112.4	69.2	1.16	2,927	67,938	2,266	<u>2,593.2</u>	
Philippines	92.6	77.1	30.5		187	3,636	154	
Singapore	92.5	99	45	1.91	1,984	62,471	0	4,139.6
Thailand	92.6	82.8	35.6	0.25	558	5,665	1,117	<u>289.5</u>
Viet Nam	<u>90.3</u>	67.1	9.7		112	59,776	35	
Latin America 17								
Argentina	96.8	96.7	52.2	0.44	2,705	6,634	0	737.0
Bolivia	85.4	80.0	36.7	0.29	33	<u>275</u>	<u>30</u>	71.2
Brazil	86.4	105.3	16.2	1.04	5,950	64,686	41	323.9
Chile	95.8	85.5	37.1	0.53	1,062	3,120	241	416.0
Colombia	91.6	69.8	23.1	0.18	254	1,799	75	100.2
Costa Rica	95.6	60.5	16.6	0.39	76	52,437	0	
Cuba	96.7	84.6	24.2	0.53	242	58,418	0	480.7
Ecuador	91.6	57.7		<u>0.08</u>	20	11	0	<u>84.2</u>
El Salvador	78.7	53.9	17.2	<u>0.01</u>	0	<u>245</u>	<u>28</u>	47.2
Guatemala	68.5	36.9		14	226	13		
Mexico	90.5	73.5	20.5	0.37	2,925	66,916	451	<u>259.1</u>
Nicaragua	66.5	54.0		<u>0.08</u>	8	<u>145</u>	<u>9</u>	<u>72.6</u>
Panama	91.9	67.1	<u>33.6</u>	0.38	37	160	7	100.2
Paraguay	93.3	59.9	15.8	0.08	4	<u>83</u>	<u>3</u>	<u>89.2</u>
Peru	89.9	<u>81.7</u>	<u>31.8</u>	0.11	60	<u>1,079</u>	<u>40</u>	<u>225.4</u>
Uruguay	97.6	98.0	36.6	0.24	159	616	44	277.5
Venezuela	92.5	66.0	22.9	0.33	523	2,348	56	194.0
World	79.1	70.2	23.9	2.18	633,669			

Note 1: Literacy Rate of Viet Nam (1999).

Note 2: Gross enrolment rate is defined by UNESCO as Enrolment at a given level of education, regardless of age, expressed as a percentage of the population in the theoretical school-age group corresponding to this level of education.

Note 3: School enrollment, secondary of Peru (1998).

Note 4: School enrollment, tertiary of Panama (1999), of Peru (2001, UNESCO).

Note 5: R&D Expenditure of Nicaragua (1997), Ecuador and El Salvador (1998), New Zealand and Paraguay (2001).

Note 6: Patent applications of Bolivia and El Salvador, Paraguay and Peru (Source: OAS), Malaysia (1997), Nicaragua (1999).

Note 7: Researchers in R&D of Nicaragua and Peru (1997), Ecuador (1998), Mexico, New Zealand, Paraguay and Thailand (2001), Brunei (2002).

Source: World Bank, WDI. Ministry of Education (Singapore for Enrollment Data), Organization of American States (OAS). UNESCO.

In Asian developed countries, the private sector plays a vital role in R&D. The R&D funds, classified by research type, are used mainly for experimental development,⁵ which is primarily run by enterprises. Most of the expenditures are financed by the corporate sector. In contrast, Latin American researchers are more dedicated to applied research depending on governmental resources. In addition, higher educational institutions take on the leading role. Based on this present situation, building a mechanism for technology transfer from universities to the private sector is a prioritized policy issue for Latin America, which should result in commercialization of R&D findings and increase in technology-based exports.

TABLE 12
R&D EXPENDITURES IN ASIA AND LATIN AMERICA

	Australia 2000	China		Japan 2002	South Korea 2003	Malaysia 2002	New Zealand 2001	Singapore 2002
Gross Expenditure on R&D (US\$ million)	5,997	10,819	15,556	124,027	16,002		605	
Gross ERD/GDP (%)	1.54	1.01	1.23	3.12	2.64	0.69	1.16	2.19**
Total R&D personnel (Full-Time Equivalent)	95,710	922,131	1,035,100	857,300	186,214	10,731	14,699	21,871
ERD by research type (%)								
Basic		5.2	5.7	15.0*	14.5	8.4		15**
Applied		17.0	19.2	22.8*	20.8	68.6		35**
Experimental Development		77.8	75.1	62.2*	64.7	23.0		50**
ERD by source of funds (%)								
Government	45.7	33.4		18.2	23.9	30.5	46.4	41.8
Enterprises	46.3	57.6		73.9	74.0	49.5	37.1	49.9
Foreign	3.3	2.7		0.4	0.4	11.5	6.6	7.2
Others	4.8	6.3		7.6	1.7	8.5	9.9	1.1
ERD by sector of performance (%)								
Government	22.9	31.5	27.3	9.5	12.6		33.2	13.2
Enterprises	47.5	60.0	61.2	74.4	76.1		36.5	61.4
Higher Education	26.8	8.6	10.1	13.9	10.1		30.3	25.4
Non profit private organizations	2.7		1.4	2.1	1.2			

Note: Expenditure on R&D (ERD), *Statistics Bureau of Japan, **Agency for Science, Technology and Research of Singapore.

Source: OECD, Statistics Bureau of Japan, Secyt (Argentina), Ministry of Science and Technology of China (data for 2002), MASTIC of Malaysia, Agency for Science, Technology and Research of Singapore.

⁵ R&D can be classified by different methodologies. The widely accepted OECD definition is as follows: The term R&D covers three activities: basic research, applied research and experimental development;... (omission)... **Basic research** is experimental or theoretical work undertaken primarily to acquire new knowledge of the underlying foundation of phenomena and observable facts, without any particular application or use in view. **Applied research** is also original investigation undertaken in order to acquire new knowledge. It is, however, directed primarily towards a specific practical aim or objective. **Experimental development** is systematic work, drawing on existing knowledge gained from research and/or practical experience, which is directed toward producing new materials, products or devices, to installing new processes, systems and services, or to improving substantially those already produced or installed (OECD, 2002, p.30).

TABLE 12 (continued)
R&D EXPENDITURES IN ASIA AND LATIN AMERICA

COUNTRY	Argentina 2003	Brazil 2000	Chile 2001	Colombia 2001	Mexico 2001	El Salvador 1998	Peru 1999
INDICATOR							
Gross Expenditure on R&D (US\$ million)	532	6,239	360	136	2,453	10	49
Gross ERD/GDP (%)	0.41	1.04	0.57	0.17	0.39	0.09	0.10
Total R&D personnel (Full-Time Equivalent)	39,393	157,384	11,173	4,383	44,085		
ERD by research type (%)							
Basic	25.6		55.3	24.0	34.5	58.8	38.3
Applied	46.9		32.1	47.0	40.2	31.8	48.3
Experimental Development	27.5		12.6	29.0	25.2	9.4	13.4
ERD by source of funds (%)							
Government	68.9	60.2	68.9	13.2	59.1	51.9	
Enterprises	26.3	38.2	24.9	46.9	29.8	1.2	
Foreign	1.4		4.1		1.3	23.4	
Non profit private organizations	3.5		2.1	1.7	0.8	10.4	
Higher Education		1.6	0.0	38.3	9.1	13.2	
ERD by sector of performance (%)							
Government	41.1	18.4	40.4	8.0	39.1		35.9
Enterprises	29.0	37.4	14.9	18.0	30.3		11.6
Higher Education	27.4	43.6	43.8	60.0	30.4		40.1
Non profit private organizations	2.5	0.6	0.9	14.0	0.2		12.4

Source: Secyt (Argentina), Network on Science and Technology Indicators (RICYT).

Asian manufacturing-based companies have concentrated their limited R&D resources into the manufacturing sector, especially automobile and IT manufacturing. In Republic of Korea, for example, 82.8% of business R&D expenditure was in the manufacturing sector in 2001; 47% of the total was spent on electrical and optical equipment, and 16.8% on transport equipment (OECD, 2004). Chinese businesses invested 53.7 billion yuan in R&D in 2000, 84.4% of which went to manufacturing. The leading Chinese R&D sectors were:

1. electronics and telecommunications, 20.1%
2. electronic equipment and machinery, 7.8%
3. transport equipment, 9.3%
4. raw chemical materials and chemical products, 7.2%

Malaysian R&D expenditure in 2002, by contrast, was led by:

1. motor vehicle manufacturing, 39.2%
2. electrical machinery and related apparatus, 27.2%
3. radio, television communications equipment and related apparatus, 9.0%

Singaporean R&D was dominated by electronics manufacturing (53% of the total), with telecommunications and IT also occupying significant percentages.

Compared to these Asian countries, the destinations of Mexican R&D expenditures were more diversified. In 2001, 53.8% of the R&D expenditure in the private sector happened in the manufacturing sector, and about 45% in the services sector. Significant areas of investment included transport equipment; food, beverages, and tobacco; textiles, textile products, leather, and footwear; chemicals and pharmaceuticals; telecommunications; software consulting; and social and personal services.⁶

(4) Other Trade and Business Conditions

The international trade system is dependent on a wide range of infrastructure that should decrease transaction costs and promote technical innovation, creating comparative advantages for countries and forming a global pattern of industrial specialization.

Transportation infrastructure is a fundamental public good to facilitate international trade. Using the Global Competitiveness Report (GCR) indices, which do not include less-developed countries in Asia, we can observe weakness in Latin America, especially port infrastructure in Central America and the Andean Community (table 13). The index for many of these countries is at a level similar to or worse than the Philippines and Viet Nam.

Technical barriers to trade such as technical regulations, industrial standards, and testing and certification procedures are an increasing threat to the international trade system. In order to respond to new requirements, companies need to establish well-controlled systems for production and administration. One of the indicators of a company's ability to overcome technical necessities is the acquisition of international standards such as the ISO 9000 and the ISO 14000 series. In addition, large firms can use such certificates in order to select possible suppliers of inputs. As shown in table 13, there is a clear gap in the number of certificates issued between Asia and Latin America. Many more firms in Asia, which is an emerging global production base for manufactured goods, have obtained ISO's certificates than in Latin America.

⁶ Pacific countries have different characteristics. In New Zealand, 56.3% of the R&D expenditure in the business sector took place in the manufacturing sector and 39.5% in services in 1999/2000. In the manufacturing sector, the expenditures were concentrated in machinery equipment, instruments and transport equipment (24%) and food, beverages and tobacco (19%). The share of the manufacturing sector in Australian private business R&D expenditure was 50.4% and the service sector 39.9% in 2000. Although the distribution in Australia between the manufacturing and services is similar to that of Mexico, Australian firms seem to have made R&D expenditures on higher-technology fields. In the manufacturing sectors, more expenditures were made on: radio, television and communication equipment (9.9%); motor vehicles, trailers and semi-trailers (7.9%); and pharmaceuticals (6.8%).

TABLE 13
TRADE AND BUSINESS CONDITION INDICATORS

	Port Quality 1/	Airport Quality 2/	Collaboration in Clusters 3/	IT Laws 4/	ISO9000 (2003)	ISO14000 (2003)
Asia-Pacific						
Australia	6.0	6.6	4.0	5.6	19,975	1,250
Brunei					40	3
Cambodia					8	1
China	3.7	3.9	4.5	3.6	96,715	5,064
Indonesia	3.7	4.1	3.6	3.7	2,056	297
Japan	5.6	5.3	5.7	4.4	55,916	13,416
Republic of Korea	5.3	5.7	4.7	5.0	12,846	1,495
Malaysia	6.1	6.2	4.2	5.4	3,668	370
Myanmar					8	
New Zealand	5.9	5.9	4.1	5.1	2,816	155
Philippines	2.4	3.9	3.5	3.6	509	174
Singapore	6.8	6.9	4.9	5.8	3,480	523
Thailand	4.5	5.6	4.2	3.8	5,105	736
Viet Nam	3.1	3.9	3.7	3.5	1,311	56
Latin America						
Argentina	3.7	3.9	3.0	3.2	2,257	286
Bolivia	1.4	3.3	2.2	2.3	49	7
Brazil	3.3	5.1	4.1	4.1	4,012	1,008
Chile	4.6	5.4	3.4	4.3	420	99
Colombia	2.6	4.2	3.2	3.9	2,659	135
Costa Rica	2.1	4.1	3.3	3.4	68	38
Cuba					32	
Ecuador	2.8	3.0	2.5	3.0	33	1
El Salvador	2.6	5.0	2.6	3.1	8	
Guatemala	2.6	3.7	3.0	2.5	19	1
Mexico	3.3	4.6	3.5	3.5	1,935	406
Nicaragua	1.7	3.0	2.2	2.7	9	
Panama	5.4	4.9	3.2	3.8	48	2
Paraguay	2.3	2.7	2.2	2.1	71	3
Peru	2.3	3.0	2.7	3.4	329	31
Uruguay	4.0	3.0	2.4	3.0	258	32
Venezuela	3.1	3.9	2.3	3.5	206	20
FEALAC Average	3.7	4.5	3.4	3.8		
World Average	3.9	4.5	3.6	3.7		

Note 1: Port Infrastructure Quality: Port facilities and inland waterways in your country are (1 = underdeveloped, 7 = as developed as the world's best)

Note 2: Airport Transport Infrastructure Quality: Air transport in your country is (1 = infrequent and inefficient, 7 = as extensive and efficient as the world's best)

Note 3: Extent of collaboration among clusters: Collaboration in your clusters with suppliers and partners is (1 = almost nonexistent, 7 = extensive and involves suppliers, local customers, and local research institutions)

Note 4: Laws relating to ICT: Laws relating to information and communication technologies (ICT) (e-commerce, digital signature, consumer protection) are (1 = nonexistent, 7 = well developed and enforced)

Source: World Economic Forum (WEF), *The Global Competitiveness Report 2003-2004*, and International Organization for Standardization (ISO).

Concerning legal conditions, IT laws in Latin America have not developed well compared to the world average. Only four countries from Latin America –Brazil, Chile, Colombia and Panama– surpassed the average.

The most serious disadvantage for Latin America is reflected on an index related to the extent of collaboration among clusters. Only Brazil has created a positive dynamism for sustainable industrial development comparable with Asia. In Asia, governmental research institutes and universities focus on basic and applied R&D and the private sector concentrates in experimental

development, so that collaboration within clusters seems to enable technological clusters in an effective manner. In addition, small and medium-sized enterprises can become not only leading innovators but also business partners with large enterprises.

4. IT USAGE AND DEVELOPMENT OF SMES

As described at the beginning of this report, the research project on “Comparative Study on East Asia and Latin American IT Industries” focused on 13 countries selected from FEALAC. From this point on, this report deals primarily with the development of SMEs in the selected countries, with a particular focus on IT usage, adding information on other member states to complement observations if necessary.

(1) IT and Business Conditions in the Selected Countries

Figure 9 shows a comparison of business conditions for SMEs in the selected countries. The figures in figure 9 have been normalized to be one (1) if a variable of a country is a maximum in FEALAC and zero (0) if a minimum. Larger values indicate better conditions. Values for the world are included as a reference. Note that the R&D expenditure as a percentage of world GDP is relatively large because such expenditures are concentrated in a portion of large developed countries. Even Singapore’s R&D is inferior to the world level.

The figures illustrate the superior business conditions in leading Asian countries such as Japan, Republic of Korea and Singapore. Japan has advantages in R&D and collaborations among clusters. Republic of Korea has the best IT infrastructure and the highest tertiary education enrollment. Singapore has developed the best port and the best IT-related legal infrastructure.

The ratio of secondary school enrollment is not necessarily low in the selected countries, although R&D expenditures are lower, except in Brazil and China. The clear difference is in terms of collaborations among clusters as mentioned above. The score for Viet Nam, with the least GDP per capita among the selected countries, is a slightly higher than the world average.

(2) Informatization at the Firm Level

Informatization of firms can be regarded from two points of view: (1) IT infrastructure; and (2) Purposes of IT usage.

Three Layers of IT Usage

IT usage is based on IT infrastructure, which is broadly composed of three layers:

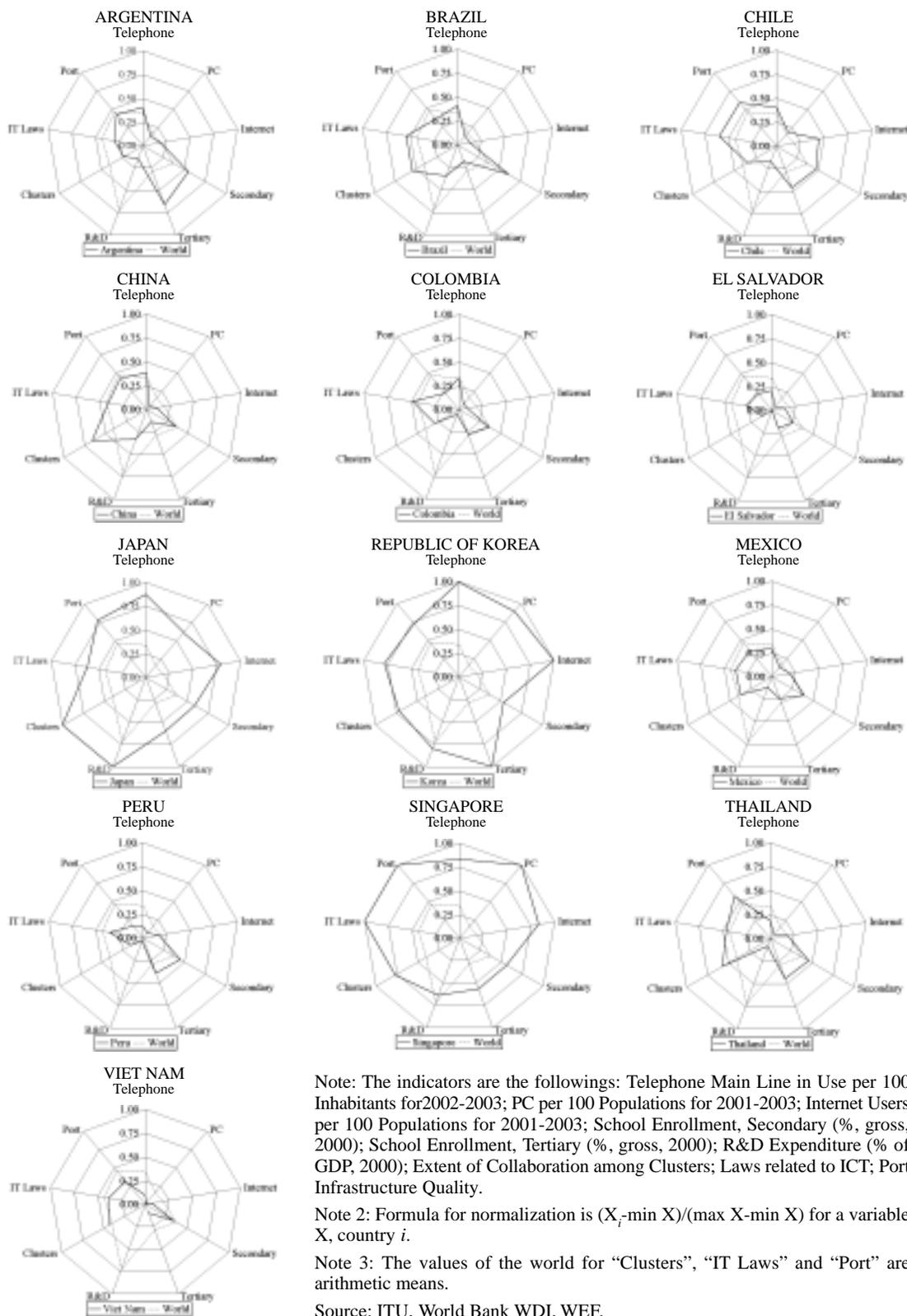
- (1) Infrastructure: Telecommunications Network;
- (2) Platform: Personal Computer (PC), Mobile phone;
- (3) Application: E-commerce (B2B, B2C), EDI, SCM.

It is necessary to combine these three layers effectively in order to utilize IT fully.

Although infrastructure traditionally refers to telecommunications networks, today the Internet can be included in this category. The dial-up connection was the main access to the Internet in the early phase of the “IT Revolution”. As broadband Internet has become affordable, more users in semi-developed countries are switching to cable-modem and ADSL. In parts of developed countries, fiber-optic networks are reaching individual households.

The platform layer connects telecommunications networks and the application layer. The representative hardware of this layer is the PC. In recent years mobile phones/mobile Internet have begun to penetrate to both individual and corporate users. In enterprises, handhelds are also used widely in order to input and output bar codes.

FIGURE 9
NORMALIZED MAIN INDICATORS ON BUSINESS CONDITIONS



Note: The indicators are the followings: Telephone Main Line in Use per 100 Inhabitants for 2002-2003; PC per 100 Populations for 2001-2003; Internet Users per 100 Populations for 2001-2003; School Enrollment, Secondary (% , gross, 2000); School Enrollment, Tertiary (% , gross, 2000); R&D Expenditure (% of GDP, 2000); Extent of Collaboration among Clusters; Laws related to ICT; Port Infrastructure Quality.

Note 2: Formula for normalization is $(X_i - \min X) / (\max X - \min X)$ for a variable X, country i.

Note 3: The values of the world for “Clusters”, “IT Laws” and “Port” are arithmetic means.

Source: ITU, World Bank WDI, WEF.

EDI was once the main IT application for large firms. As IT applications migrated to the Internet, corporate applications diversified to include, for example, e-commerce and SCM, and smaller firms were incorporated into the user group.

Purposes of IT Usage

Main purposes of IT usage by the corporate sector are the following, primarily oriented towards facilitating information flow and sharing:

- Providing and sharing information: e-mail, homepages, web pages;
- Efficiency of internal works: Groupware such as accounting, payroll, and inventory management;
- Collaboration other firms through networking: B2B, B2C, EDI, SCM, ERP, CRM.

To accomplish these objectives, companies follow the three stages of the computerizing process:

- (1) Information sharing within an individual firm. To this end, firms introduce PCs and develop LANs;
- (2) Development and introduction of applications to seek further efficiency and rationalization of office operations such as accounting, business planning, human affairs, production planning and control, inventory management, and so on, within the firm; and
- (3) More advanced IT usage for information sharing and collaboration with partner companies, for the purpose of improving the efficiency of production, inventory, sales and distribution managements, or for developing SCM.

It is difficult to make a strict cross-country comparison on informatization of SMEs by using official figures, due to the differences in the definition of SMEs among countries and institutions, as well as the differences in methodology, definition, and year of announcement of IT indicators. Especially in less developed countries in Asia and Latin America, trustworthy government statistics are not always available. For this reason, we cannot do a comparative study on the present IT usage by SMEs in the studied countries. We can only overview the present states of IT usage by firms in the surveyed countries within the limit of data availability, depending on the obtainable data mainly presented by the government, chambers of commerce, consultancy firms and universities.

(a) Current State of Informatization by Layer

Platform: Personal Computers (PCs)

Introduction of PCs by the corporate sector is entering into the mature phase in developed countries. Even in semi-developed countries, almost all large firms have installed them, even though there are large gaps in the adoption of them between small and medium-sized enterprises.

Among the surveyed Asian countries, in Japan more than 90% of the SMEs had already introduced PCs in 2003, so that almost all Japanese firms use PCs. In Singapore, the diffusion ratio of PCs was 83.3% in 2002 and 83.1% in 2003. Even though the percentages are lower than that for Japan, the penetration of PCs in Singapore is hitting a peak. Among the Latin American countries, 64% of the Chilean firms used PCs as of the year 2002. The percentage was 98.4% for the large firms and 97.1% for the mediums, while that for the small firms was only 58.2%. A similar pattern was observed in Mexico, where PCs are owned by 28% of micro firms, but 92% of all SMEs. In Peru, 80% of the surveyed medium and large firms had introduced PCs in 2000. A 2004 survey Peruvian SMEs sampled from 7 zones demonstrates insufficient utilization of basic IT tools by local SMEs. About 12% of these firms owned PCs in their offices, and 40% did not use software.

Infrastructure: the Internet

Almost all of the large firms in IT-developed and semi-advanced countries have introduced the Internet. More than 90% of the large firms were connected to the Internet around the year 2000, so that the Internet penetration ratio at the national level depends on the informatization level among SMEs. The gap in adoption of the Internet is also observable between medium and small enterprises. On the other hand, there is a significant difference in the progress in diffusion of broadband Internet even among companies connected to the Internet, especially between Asian IT-leading countries and others. In closing, it should be noted that public infocenters still provide an important channel to the Internet to small firms in Peru and less-developed countries.

In Asia, 93.9% of Japanese SMEs had Internet connections in 2003. As is the case with PCs, the Internet is diffused to approximately all businesses in Japan. The dissemination rate in all Korean businesses reached 71.1% in July 2002. Although the figure is lower than that for Japan, 62.7% of the Korean firms with Internet access utilize ADSL. The Internet penetration in Singapore, which achieved 78.3% for 2002 and 75.9% for 2003, is reaching a threshold, as is the case with PCs, although the level is lower than Japan. On the other hand, more Internet-connected firms are shifting to broadband Internet. The percentage of the firms with broadband of the total number of firms connected to the Internet, or the diffusion rate of broadband, rose from 41.2% in 2002 to 54% in 2003 (IDA, 2004). In Latin America, Internet adoption in Chile went up from 61% in 2001 to 64% in 2002 and 69% in 2003. By firm size, less than 60% of the micro businesses had Internet accesses in 2003 as contrasted with about 100% for the medium and large companies and 90% for the small firms. In Colombia, a survey conducted in 2003 revealed that 86% of the total sampled SMEs, and 91% of the firms in the service sector, had Internet connections. The dominant connection method was dial-up that made up 57.7%. Cable-modem accounted for 19.4% and the figure for ADSL was only 6.4%. On the other hand, 96% of the large firms possessed the Internet, 74% of which were dedicated connections (Pyramid Research – CINTEL, 2003). In Peru, 64.2% of the surveyed medium and large firms were connected to the Internet in 2000. Approximately 19% of the SMEs with PCs have Internet access in their offices and 50% of the surveyed SMEs utilized public Internet booths in 2004.

Internet Applications

E-mail and information collection are two major purposes for which firms intend to utilize the Internet. Websites are gaining importance as a medium to advertise companies and their products and services. In some semi-developed countries, around 20-30% of SMEs have established a website. Nevertheless, large gaps in website ownership exist among different sizes of firms and industrial sectors even in semi-developed countries. Even in Republic of Korea, the ownership ratio has a positive correlation with the firm size: 19.4% for the micro firms with 5-9 persons in 2003; 35.2% for the smalls (10-49); 59.8% for the mediums (50-299); 76% for those with 300-999 persons; and 81.9% for those with more than 1,000. There are differences in website building among sectors. Around 30% of Argentine SMEs had an active business portal in 2003. Some 25% of Peruvian SMEs with direct Internet accesses have created a website, which imply a very limited diffusion, taking into consideration the fact that only 12% of the sampled firms had PCs and 19% of the firms with PCs had an Internet connection.

TABLE 14
OWNERSHIP RATIO OF WEBSITE BY SMES

China (2001)	Japan (2003)	Republic of Korea (2003)	Chile (2002)	Mexico (2002)
46.2% (Small)	52.3% (SME)	19.4% (Micro)	9.8% (Small)	36.6% (Manufacturing)
57.1% (Medium)		35.2% (Small)	27.8% (Small-Medium)	31.2% (Commerce)
		59.8% (Medium)	35.6% (Medium)	21.1% (Services)
			12.6% (SME)	

Source: Country Papers (China, Japan, Republic of Korea, Chile) and Secretaria de Economía (2003) (Mexico).

E-commerce is in the initial development stages and growing at a fast rate. B2B dominates and accounts for more than 90% of the total e-commerce transactions in many countries. A small percentage of large enterprises have adopted e-commerce. SMEs users of e-commerce still seem to be the exception. In Republic of Korea, about 30% of large firms and 18% of SMEs utilize e-commerce. About 27% of Singaporean SMEs with Internet access utilize it as customers and 14% as suppliers. In Japan, 7.8% of SMEs and 19.3% of large firms implemented B2B. According to a survey in Brazil, 15% of small firms utilize B2B for purchases and sales. In Chile, 16% of the companies connected to the Internet use e-commerce platforms to purchase inputs. Public e-procurement systems are an important driving force that encourages SMEs to participate in e-transactions. That had been observed in Brazil, Chile and Republic of Korea. Most of the companies have not been incorporated into a supply chain. Some 15.5% of Japanese large firms and 8.4% of SMEs have already or partially implemented Internet Supply Chain Management (SCM).

(b) Current State of Informatization in the Studied Countries

The main features of IT market demand and the present situation of e-commerce in the studied countries are summarized in the following subsections. Since the information for each country depends strongly on the particular surveys conducted in that country, comparison charts and figures cannot be made; instead, we present lists of the relevant facts for each country.

China

IT Markets

- Hardware and software markets have seen a rapid growth (hardware: an annual rate of over 12%; software: more than 35%); however, compared with China's overall economic scale, IT hardware and software sales value is rather small.
- IT hardware represents over 70% of the market share, while software and information services only make up 11% and 16%, respectively.

Purposes of Internet Usage

- Information collection and display of firm information are the two main actual uses of the Internet, but quite a few firms perform e-commerce online.
- Application of IT and e-commerce in enterprises is still in the beginning stage, but the popularity of these technologies is growing rapidly.

Internet Connection Methods

- A survey in 2001 showed that 89% of firms used the Internet. The figure rose to 98.6% in the 2002 survey.
- Telephone line and modem are the major connection methods. In 2001, 50% firms used these two methods, but this had declined to 43.8% in 2002.
- Usage of dedicated data lines rose from 25% in 2001 to 36.8% in 2002. ADSL usage soared from 2% in 2001 to 26.5% in 2002. ISDN ranked fourth, accounting for 16%.

E-commerce

- Continuously running e-commerce websites have increased in number from 575 in 2000 to 1,533 in 2002.
- Trade volume through e-commerce has increased by 3.5 times, from 77.2 billion yuan in 2000 to 355.6 billion yuan in 2003.
- B2B accounts for over 97% of the total e-commerce volume.

Company Websites

- According to a survey made by the State Economic and Trade Commission in 2002, 84% of firms have established public websites.
- The survey shows that launching new product/service information (73.5%), distributing news (70.5%), collecting customers' information (48.9%), after-sales selling (25.4%) and receiving orders (20.9%) ranked as the top five applications of websites.
- Online selling, purchasing, supplying, and other online trade business were at 16.8%, 12.1% and 7.7%, respectively.
- Currently, establishing websites usually serves the purpose of image promotion rather than online purchasing and selling. Only a minimal number of firms (1.05%) have fully realized e-commerce, and not many firms (16.48%) have even partially realized it.

Japan

Purposes of Internet Usage

- In 2003, 90% of SMEs had already introduced PCs and could access the Internet, and 80% of them practiced e-mail communications.
- 50% of them made use of the web to transmit and collect information.
- Further uses, however, such as the introduction of the Intranet, online conferencing, and sharing schedules, are less widely in use.
- In 2003, about 60% of SMEs had introduced management systems for accounting and sales management, including POS (point of sale).
- 33.9% of SMEs had adopted inventory management and 31.0% purchase management.
- Information systems inside SMEs are less common, but among them, the work connection system (28.7%), the document sharing system (26.2%), and the work reporting system (23.1%) are the most popular.

The Ministry of Information and Communications (MIC) surveyed in 2001 more than 1.6 million companies, nearly 90% of which are SMEs, concerning e-commerce and related activities:

E-commerce

- The ratio of firms in all categories practicing e-commerce is about 10.5%. SMEs are at 10.1%, while large firms are at 26.1%.
- B2B transactions are conducted by 7.8% of SMEs and 19.3% of large companies.
- For B2C, SMEs are at 3.8%, large firms at 11.1%.
- More than 50% the firms that practice B2B replied that their purposes of B2B use are: sales (57.4%), purchase (54.8%), distribution (18.2%), and after-sale services (21.8%). These figures are the same for both large companies and SMEs.
- B2C is mostly used for accepting orders (82.2%), distribution (19.2%), and after-sale services (27.3%). This implies that many firms are using B2C to construct a new kind of customer relationship. As was the case with B2B, these figures do not change with the size of firms.

Supply Chain Management

- According to a survey by the Small and Medium Enterprise Agency, among industries involving SCM such as manufacturing, wholesale, trading, and retail, only one third of SMEs recognize the concept of SCM and view it as useful; the number of firms practicing SCM is less than 15% of the manufacturing industry.
- Breaking this down by size of firms, only one fourth of SMEs recognize the concept of SCM, and only 8.4% of them are actually implementing it. This figure is less than half that of large firms.

Republic of Korea

Internet Access

- By June 2002, 40.7% of all businesses that employed more than five workers had a corporate network infrastructure.
- 71.1% of all businesses had available Internet services within their vicinity.
- Among the 314,000 firms, 62.7% used ADSL-based services to access the Internet as of July 2002, while 21.9% used leased lines. Larger firms tended to use leased lines.
- 68.1% of all firms that have Internet access use services with average Internet connection speeds of more than 2Mbps.

Company Websites

- The breakdown of company homepage possession percentages by industrial sector is: agriculture (19.7%); light industry (25.5%); heavy industry (34.0%); chemicals (38.4%); construction (15.3%); distribution (19.5%); finance (30.6%) and other services (37.2%).
- The rate of possession of homepages increases as the size of firm increases: firms with 5-9 employees (19.4%); 10-49 (35.2%); 50-299 (59.8%); 300-999 (76.0%); and more than 1,000 (81.9%).

E-commerce

- About 21% of firms have implemented e-commerce.
- Implementation ratios were 64.7% for the communication sector, although the ratios for transportation and manufacturing were 7.6% and 6.9% respectively.
- By number of employees, 29.8% of the larger firms with more than 300 employees utilize e-commerce and that for SMEs with less than 300 employees is 18.1%.
- B2B is dominated in terms of transaction amount with 87.6% of the total in 2002 and 88.0% in 2003, followed by B2G (9.2%), B2C (2.6%) and others (0.2%).
- Another survey showed that e-commerce is used by only 4.0% of the manufacturing SMEs and the ratio over total sales was 1.4% in 2003.
- B2B accounted for 59.3% of the sales. The percentages were 25.9% for B2C and 14.8% for B2G.
- The B2B volume for 2003 was 206,854 billion won, a 32.8% increase over the previous year.
- That in manufacturing sector was 146,162 billion won, 70.7% of the total.

- Customer-led e-commerce was 150,688 billion won, 72.8% of all B2B transaction. The rest was seller-led e-commerce, 87.1% of which is composed of cooperative transactions.
- The revenues in the B2C market in the 4th quarter of 2002 hit 1.4 trillion won, which was a 75% increase compared to the previous year.
- The B2C market now has a 4% market share of the 122 trillion won consumer retail market.
- After the government finished building the Government e-Procurement System (GePS) and passed regulations to govern the service, the G2B market has expanded in scope and scale. The government opened 33,109 contracts out of 34,773 for bidding over the span of three months starting from October 2002.

Singapore

Spending on IT

- The average SME spent an average of \$ 32,000 (Singapore dollars) on IT in 2002, much lower than the spending of local large companies (\$ 1.2 million) and foreign large companies (\$ 856,000).
- The average foreign SMEs spent \$ 74,000 on IT in 2002, more than double that of local SMEs.
- The bulk of SMEs' IT budgets are spent on hardware and software. Very little is spent on external IT services and manpower.

Computer and Internet Usage

- A survey on IT usage in business in 2002 carried out by the Infocomm Development Authority (IDA) showed that SMEs have a high level of usage of computers, with 84% using PCs, workstations and laptops. By comparison, all large companies, local and foreign, use computers.
- Similarly, a high proportion of employees (three-quarters) in SMEs have access to computers. This is less than for those in foreign companies (85%), but about the same as that for those in local large companies (72%).
- We also find observations that the overwhelming majority of SMEs (94%) use the Internet, and 72% of employees having access to the Internet.
- The most common forms of uses of the Internet by SMEs are information searches (98% of SMEs with Internet access), e-mail (99.9%) and exchanging electronic files (88%).
- A smaller proportion of SMEs use the Internet for advertising/marketing, providing information on their own websites, and to access databases of suppliers.

Internet Connection Methods

- Almost half (48%) of Internet-using SMEs have broadband access. Using broadband as a platform to deliver content, for marketing/promotion, and to access multimedia applications and collaborative tools such as file sharing is relatively common.
- Reliability and stability are the most important considerations for SMEs when deciding whether to adopt broadband services and applications, followed by affordability.

E-Commerce

- SMEs that do engage in e-commerce are more likely to use it for buying rather than selling. E-commerce is used by 27.3% of SMEs with Internet access as customers but only 14% use it as suppliers.
- Only 10% of SMEs currently make use of ASPs (application service providers).
- The greatest benefits for SMEs in using ASPs are gaining access to the latest technologies and upgrades, as well as obtaining cost savings.

Benefits of IT Usage

- A minority of SMEs report reaping tangible benefits from IT usage.
- 41% of SMEs using IT had an increase in domestic sales, 30% reported an increase in overseas sales and 44% reported a reduction in their manpower costs.
- Both IT using SMEs and non-users cite the cost of IT as their main concerns about using IT. Security issues, technical problems such as systems breakdowns and the difficulty of keeping pace with changes in technology are also important concerns.
- SMEs see financial grants and assistance as the most effective measure for encouraging use of IT technologies, followed by assistance in skills and knowledge acquisition.

Thailand

IT Usage

- IT penetration in business enterprises is limited. According to the National Statistic Office Survey on Trading and Service Providing Enterprises in 2002, only 10.6% of firms were equipped with computers.
- Only a half of computer-using companies used the Internet, and less than 10% of them had their own website.
- Usage of computer has been primarily clustered in and around Bangkok, with the country's other regions relatively uniform.

Website Usage

- According to the 2001 National Electronics and Computer Technology Center Survey, it was found that most company websites are in tourist industry, the computer and Internet industry, and the entertainment industry; 55.3% of these websites were written in English to reach to overseas markets.
- 26.5% of all websites were written exclusively in Thai, and 18.1% were in both Thai and English.
- Approximately 11.42% of websites were used for several purposes, such as purchasing, clearing or logistics. These advanced websites were mainly in the tourism, computer and Internet, garments and cosmetics, and florist and handicraft industries.
- Roughly 69.5% of advance-stage websites provide purchasing-order forms, 79.5% provide payment systems, 47.7% provide information on how to receive products, and 61.2% provide services to both domestic and foreign customers.

Breakdown of Firms Using IT

- According to the Office of Industrial Economics, 58.3% of medium-sized enterprises in the manufacturing sector use IT, while only 24.4% of small enterprises do so.
- Currently, most trading SMEs have not employed IT to improve managerial and marketing functions.
- The use of IT in trading SMEs has been mainly restricted to newly established firms. IT employed in this sector focuses mainly on wholesaling processes such as Efficient Consumer Response (ECR).
- The number of retailers using barcodes and elementary IT functions has been increasing.
- In the service sector, IT and e-commerce have played an important role in marketing, advertising, sales processing, and managing services.
- The most successful industry in applying IT and e-commerce is tourism, 55% of whose firms have websites.
- Other SMEs in other services sector also place a high value on IT, such as private hospitals, insurance, transportation, and real estate.

Viet Nam

IT Usage

- A survey conducted by the Viet Nam Chamber of Commerce and Industry (VCCI) on the usage of computers in small enterprises, most of which are private enterprises with less than 50 employees, found that computers were used in 91.6% of the surveyed firms, but that 48.7% of these had less than 3 computers.
- The firms' purposes of using computers were typing, accounting management, Internet access and e-mail.
- These enterprises gave several reasons for not using IT: unavailability of specialized staff (33%); dependence on parent companies' decisions (16%); and financial difficulties (16%).
- Only 27% of surveyed firms had arranged positions for IT management in their management board; 36% of surveyed firms did not have departments specialized in IT.

Internet Connection Methods

- Regarding IT infrastructure, 80% firms operated in the networking environment: 49% of them used Local Area Networks (LANs) and 3% had established Wide Area Networks (WANs).

Purposes of Internet Use

- Nearly 73% of the surveyed firms have introduced the Internet. The main purposes of Internet usage were e-mail (100%) and information collection (94%).
- One fourth of firms used the Internet for daily communication, 16% to sell products, 34% to connect with affiliates, and 16% to connect with suppliers.
- Websites were owned by 43% of the surveyed firms.

- These websites were used mainly for advertisement (28%), service providing (16%), selling products (20%), and exchanging information (16%).
- Among manufacturers, 16% offered and sold their products through network service providers.

Problems with IT Usage

- The majority of the surveyed firms complained of high prices of IT equipment, training services, business management software, IT consulting services, and Internet access.
- In addition, 43% of them said that Vietnamese IT firms were not capable of meeting their demands, and 7% of them rated local firms' IT capabilities as "low".
- The ratios of enterprises' total investment in IT to their total turnover in 2002 and 2003 were 0.07% and 0.06%, respectively.

E-Commerce

- A survey conducted by the Ministry of Trade in 2003 showed that 46% of the surveyed enterprises utilized e-commerce.
- Among those who had participated in e-commerce, 76% of firms were more interested in B2B than B2C (57%).
- E-mail, EDI and XML were the most applied information exchange methods for e-commerce (93%).
- Nearly 54% of surveyed firms had their own websites.
- Due to insufficient legal framework for online payment, payment still had to be made by traditional methods.

Argentina

A study conducted by Trends Consulting in accordance with IDC Worldwide definitions and methodology analyzed the IT market for 84 SMEs with fewer than 500 employees (micro enterprises with less than 10 employees were not included), whose sales averaged \$ 242.3 million (pesos) in 2002 and \$ 282.2 million in 2003. The major findings include, among others:

IT Spending

- The average IT spending of the surveyed SMEs was \$ 3.2 million in 2002, and grew 9.4% to reach \$ 3.5 million in 2003
- Their total IT spending was close to \$ 270 million.
- The average IT expenditures by SMEs are equivalent to 2.7% of their total sales, which is higher than that for all companies (1.8%).
- The total IT spending by SMEs can be broken down into 28.6% for hardware, 22.6% for software, 21.7% for communications, and 27.1% for services.
- Compared with all companies, SMEs tend to allocate fewer resources to hardware and services, a similar percentage to software, and more to communications.

Purposes of IT Usage

- Some 93% of SMEs already had installed an ERP solution in 2003.

- Installations of CRM and SCM by SMEs do not reach half the percentages for ERP. In 2003 these two applications had a penetration rate of close to 40%.
- Approximately 68% of SMEs have human resource applications, in addition to traditional payroll calculation systems.

Company Websites

- Websites were owned by 84% of SMEs in 2002. This figure had increased to 90% at the end of 2003.
- In order to manage their websites, 48% of companies host their sites on their own servers, 36% use hosting services from local providers, 12% locate them at their foreign headquarters and only 4% use the services of local housing providers.
- Some 72% of SMEs operate a corporate intranet, but only 38% possess extranet.
- At the end of 2003, 52% and 83% of employees were able to use Internet and e-mail respectively.

E-Commerce

- Slightly less than one third of SMEs had active business portals at the end of 2003.
- The percentages of companies with e-commerce and e-procurement solutions had fallen somewhat by December 2003, to 24.2% and 8.4% respectively.
- In 2003 there was an increase in the use of these applications by SMEs, especially in e-commerce by small companies and e-procurement among medium-size enterprises.
- Only 21.7% of SMEs have developed some type of B2B solution, which includes partial integral solutions (ex. uploading online catalogues to sell by using e-mail or telephone).
- The penetration of B2C is 14.5%.

Brazil

The survey Pesquisa Perfil da Empresa Digital 2003/2004, carried out by the Federação das Indústrias do Estado de São Paulo (FIESP), reveals that:

- Half of SMEs surveyed did not forecast implementing Internet-based EDI, and 20% did not even have a website.
- Most large enterprises (72%) had already implemented e-commerce or plan to do it in the near future.
- Furthermore, among micro-enterprises, only 8% make use of B2B for sales, and 16% make use of it for purchases, while just 8% use B2C.
- Among small enterprises, 15% use B2B, for both purchases and sales, and 11% use B2C.

Another survey carried out by the Brazilian Service to Support Micro and Small Companies-São Paulo (Sebrae-SP) revealed that the main uses of the Internet are: (1) banking services; (2) government services; (3) news; (4) communications (e-mail); (5) research on business deals, prices and suppliers; and (6) websites for advertisement.

An analysis in 2002 done by the Center for Research on Information Technology and Organizations (CRITO) shows that:

- All surveyed small firms use e-mail and about 70% have a website.
- The penetration ratios of intranet were 36.8% for SMEs and 71.7% for large firms. Those of extranet were 32.9% and 44.6% respectively.
- Some 35.7% of SMEs and 71.9% of large firms have adopted EDI.
- The launch of the public purchasing site Comprasnet greatly increased SMEs participation in government purchasing.

Barriers to E-Commerce

- Major barriers to adopting e-commerce are: concern about privacy of data or security issues (48.6%); lack of customers who use the technology (47.6%); and inadequate legal protection for Internet purchases (41.4%).
- Scarcity of staff with e-commerce expertise is associated with insufficient on-the-job experience in developing and adapting IT to specific applications and business environments, rather than with the lack of basic skill levels.

Benefits of E-Commerce

- The identified impacts of e-commerce are increases in the number of suppliers (39.8%) and distribution channels (35.2%).
- Large firms reap most of their benefits from e-commerce by increasing internal efficiency, widening sales areas, and by improving customer services and coordination with suppliers.
- SMEs primarily achieve inventory and cost reduction through e-commerce.
- Only 12.8% of large firms and 11.7% of SMEs reported increased international sales since going online.
- On the other hand, 41% of large firms said that making needed organizational changes was an obstacle to doing business online, versus 33% for small firms.

Chile

E-Commerce

- The Santiago Chamber of Commerce (CCS) estimated that the total amount of e-commerce reached US\$ 2,329 million by 2002.
- B2C accounted for less than 2% of total e-commerce transactions, while its transaction value doubled from 2000.
- The ratio of B2C to total transactions was only 0.2%.
- The volume of B2B was estimated at US\$ 2,288 in 2002.
- The share of B2B in total transactions was 2.2% in 2002 and projected to be 7.0% in 2005.
- More than 20,000 suppliers had offered their products through e-marketplaces, about 65% of which are vertical markets that focus on a specific industry, such as supermarkets, construction, or mining.
- ChileCompra, a public e-procurement system, is also a driving force of B2B.

Internet Usage

- During 2000 and 2003, Internet connectivity increased from 42% to 69% and website ownership from 7% to 25%.
- These are expected to reach 70% and 33%, respectively, in 2004.
- Nonetheless, only 11% of firms utilized the Internet as a platform for sales, and 16% for purchasing inputs and connecting with their providers, in 2003.
- Among the most widely used Internet applications were Internet banking (58%), government-related procedures (53%), and tax declaration and payment (48%).
- On the other hand, less developed were sales to foreign markets (4%) and videoconferencing (4%).

PC and IT Usage

- According to a survey by the Subsecretaria de Economía in 2002, 62.7% of Chilean SMEs were equipped with PCs, and two-thirds of firms with PCs were connected to the Internet from their offices.
- Some 5.1% of the SMEs without PCs accessed the Internet from outside their offices.
- Principal usages of PCs are word processing, spreadsheets, and Internet browsers and e-mail.
- IT was not fully incorporated into organized activities.
- About 60% of the large firms and 26.6% of the SMEs equipped with PCs had introduced a database and a system for administration.

Purposes of Internet Usage

- The most widespread Internet application is e-mail, followed by contact with banks and contact with public services.
- The main usage of the banking service by SMEs was not relevant to money transfers.
- Even large firms did not exploit contacts with suppliers and clients. These firms' main activities were information exchanges with their suppliers and clients.
- Even if firms introduced e-commerce, the utilization of it was insignificant.
- Among the firms that made e-procurements, 52.5% of them purchased less than 5% of the total inputs that they bought. The percentage was 56.5% for online sales.

Colombia

- All surveyed companies with more than 100 employees have a connection to the Internet.
- 87% of these firms have a website, and 36% of the nation's companies are developing e-commerce solutions through websites and extranets.
- Despite the important progress made in recent years, the e-commerce market is still incipient.
- A survey by the Chambers of Commerce points out that among 2,500 companies who have some type of commercial activity, 75% of them have access to the Internet, while only 20% use Internet for activities related to their businesses and only 9% for activities related to e-commerce.

Purposes of Internet Usage

- Surveys conducted by the Administrative Department of Statistics (DANE) in 2002 showed that 65% of SMEs in the services sector had Internet connections and 14.8% had established their own websites.
- These firms offer on their websites services such as: product marketing with clients (66.8%); product marketing with industries (8.0%); online payment (3.2%); online processing of delivery and order (11.7%); capacity to offer secure transactions (2.6%); and others (34.3%).
- The manufacturing sector is the biggest Internet user. Approximately 71.1% of SMEs in the manufacturing sector access the Internet, and 25.7% have created their own websites.
- These firms offer on their websites services such as: product marketing with clients (51.8%); product marketing with industries (15.9%); online payment (10.9%); and others (46.1%).

El Salvador

- According to a questionnaire survey conducted by CID Gallup El Salvador in 2003 – answered by 100 samples companies, 25% of which were government and 75% private entities and third were SMEs – 56% stated that they have contracted application development services with local companies.
- The use of IT in Salvadoran companies varies greatly: 14% of the surveyed firms have between 1 to 25 computers, 18% between 26 and 50, 24% between 51 to 100, 19% between 101 to 200 and 26% have 200 computers or more.
- Additionally, 50% of companies with Internet access have the following amounts: 21% have 26 to 50 PCs, and 13% have 51 to 100.
- The purposes of local IT application are mainly sales (72%), human resources management (71%), application integration (68%), portals (62%), finance (60%), marketing and customer service (50%), distribution (38%), B2C e-commerce (33%) and manufacturing (29%).

Mexico

- According to a survey conducted by the CRITO, ratios of IT penetrations to firms in 2002 was 98.3% for e-mail, 79% for website, 50.9% for intranet, and 58.4% for EDI.

Purposes of Internet Usage

- Online sales were used by only 11.8% of the firms.
- On the other hand, 64.8% of companies make purchases online.
- B2B transactions have overwhelmingly predominated over B2C, partially due to the large presence of multinational corporations that have facilitated the introduction of Internet-based management practices.
- Only 1% of the population and 7% of the Internet users utilized open purchase markets to search for products and make purchases in 2002.

PC Usage

- A survey conducted by the National Statistical Institute (INEGI) provides data on PC diffusion in 1999 by industrial sector.

- In the commercial sector, almost 30% of the firms utilized PCs.
- The construction sector and agribusiness were well equipped, with more than 80% possessing computer equipment, while in the manufacturing sector, more than 60% of the companies had computer equipment.
- A survey conducted by the Ministry of Economy pointed out lower penetration ratios in 2002 than those reported by INEGI in 1999. In the previous survey, 31% of all firms had PCs and 37% of office employees had access to PCs.
- By industrial sector, PCs were owned by 28% of the surveyed firms in the commerce and restaurants & hotels sectors, 87% of the construction firms, and 33% of the manufacturers.
- Among other sectors, the percentage was 100% for the electricity, gas and water sector, and the financial, security and real estate sector, while 21% for the mining, 35% for the social and personal services and 56% for the transport, storage and communications sectors.

IT Use by SMEs

- Regarding informatization of SMEs, a 2002 study executed by the Ministry of Economy showed that 28% of micro-enterprises had PCs and 23% of their office employees had access to PCs in 2002.
- The percentages go up as company size increases. The figures for SMEs are 92% and 65% respectively. In intermediate and large firms, whose PC penetration ratios are 100%, 75% and 88% of office employees can access PCs, respectively.
- Another study on SMEs conducted by the Ministry of Economy (Secretaría de Economía, 2003) show that 69.4% of the SMEs in the manufacturing sector had Internet access in 2002.
- The figure was 68.7% for the commerce and 82.2% for the services sector.
- The first and second most common reasons for using the Internet, shared by the aforementioned three sectors, were (1) to compile information on the sector and (2) to introduce their companies and products.
- Purchasing inputs or products was the third most common reason for Internet use for both the commercial and the services sectors.
- Around 36.6% of the manufacturing SMEs, 31.2% in the commercial sector and 21.1% in the services sector owned their own websites.
- Finally 36.4% of the manufacturing SMEs had realized commercialization of products on the Internet and online sales, through which 7.7% of the total sales were conducted. Those percentages were 36.1% and 10.6% for the commercial SMEs and 36.1% and 14.7% for the SMEs in the services sector respectively.

Peru

PC Usage

- A survey carried out by the Instituto Nacional de Estadística e Informática (INEI) in 2001 revealed that 80% of medium and large businesses had computers.
- By industrial sector, 76.3% of manufacturing companies owned computers. The percentage was 82.8% for the service-oriented companies.

- Roughly 65% of the companies possessing PCs allocated 1 to 5 units of PCs to the administrative and production areas, respectively.
- About 51% of these firms have established a local area network (LAN).

Internet Usage

- 64.2% of firms were connected to the Internet.
- Most frequently used Internet applications were e-mail (60.9%), web pages (22.9%), and database queries (15.6%).
- These firms used the Internet for the purposes of carrying out their businesses (45.2%), research and investigation (37.8%), diffusing their corporate images, (22.6%), and online training (11.5%).
- Only 14.1% of firms had implemented e-commerce.
- The most frequently used type of e-commerce was B2B, which was used by 74.5% of all e-commerce using businesses, followed by B2C (49.0%) and B2G (8.9%).

IT Use by SMEs

- SMEs do not generally use the Internet and IT effectively; this is often due to weaknesses in their businesses as a whole. Based on a study conducted by Proexpansion in 2004, 50% of SMEs utilize IT tools. But on average only 12% of SMEs have a PC, only 19% of the firms with PCs have an Internet connection, and only 25% of those with Internet connection develop their own web pages.
- Public Internet booths were utilized by 49.6% of the interviewed firms.
- Some 45% of them had e-mail.
- Just 1% of those interviewed used the Internet for selling or buying goods.
- High cost and lack of knowledge are the principal obstacles to acquiring such tools.
- Almost 40% of SMEs do not use any software.

Personal Media Usage

- According to a survey on media usage by SMEs carried out by Centro de Promoción de la Pequeña y Micro Empresa (PROMPYME) in 2003, commercial television, newspaper, and radio were the most widespread and intensively used media (40%, 29% and 17%, respectively), while cable TV (9.2%) and the Internet (0.7%) showed less significant user rates.
- Only 4% of the interviewees reported the Internet as their most frequent means of accessing information.
- The Internet is used to search for management information (71% of interviewees), e-mail (34%), and entertainment (22%).
- About 50% of managers/owners have a PC in their home, but only 32% have one in their business or office.
- 50% of interviewees connect to the Internet from public booths or telecenters, 25% from their business, and 21% from their homes.

5. INTERNATIONAL TRADE AND DEVELOPMENT OF SMES

(1) Business Environment of SMES

(a) Contribution of SMES to National Economies

The definition of SMES is not harmonized internationally. There may be differences in the definition between government-affiliated organizations even within a country. An overview of the present situations of SMES mainly in the surveyed economies follows.

SMEs account for more than 95% of firms in most of the surveyed economies; the importance of SMES in Singapore (92%) is slightly lower than the others. Viet Nam does not have well-developed statistics related to SMES, so that it is impossible to obtain complete information. SMES create a significant amount of employment. SMES employ 50 to 85% of all employees, although these percentages are lower than those for number of firms (table 15).

Compared to the significant importance of SMES in terms of number of firms and employment, their contributions to production and value creation are moderate. The gap between establishment/employment and output/value-added indicates lower productivity for SMES. The ratios of value-added to employment are, for example 0.85 for Japanese SMES, which achieve the highest efficiency, and 0.56 for Thailand and 0.52 for El Salvador, which are the lowest (table 15).

TABLE 15
CONTRIBUTION OF SMES TO ECONOMIES

	Establishment		Employment		Output/Sales		Value Added/GDP		Trade	
China	95.2%	(2002)	65.5%	(2002)	54%	(2002)			61.2%	(2002)
Japan	99.7%	(2001)	66.9%	(2001)	51.1%	(2002)	57.0%	(2002)	14.5%	(2003)
Republic of Korea	99.8%	(2002)	86.7%	(2002)	50.8%	(2002)	51.9%	(2002)	42.2%	(2003)
Singapore	90%	(2002)	52%	(2002)			31%	(2002)		
Thailand	99.6%	(2002)	69.0%	(2002)			38.9%	(2002)	38.2%	(2002)
Viet Nam	96%	(2003)	25-37%	(2003)	31%	(2003)	26%	(2003)		
Argentina	99%	(1993)	73%	(1993)	60%	(1993)	8.8%	(2001-02)		
Brazil	99.7%	(2002)	67.0%	(2002)			20%		22%	(1Q, 2004)
Chile	99.0%	(2001)	70%	(2000)	21.7%	(2001)	16%	(2003)		
Colombia	91.8%	(2000)	46.5%	(2000)	36.4%	(2000)	32.3%	(2000)		31%
El Salvador	99.4%	(2002)	87.1%	(2002)	45.3%	(2002)				
Mexico	99.7%	(1999)		64%			42%			
Peru	99.7%	(2001)	76.6%	(2004)						

Note: The contribution of employment in Viet Nam: 25% of the country's regular job supply; and 36.6% of the regular jobs employed by private firms. Employment by micro & small firms for Chile and Peru. Manufacturing sector for Colombia.

Source: Country Papers, Presentation prepared by Ngo Quang Hung (Viet Nam), Guaipatín (2003), ACOPI (Colombia) and various country sources (SMBA (Republic of Korea), MTI, Dep. of Statistics, SPRING (Singapore), Ministry of Economy & Production (Argentina), SEBRAE (Brazil), CORFO, CCS, SERCOTEC (Chile), INEGI (Mexico), PROMPYME, INEI, PROEXPANSION (Peru), etc.)

(b) Internationalization of SMES

The contributions to exports by SMES are more varied among the studied countries. Compared to Latin America, Asian SMES in the manufacturing exporter countries are more export-oriented; in Japan, however, only 14.5% of total exports were represented by exports of SME-driven manufacturing products, which are defined as products for which more than 70% of which were shipped by SMES in 2000.

Data on small and medium-sized exporters (SMEXs) in three Latin American countries clarify the present situation of internationalization of SMES. The first is a high concentration of

export value in larger firms. This characteristic is more obvious in Argentina, Brazil and Chile than in Republic of Korea. In these three countries, although more than 90% of the exporting companies are SMEs, exports by large firms account for more than 75% in value terms. Those percentages surpass 95% if we consider medium and large firms together. The second is that more exports by smaller firms are shipped to neighboring countries, in addition to the United States and Europe. This is true of Colombian SMEs, whose main export markets are the Andean Community (Venezuela, Ecuador and Peru) and the U.S. (ACOPI: Asociación Colombiana de Pequeñas y Medianas Empresas). The third is a higher intensity of technology incorporated in exported products. In these Latin American countries, there are a few larger firms that export huge volumes of primary and natural resource (NR) based products (tables 16-18).

The same is true of Malaysian SMEs, which directly exported 26.5% of their production in 2003; the export ratio by industry is high, among others, for textile and apparels (79.7%) and for the transport sector (45.0%). Main export destinations are the industrial market economies, East Asia and ASEAN. According to a survey, only two electrical and electronics and one manufacturing-related services companies were identified as exporters to Latin America, and one SMEs in the metal and metallic products exported to South America. Conversely, 90 of SMEs recognized Singapore as a major export market. The numbers of the SMEs for Indonesia, Thailand and Japan were 43, 37 and 32 respectively (SMIDEC, 2004).

TABLE 16
EXPORTS BY SMALL AND MEDIUM EXPORTERS
(% of the Total)

	Argentina (2001-2)			Brazil (1Q, 2004)			Chile (2003)			(Ref.) Republic of Korea (2003)
	No of Exporters	Value		No of Exporters	Value		No of Exporters	Value		Value
Micro	1,240	15.0%	0.1%	1,845	18.9%	0.2%	3,250	50.7%	0.2%	
Small	2,910	35.2%	0.7%	3,809	38.9%	2.0%	2,136	33.3%	3.0%	42.2%
Small-Medium	1,914	23.1%	1.8%	344	3.5%	4.7%				
Medium	1,540	18.6%	6.2%	2,737	28.0%	15.1%	783	12.2%	12.5%	
Large	670	8.1%	91.2%	978	10.0%	78.0%	240	3.7%	84.3%	57.8%
Others				67	0.7%	0.0%				0.1%
Total	8,274	100.0%	100.0%	9,780	100.0%	100.0%	6,409	100.0%	100.0%	100.0%

Note: Samples of Brazil are industrial firms and others are not-classified firms. Others for the Republic of Korea are firms in the public sector.

Source: Argentina (Ministry of Economy), Brazil (SEBRAE), Chile (CCS), Republic of Korea (SMBA).

TABLE 17
PRODUCTS AND DESTINATIONS OF SME EXPORTERS IN LATIN AMERICA
(1) Argentina (2001-2)

	Product Types						Destinations					
	Primary	NR based	Labor-intensive	Scale-economy	Specialized	R&D-intensive	Mercosur+ Chile	EU	Other LAC	U.S.	Asia, Africa, Middle East	ROW
Micro & Small	20.7%	18.6%	19.2%	13.7%	17.9%	9.8%	45.9%	16.1%	14.7%	10.9%	5.1%	7.4%
Medium	26.0%	20.4%	16.4%	13.1%	14.3%	9.8%	41.9%	19.6%	12.2%	12.4%	7.2%	6.6%
Large	32.7%	40.5%	5.5%	15.4%	1.9%	4.0%	33.1%	21.1%	7.9%	11.1%	20.2%	6.6%

Source: Ministry of Economy and Production.

TABLE 17 (continued)
PRODUCTS AND DESTINATIONS OF SME EXPORTERS IN LATIN AMERICA
(2) Brazil (1st Qtr, 2004)

	Product Types				Destinations					
	Basic	Semi-Manu-factured	Manu-factured	Others	Mercosur	ALADI (exc. Mercosur)		NAFTA (exc. Mexico)		ROW
						EU15	Asia	EU15	Asia	
Micro & Small	5.8%	13.5%	80.2%	0.4%	14.5%	15.9%	23.2%	27.1%	8.3%	11.0%
Medium & Large	26.6%	14.1%	58.4%	1.0%	10.0%	11.5%	23.1%	22.8%	15.0%	17.7%

Source: SEBRAE.

TABLE 17 (continued)
PRODUCTS AND DESTINATIONS OF SME EXPORTERS IN LATIN AMERICA
(3) Chile (2003)

	Industries			Destinations				
	Mining	Agriculture	Manufacturing	Latin America	North America	Europe	Asia	ROW
Micro	0.8%	11%	88%	58%	19%	15%	5%	4%
SMEs	1.9%	22%	76%	34%	25%	23%	12%	6%
Large	51%	6%	43%	16%	18%	26%	36%	4%

Source: CCS.

TABLE 18
EXPORTS AND FDI BY KOREAN SMES

	Exports (2003)					FDIs by SMEs (2002-2004 Total)			
	Total		SMEs		SME/Total	No.	% of Total	US\$ Million	% of Total
	US\$ Million	% of Total	US\$ Million	% of Total					
Africa	3,118	1.6%	883	1.1%	28.3	14	0.3%	6	0.2%
Asia	99,312	51.2%	48,049	58.8%	48.4	3,739	83.2%	2,906	72.8%
Central & South America	8,802	4.5%	2,854	3.5%	32.4	55	1.2%	212	5.3%
Europe	31,899	16.5%	11,054	13.5%	34.7	126	2.8%	129	3.2%
Middle East	8,592	4.4%	24	0.0%	0.3	18	0.4%	8	0.2%
North America	36,902	19.0%	13,090	16.0%	35.5	512	11.4%	693	17.4%
Oceania	4,906	2.5%	1,478	1.8%	30.1	31	0.7%	37	0.9%
Other	287	0.1%	66	0.1%	23.0				
Total	193,817	100.0%	81,699	100.0%	42.2	4,495	100.0%	3,991	100.0%

Source: SMBA.

Recently more Japanese and Korean SMEs are going abroad to acquire cheaper qualified labor forces. FDIs by Korean SMEs have been flown mainly into Asia (83.2% of the total cases and 72.8% of the total value of FDIs by SMEs for 2002-2004) and North America (11.4% and 17.4% respectively), which are their main export markets. The percentages for Latin America are 1.2% and 5.3%, respectively. In terms of amount, FDI to Latin America is relatively high compared to the ratio of Latin American to total exported value (3.5% in 2003) (table 18).

(c) Obstacles for SMEs to Export

Table 19 summarizes barriers for Latin American SMEs to participating in foreign markets, many of which were identified in a survey carried out 10 years ago for APEC countries. In the APEC economies, difficulties faced by SMEs with respect to exporting and investing abroad included: lack of information on overseas markets; trade and non-trade barriers; inadequate

networking; shortage of funds for setting up business channels abroad; and lack of experience in international business practices (APEC, 1994).

TABLE 19
BARRIERS TO EXPORTS FOR LATIN AMERICAN SMES

Argentina	Brazil	Chile	Mexico (Manufacturing)	
Obstacles to initiate exports for non-exporters	Major Difficulties for Exporters	Weakness of SMEs	<i>External</i> Factors that limit exports	<i>Internal</i> Factors that limit exports
<ul style="list-style-type: none"> • Access to information • Prices • Scarce official supports • Scale • Finance • Human capital • Transport costs 	<ul style="list-style-type: none"> • To deal with bureaucratic and administrative procedures • To obtain information on regulations in foreign markets: technical norms, commercial barriers, etc. 	<ul style="list-style-type: none"> • Quality management • Information management (Marketing and sales) • Marketing strategy • Definition of products • Customer relationship 	<ul style="list-style-type: none"> • Scarcity & high freight costs • Slowness and excess of customs procedures • High costs of information on exporting markets • Conditions of trade finance 	<ul style="list-style-type: none"> • None • Insufficient production capacity • Organizational insufficiency • Insufficient quality

Source: Ministry of Economy and Production (Argentina), Ministério do Planejamento, Orçamento e Gestão (Brazil), CCS (Chile), and Secretaría de Economía (Mexico).

This clarifies that SMEs do not fulfill the necessary conditions to meet current customers' needs related to cost, quality, delivery, and customer service. These weaknesses often arise from characteristics of SMEs, including, among others: lack of human resources; unsound operating bases; vulnerability to business environments; shortsighted business management; small scale; and sporadic export. In addition, although management of an SME tends to be largely in the hands of a few executive officers, they often cannot perform all necessary functions, or they may not be willing to change their business cultures to cultivate new markets. Representative issues concerning facilitation of exports by SMEs include quality management, transportation costs, and trade-related procedures.

Technical norms and quality management

Today, secure product quality is a prerequisite for businesses to access foreign markets. In addition, SMEs intending to export their products must comply with the technical specifications and phyto-sanitary conditions applicable to each market. On the other hand, large companies oblige their suppliers to ensure products meet the specified standards and quality. Therefore, achieving international certifications is an important step for SMEs to meet market requirements and expand exports.

In Mexico, according to a survey carried out by CONACYT, the number of companies with the ISO 9000 and 14000 grew from 113 in 2000 to 3,296 (2,889 or 87.7% for the ISO 9001:2000 and 407 for the ISO 14000) in 2003. The 3,296 firms include 160 micro, 332 small, and 901 medium firms (842 large and 1,061 not-specified firms). By industrial sector, 47.9% of the establishments belong to the manufacturing sector (including 114 firms in the food and beverage sector), and 40.0% to the services sector. About 30.4% of those certificated export their products. By firm size, 1.3% of the exporting firms with certifications are micro. The percentage for small and mediums firms are 5.0% and 32.8% respectively (38.2% for large and 22.7% for non-specified firms).

Governments provide SMEs with various supports to obtain various certifications. In Malaysia, at the end of December 2003, a total of 2,022 companies had received the ISO 9000, out of which 1,158 were assisted by the Government (SMIDEC, 2004). Now the ISO 9000 Certification is only an important first step in the process. In the food sector, a total of 534 companies had already obtained Halal certification to meet Moslem religious requirements, in addition to the 56 that had obtained the Hazard Analysis Critical Control Point (HACCP)

certification. As a result of strong government initiatives, 46.1% of the SMEs sampled have received at least one type of certification. Nineteen per cent have two types of certification, and 7.2% have three. A significant 25.4% have not obtained any type of certification.

Cao and Scrimgeour (2004) surveyed motivations, implementation problems, costs and benefits associated with the implementation of HACCP/Risk Management Programme (RMP) for SMEs in New Zealand, where 81% of SME respondents to the survey have HACCP (compared to 96% for large firms). SMEs are encouraged to adopt these programs, motivated mainly by external factors including:

- (1) legal requirement,
- (2) accessing new overseas markets, and
- (3) needs of major customers.

In the implementation process, SMEs incur the burdens of (1) design and development costs for implementation, and (2) record-keeping tasks for operation and verification – although in general SMEs spent less time on developing HACCP/RMP than large firms, perhaps because of their less complicated production process. In addition, SMEs are more concerned about the costs associated with implementation, resources (staff, time, budget) available, and lack of expertise in HACCP/RMP implantation. Perceived benefits from the programs are improvement of risk management, market access, and positive effects on overall business management (efficiency and production control). But there is a gap in the perception on the achieved benefits. Some firms did not report any benefits of these programs as a business tool. This can be explained partly by the ways in which SME use the certification systems.

SMEs hesitate to enter into processes to obtain international certifications because of high costs to acquire certifications and uncertainty of benefits to be gained from obtaining them. Some Latin American exporters commented that local SMEs prefer to export their products to neighboring countries that do not call for such certifications.

Costs related to transportation and trade-related procedures

Transportation costs are of growing importance, as customs tariffs have been decreased through trade negotiations. Recent price increases in freights caused by increases in demand and a rising oil price have had a considerable effect on SMEs. According to a report by the Santiago Chamber of Commerce (CCS) in May 2004, transportation costs as a percentage of the exported value were 8.0% for large firms, 11.4% for SMEs, and 11.1% for micro firms. Smaller volume and irregularity of exports by SMEs affect the difference in transportation costs between SMEs and large firms.

On the other hand, Verwaal and Donkers (2001) identified transaction-related economies of scale (which are closely related with the size and frequency of international trade activities), simplified customs procedures, and advanced IT as the main determinants of customs-related transaction costs in the case of the Netherlands. In addition, the study did not recognize any effects of firm size on customs-related transaction costs, if these determinants of customs-related transaction costs are taken into account. Nevertheless, smaller firms may find it more difficult to comply with requirements to obtain a license for simplified customs procedures, such as the specification of the accounting information system and measures of internal control.

(2) SME Development Through IT: Key Findings from the Case Studies

From the practical experiences presented by the studied countries listed in the Annex 1, we can find common aspects related to: motives to introduce IT; key application areas and IT usage patterns; processes to expand access to foreign markets; and barriers to diffusion of e-commerce, SCM and other e-transactions.

(a) Motives to introduce IT

Information technologies are thought to be effective tools to overcome obstacles for SMEs seeking to participate in international trades. In practice, SMEs are motivated to introduce IT by various purposes, and governments provide a variety of support programs to overcome barriers encountered by SMEs. The case studies presented clearly the motives for SMEs to introduce IT, and the public institutions necessary to make use of IT for trade promotion and SME development.

The main reasons for private firms to introduce IT are, among others, to:

- Improve information access;
- Improve internal administrative management;
- Improve product management and quality control;
- Enhance productivity by improving internal managements as listed above;
- Facilitate collaboration with other companies and seek economies of scale; and
- Acquire new business opportunities.

In addition, services providers, especially in the logistics and transportation sector, are eager to provide SME-supporting services and improve their services targeted at SMEs that depend on modern web-based services.

The weaknesses of SMEs mentioned before are related basically to limited capabilities to access and manage information, inefficiencies in their internal managements, and disadvantages caused by the small scale of their businesses, in addition to lack of qualified human resources and access to finance. SMEs also often look to collaborate for developing new businesses and products, sharing IT systems with other firms in order to avoid huge investments, attempting to achieve an economy of scale that may not be achievable.

On the other hand, the main motives for the public institutions to promote IT policies and introduce IT are to:

- Improve SMEs' competitiveness and to develop industrial clusters;
- Promote partnerships between large firms and SMEs, and among SMEs;
- Reduce costs related to trade procedures for both the private and the public sectors;
- Increase productivity and transparency of the public sector; and
- Facilitate implementations of trade promotion policies and trade agreements.

The public sector is encouraged to utilize IT with the two different intentions of (1) implementing their policies for economic and social, and national regional developments more efficiently and effectively, and (2) improving their internal management. In the case of trade promotion policy, both the public and the private sectors are looking for IT solutions to enforce implementation processes of closed multilateral, regional, and bilateral free trade agreements, as well as unilateral efforts toward trade promotion.

(b) Patterns of International Trade by SMEs and IT applications to promote SME development

The case studies on IT usage for international trade listed in Annex 1 are mainly related to (1) IT usage by SMEs that participate directly in foreign markets, and (2) IT services for trade promotion and facilitation. In terms of area of application, the studies can be classified into the followings:

- Corporate management and strategy;
- Partnership between large and small firms;

- Partnership among small firms;
- Sector-specific services and policies;
- Public and private websites for information provision and business matching;
- Public websites for trade promotion and facilitation; and
- Adoption of IT in the non-IT sectors.

Corporate Management & Strategy

It is fundamental for companies to apply IT to the important areas of their internal management, from the perspective of their business strategies, with the objective of reinforcing their competitive advantages. Platforms for collaboration with other firms should be the information systems installed for these purposes, and business areas in which a firm is competitive. SMEs can establish such IT systems by themselves or outsource them from application service providers. As is the case with Taiwanese affiliates in China, SMEs invested in or allied with firms with advanced IT systems and could share a state-of-the-art information system created and located in their parent firms, with relatively less IT investment.

Business Matching

This is a relatively simple service offered by private and public websites that permit registered users to submit and transfer automatically business requests, offers, bidding information and so on in order to provide opportunities to make the first contacts with potential buyers and suppliers. Governmental trade and investment promotion agencies have established this type of services within their own website specialized for international trade. Nevertheless, as mentioned in the case studies of Chinese IT firms that have aggressively adopted IT for their internal purposes and advertisement of their companies and products, companies have necessarily utilized neither services for ad-hoc business matching nor contract-based e-transactions including SCM for the reason of lack of confidence in these IT systems and high adoption costs. Private websites that often offer services with more added values than public websites are not always affordable for all of the SMEs.

Partnership between Large and Small Firms

It is acknowledged widely that SMEs can increase opportunities of exports by participate in supply chains organized by large firms. SMEs are investing in IT to reinforce and make more efficient their internal processes of design, development of products, production, quality management and other administrations. Governments offer supporting programs to facilitate private partnerships and public-private partnership, as shown in the case of the Argentine Apex program. Nevertheless, the problem often mentioned on this private partnership is related to asymmetric bargaining powers between large and small firms. In addition, the small production capacity of SMEs makes SMEs to be too much dependent on a business with a large purchaser. These can result in the situation that SMEs should accept unfavorable terms of contracts, as written in the case of the Brazilian aeronautic suppliers that have invested in IT mainly for design and production processes. Another issues is identified by the Korean case that a SME passively implementing e-commerce by the guide of a large customer company constrains the firm's business opportunities with other large firms.

Partnership among Small Firms

This partnership will facilitate a market development by potential SME exporters with capabilities and specialties to provide competitive products and services but without enough capabilities and production capacities to meet market demands completely by themselves. Establishing alliances among their participants enables to satisfy such requirements. IT platforms may realize partnerships in more flexible and efficient manners by permitting SMEs to share IT resources and combining specialties of the members. Such private entity is often mentioned as a virtual company. By associating with regional development policies, Internet-supported partnerships

between, private firms, public entities and universities and research institutions have a potential to develop into formation of virtual clusters.

Sector-specific Projects

Relatively well-functioning projects in the B2B sector are sector-specific projects, of which examples are travel sector development in Mexico and Viet Nam, a portal site for the knit sector in Republic of Korea, a samples production group and a virtual SME group in the construction services in Japan, a gemstone company group in Thailand, and so force. A platform for this purpose is a website specialized in a specific sector, or “vortal” (vertical portal) that can be a helpful tool for development of SMEs, industries, clusters and regional economy.

Public Services for Trade Promotion and Facilitation

Public entities, mainly ministries in charge of trade and economy and governmental agencies for trade and investment promotion, have already established websites for information provision related to trade-related regulations and tariff rates of main export markets and elementary facilities for business matching. On the other hand, public entities that regulate exports and imports –especially ministries related to finance and customs, transport, economy, agriculture, fish, animals, health, and national security– are digitizing paper-based trade-related procedures to make it possible for traders to complete required procedures online. This trade information system development is combined with development of industrial zones in China to facilitate exports. A recent phenomenon is a difficult effort to build a single window system or one-stop service that integrates all of the IT systems related to international trade into a single website and permit users to accomplish all of the procedures with one-click. The “e-Trade Korea” is one of the most innovative projects observed in the studied countries. Another new incident is an interconnection of trade-related systems with those of trade partner countries. These are advancing in parallel with a series of free trade negotiations to reinforce bilateral, regional and multilateral economic integration (a case is summarized in Box 1).

Adoption of IT in the Non-IT sectors

The IT sector is the most intensive IT applications, as observed in China. Trade support services, particularly IT services for logistics, are gaining momentum by developing new service providers and supplying the demands of exporting and importing SMEs. Firms in the non-IT sectors with comparative advantages are also leading in adopting IT into their core businesses. These sectors include the food-related sectors that are hastened to build traceability systems, mining sector, tourism, and handicraft. The Nostalgia market, which targets immigrants mainly to the United States, is a fruit of globalization driven by human migration and information technology, and special to Latin America. Mexican and Salvadorian firms have developed a typical pattern of the nostalgia market, for which these firms exports national products to immigrants in the United States. Latin American firms are also meeting demands for services exports. An example is a sale of a birthday cake that an immigrant who lives in the United States can order to a sweet shop in his home country to send it to his family and relatives. The sweet shop can use the birthday data of its client for sales promotion sending via e-mail before the next year’s birthday.

(c) *Processes to expand access to markets abroad*

Developing a new market and building up contacts with clients are an initial step and high hurdles for unbranded SMEs even if they have established their own websites. Business matching services are expected to be a low-cost and convenient measure for SMEs that are willing to expand customer base. In the case of “e-Trade Korea”, users evaluated it as an effective method for foreign marketing, to find trade partners, for simplification of trade procedures and to get trade information.

On the other hand, such online marketing channels can substitute for those offline partially. Some case studies, mainly of Chinese firms, mentioned the process to get to deal with foreign clients. Lessons learned from firms’ experiences are the followings:

- Importance of face-to-face (F2F) contacts and traditional channel such as trade fairs;
- E-mail and other telecommunications methods for communication with acquainted persons; and
- Websites for products advertisements, which may be accessed by participants who made contacts at trade fairs.

Some SMEs that make contacts with a client successfully combine traditional marketing channels and information technologies effectively to build up trustful relations with their clients. F2F contacts are fundamental as the first step and trade fairs provide good opportunities for SMEs to encounter potential clients and reinforce confidences with existing clients. A few minutes of communications can be enough to attract the persons who met at showrooms of the trade fairs to the SMEs' websites. They will visit the websites to gain more information on the companies and their products. E-mails and other telecommunications methods such as video conference systems are complementarily used to start deals and coordinate SCM. Through these negotiation processes, SMEs may be required to investment in their production and administration processes in order to meet specifications and requirements of new clients, which can be burdens for smaller firms that are financially weak (Box 2).

(d) *Barriers to diffuse e-commerce, SCM and other e-transactions*

Various impediments, in addition to technical constraints, cause current limited use of e-transactions by SMEs.

- From the experiences of the exemplified Chinese companies, the serious uneasiness to use them is a *lack of confidence in e-commerce*. For this reason, Chinese firms make complementary usage of video meetings and other communication methods such as telephone, e-mail, and face-to-face communications.
- The second is relate to a “*chicken and egg*” argument. Less users of IT administrative systems and lack of experiences make firms hesitate to utilize e-commerce and SCM and to digitize fully all of the administrative works related business transactions.
- *High costs and fees to start e-commerce by utilizing e-marketplaces* are a severe hindrance especially for SMEs that are incapable of develop their own IT systems by themselves.
- *Insufficient human resources and digital infrastructure* are always concerns when we discuss development of SMEs.

These barriers are common to those to promote public online services for trade promotion and trade-related procedures. Korean SMEs pointed out constraints to participate in e-Trade, some of which are as follows: insufficient internal digital capability in terms of manpower that enforces SMEs to depend upon outsourcing when they invest in information system; managers' or CEOs' incomprehension on digital-based management and technologies; and lack of experience in electronic transactions and international trade. At the same time, they mentioned as the main reason for not using e-Trade, “No need especially”, insufficient IT infrastructure, and the shortage of experts. More of Korean SMEs pointed out the shortage experts as the reason than larger firms whereas more large firms pointed out the insufficient infrastructure than SMEs. The most urgent task for promoting e-Trade pointed out by them was establishing e-Trade one-stop service system. Larger firms pointed out this more than SMEs.

BOX 1
COMPUTERIZED SYSTEMS FOR INTERNATIONAL TRADE AND CUSTOMS
INTEGRATION IN EL SALVADOR AND GUATEMALA

Computer Systems for Trade Procedures in Guatemala. In January 2000, the Guatemalan customs authority (SAT) launched a pilot plan for a new information system, the Guatemalan Integrated Customs System (SIAG) to replace the original version of the customs system developed by UNCTAD, called Automated SYstem for CUsoms DATA (ASYCUDA). SIAG, which was locally designed and is an adaptation of the Mexican computerized customs system (Integral Customs Automated System, SAAI), was implemented in June 2001.

The Association of Non-Traditional Product Exporters (AGEXPRONT), a non-profit organization, is responsible for the initiative for a single window for exports (VUPE), which was launched in 1986 by the Ministries of Public Finances and Economic Affairs in order to bring together all the public and private entities involved in the export process and streamline the inter-institutional formalities. In December 2000, AGEXPRONT launched the Electronic System for Export Authorization (SEADDEX), which was developed over a one-year period. This system is installed in the computer from which the export application is transmitted to all of the institutions concerned to trade control. As a result, applicants can receive messages of documents authorization in a few seconds today.

Computer Systems for Trade Procedures in El Salvador. The Salvadorian government began a project for implementation of the ASYCUDA in April 1999. The project was concluded in 2002. The present computerized customs system named as TELEDESPACHO installed only the declaration module of the three modules of ASYCUDA (Manifest, Transit and Declaration). Others have been designed locally in order to meet the specific needs of the country.

The Export Procedures Center (CENTREX) was created in accordance with the law on export promotion of 1987 and since September 1989 it has been an administrative unit of the Central Reserve Bank (BCR). The documents issued and authorized by CENTREX include the followings: Central American Single Customs Form (FAUCA); goods declaration; phytosanitary and zoosanitary certificates; visas for agrochemical products; certificates of origin, and so on. Between May 1995 and June 2001, an electronic link was established between the exporters and CENTREX via a private BCR network, so that the authorization process was automated and available on a 24-hour, 365-day basis. But only 240 users of this service had registered with it. In 2001, the Foreign Trade Integrated System (SICEX) was created. It provides an Internet connection between customs offices and other State institutions, exporters, SMEs, information centers and international organizations. The user friendliness and low costs permit the CENTREX to increase the SICEX users to 1,652.

Integration of the Customs Offices of El Salvador and Guatemala. Until March 2004, exporters from El Salvador to Guatemala or vice versa had to carry the formalities associated with the FAUCA at the border on entry into the respective country. As any electronic data change had not implemented between the customs authorities of the two countries, the information had to be retyped into the system of Guatemala by the customs officials at the customs post and the taxes to be paid were calculated by the computer system. Traders required a service charge of US\$ 40.

Since April 2004 when interconnection of the SEADDEX and SICEX has established, exporters can receive the documents in an average time of less than 5 minutes. When the transporters arrive at the integrated borders between El Salvador and Guatemala, the customs officials no longer have to enter the information. The average waiting time is 30 minutes and there are no charges associated with this service.

Key success factor of the customs integrations were the followings:

- Political will and decision-making at the presidential level;
- FAUCA, a significant facilitation measure of the Central American Customs Union.
- Application of a cross-platform standard such as eXtensible Markup Language (XML)

By utilizing XML and the Internet Protocol, an export form based on the FAUCA from one of the countries in the sub-region is automatically converted into an import form for the destination country, and exchanged via the Internet between different information systems.

Source: Sidney Rezende and Yasushi Ueki “Trade Facilitation and Central American Integration: Customs Modernization”, Bulletin FAL, No. 222, February 2005.

BOX 2**SWEET'S, A BETTER PRACTICE OF A SALVADORIAN SME**

The company. Sweet's (www.sweetsbakery.com), a familiar business founded in 1960, runs 8 stores in San Salvador that sell pies of weddings and a variety of gourmet desserts, all of which are integrated via the Internet with a server located in the central plant of the company.

Access to the U.S. market and Wal-Mart. In the 2003, with the support of the Salvadoran Government and the U.S. Agency for International Development (USAID), the company participated in the Chicago Food Fair. The U.S. giant supermarket chain company Wal-Mart was interested in Sweet's products. After accessing Sweet's and other Salvadorian firms' websites to gather information on the firms and their products, Wal-Mart's employees in charge of procurement visited El Salvador to know facilities of potential Salvadorian suppliers and to carry out a proposal of businesses. Only two firms succeeded in deals with Wal-Mart; one of them was Sweet's.

Costs and Result of closing a deal with Wal-Mart. In order to sell its products in Wal-Mart stores in the U.S., Sweet's had to change the packet size of its cookie from 500 gram to 250g. The firm was required to invest in a new packing machine to change a manual packing process to an automated one. The firm also acquired two new ovens. In addition, Sweet's installed new software to communicate with Wal-Mart. As a successful new deal with the great supermarket chain, its sales increased by 18%.

IT usages for export processes. As many firms, the firm communicates with the client via the Internet. Export procedures are complemented through a system of the Export Procedures Center (CENTREX) of the Central Reserve Bank of El Salvador. The firm also makes use of online banking services.

Source: Telephone interview to the firm carried by Sidney Rezende, ECLAC.

6. POLICY ISSUES CONCERNING IT UTILIZATION IT FOR DEVELOPMENT OF SMES AND INTERNATIONAL TRADE

(1) Promotion of IT utilization

(a) Obstacles to IT usage

The country studies showed wide digital gaps between larger and smaller firms, especially medium and small/micro enterprises, although most SMEs recognize IT's importance and claim that they intend to use it. But in reality, their actual performances are not satisfactory, making them reluctant to invest in IT. This is primarily due to *deficiencies in human resources, funds, and government policy*. A deeper empirical study carried out by the Japanese team revealed the obstacles for SMEs, which are mentioned by other country studies and valid for the public sector as well.

IT Leadership and political leaders' or top executives' consciousness

Since IT is related to business management and strategy, decisions made by top management are of primary importance. Even if SMEs were placed in an optimum environment, with IT specialists, sufficient funds, and government support, these factors could not promote IT usage without skilled decision-making by top management. This is true of regional, national, and international IT policies. We should not forget that IT is not just a useful tool to promote internal efficiency or productivity of routine works, but an essential tool to create entirely new business models.

Traditional business practices

Traditional business practices, which had been instituted before the IT age, hinder efforts made by individual firms or departments. New IT-based practices can breed conflicts with other departments and firms that are based on traditional approaches. For this reason, coordination efforts that complement IT leadership are a critical factor for successful implementation of an IT project.

Costs of IT investment

SMEs are in unstable business situations and generally have insufficient funds for IT investment. They do not well understand the long-term benefits of IT investment, and therefore see IT more in terms of the present costs than the future profit increases. It is true, however, that IT investment is very costly. In addition, large companies often ask SMEs to use software customized to be compatible with their own systems. This increases costs for SMEs not only to purchase and customize all necessary software but also to interconnect the customized IT system with other large firms.

(b) Key Policy Issues

Improvement of Internet connectivity and access

At least two crucial points are infrastructure availability and costs of access (investment) and operation (maintenance). Significant differences in IT diffusion observed between the analyzed countries. These differences can be corrected by public policies affecting the telecommunications sector, and the promotion of development of new access technologies, which are oriented toward special financial support programs for SMEs. Other goals are increasing public Internet access; stimulating investment in IT; implementation and use of IT in public places; applying tariff and tax exemptions; and applying incentives for the installation of public access facilities in the remote and rural zones.

Education and training

Digital alphabetization is an excellent concept. It mandates that all of the primary, secondary and higher educational establishments with IT access must include IT contents in their curriculums and be engaged with governmental programs to close digital divides. In order to implement this effectively, it is necessary to:

- Incorporate corporate executives, industry associations, NPOs, local communications carriers, and local companies in order to guarantee and co-finance the implementation of the programs,
- Implement training programs specially designed for SMEs,
- Implement special training programs to learn the use of public online services,
- Develop cooperative programs between universities, R&D centers, firms, and educational establishments; and
- Carry out *education to change business culture*.

Online government

This is one of the actions that strongly contributes to promoting acquisition and use of IT by economic agents and citizens. This includes: digitalization of central, regional and city governments; development of online services; building of online public procurement system; and promotion of online procedures.

Development of solid legislation systems

Creating sound normative and legal infrastructure assures confidence of businesses in e-commerce and privacy protection, and thus promotes development of e-commerce.

As pointed out by the questionnaire survey conducted by the Japan team, SMEs most frequently request support in the form of education, such as seminars and practical IT training. Most IT training focuses merely on using PCs and building homepages and other Web materials. However, the IT-related knowledge that would prove most beneficial for SMEs concerns how to build business models around IT. Training for top management is also of great importance, as mentioned previously. In addition, creating new firms, nurturing new industries, and providing consultation services on how to restructure businesses should be stressed. A helpful project is to

publicize and provide information about success stories of start-ups using IT; as mentioned in other parts of this report, there are many cases of successful business models built around IT. One of the reasons SMEs are reluctant concerning IT investment is that they tend to stick to short-term tangible results; thus, success stories will surely help encourage them.

Finally, it should be mentioned that the focus of IT supporting policy for SMEs may be different and customized in accordance with the maturity of IT utilization by individual firms. SMEs in the more IT-developed group point to policies such as low-interest loans, tax exemptions and subsidies for IT investment, along with various deregulations. In other words, they desire the establishment of an environment conducive to IT investment. On the other hand, the developing group tends to request policies such as IT seminars and training for PC operation and building homepages, which can be summarized as human resources development required for the introduction of IT.

(2) Policy Elements for Development of Smaller Exporters

Competitiveness development

It is observed that the governments in the studied countries have implemented four areas of separated policies:

- *industry promotion*
- *export promotion*
- *IT*
- *science and technology*

Industrial and enterprise development, which had been implemented in the relatively closed economies, has to be implemented in the process of globalization and nowadays in the process of adopting IT. In a situation of global competition, what is important for policy makers is to develop world-class SMEs that are able to compete in the world market. For this purpose, these four policy areas should be integrated into a development policy to enhance competitiveness. Otherwise, the results of the four policy areas will be incomplete, and therefore of no significance.

Inter-institutional coordination

Almost all of the surveyed countries have created diverse institutions and numerous programs to support SMEs. Nevertheless, SMEs do not necessarily understand how to take advantage of those policy instruments. One problem is that different ministries generally handle policy instruments related to these four policy areas. As a result, what happens usually to a greater or lesser degree in the researched countries is that too many, and duplicated instruments have been established without any coordination between them. In addition, these programs and instruments are often too all-purpose to meet specific requirements from a firm, an industry, or a region. Thus, each entrepreneur must combine instruments of different sources, which is not optimal. In addition, no one body can evaluate the attainment of overall policy goals, or the performance of individual policy measures.

Coordination between the public and the private sectors

Partnership between the public and the private sectors can take advantage of the expertise and experiences that each sector possesses. As observed in the case of an infocenter project in Mexico, a sector-specific policy can achieve good performance, with the government playing a catalytic role. Such a project can align the interests and capacities of the participants, and use an initial investment by the government to build the private sector's faith in the project. It can also help overcome initial technological, financial, and organizational barriers. Utilization of know-how and resources of the private sector will be helpful to achieve public policy goals.

In order to make the partnership function well, it is necessary for policy makers to involve the private sector in the processes for definition, creation and measurement of impacts of policy

programs and instruments, in addition to defining clear roles and responsibilities of each sector. A challenge for SMEs is to get their best representatives involved in such processes. For the public sector, the challenge is to find specialists who have sufficient experience in private enterprise and capabilities to work together in a team.

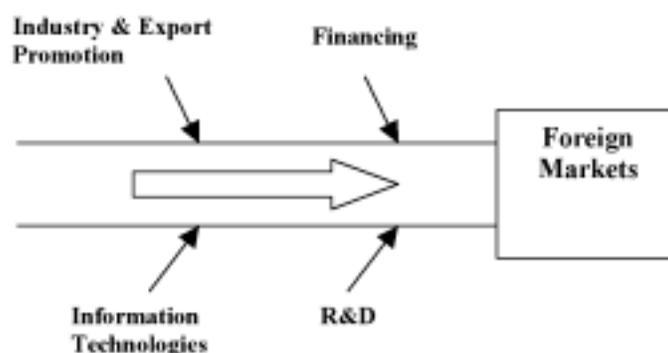
Science and technology system and SMEs

One thing observed in many countries, especially in Latin America, is a lack of cooperation between universities and SMEs. The main reasons of this problem in Latin America is that universities have more interests in basic research programs and publishing their results in international scientific magazines, which will increase the possibility for them to obtain research funds. On the other hand, the entrepreneurs of SMEs do not have interest in approaching universities, because SMEs consider those universities' fields to be too theoretical.

Highway to export

A company, which has a potential to be an exporter, but does not yet have export experience, will have to follow a metaphorical “highway” towards external markets. On this path, the firm should be highly productive and competitive. Thus, this highway can be a kind of observatory for both the public and the private sectors to generate the best conditions by providing the company with integrated support and promotion programs to develop it into a world-class one.

FIGURE 10
THE CONCEPT OF A HIGHWAY TO EXPORT



Source: sketched by Rodrigo Cárcamo Olmos.

Critical success factors for internationalization

From our observations, each country must assure the presence of at least the following three factors:

- Networks. SMEs must be integrated in productive and social systems at the local level in order to achieve economies of scale sufficient to compete with large companies.
- High quality of products, processes, and human resources. These are indispensable elements for SMEs to compete not in price but rather in a highly specialized niche market.
- Knowledge and competition. These are key factors that encourage generation of high value added, high quality, and innovative products.

Direct export vs. indirect export

We can identify two different business systems: one is oriented toward foreign markets and composed of highly dynamic, modern, productive and competitive exporting companies, most of which are large and medium companies. The other is oriented toward the domestic market and composed of non-exporters or incipient exporting companies with low productivity and competitiveness, most of which are SMEs. The outsourcer-supplier relation between larger exporters and non-direct smaller exporters can facilitate technological transfer and make it easier for SMEs to learn foreign markets' requirement and clients' needs, although it is very difficult for SMEs to participate in supply chains organized by larger firms and to meet the price and quality requirements of larger firms. In this way, these SMEs may be able to evolve into "direct" exporter.

Horizontal vs. sector-specific policies

Many of the studied countries have developed business and export promotion models with instruments applicable to all of the sectors/regions created, without considering their specificities – that is to say, horizontal policies. These models have shown some efficiencies, but they also have been insufficient to support sectors or regions progressing dynamically. What is important is to achieve an adequate combination of horizontal and sector-specific policies.

(3) International Cooperation

In order to achieve the dynamic and effective development of SMEs by incorporating IT into local economies, it is necessary to strengthen international cooperation with at least these objectives:

- Harmonizing regulations and technical standards
- Sharing development of the information society
- Interchanging Best Practices and lessons learned from failures
- Establishing and sharing information systems

It is also important to take advantage of opportunities that can be gained from trade agreements.

7. CONCLUSION

In the intensive discussions conducted in the International Seminar, the participants pointed out a wide range of policy fields and possibilities for international cooperation aimed at further deepening the inter-regional linkage. The issues discussed that concerned only direct exports can be classified into those related to: (1) access and infrastructure; (2) getting business online; (3) entering into contracts online; and (4) trade facilitation (Annex 2). The related policy issues can be amplified if we consider measures to promote indirect exports. In order to establish an international cooperation system, it is necessary to focus on the prioritized themes.

(1) Policy areas to be focused on

(a) *Improvement of access to information on international trade*

Information sharing, retrieval and collection are the most important purposes of Internet use. Once firms obtain Internet access, they can benefit from these processes. There is an urgent need to develop IT infrastructure, especially in less developed countries where many SMEs still do not possess PCs and Internet access from their offices. On the other hand, in semi- and more developed countries, almost all of the medium-sized and larger firms own PCs. At the same time, public institutions, educational institutions and infocenters provide Internet access to SMEs free of charge or at affordable rates.

Once SMEs secure Internet access, they can find trade information such as customs tariff tables, trade-related procedures, trade-related regulations, and business directories online, many of which are provided by trade-related institutions and industry associations. Some firms, nonprofit organizations (NPOs) and international organizations also offer trade- and investment-related information, manuals, business software, marketplaces and other services through the Internet, part of which are free or offered at specially reduced prices to SMEs. Nevertheless, such information is often scattered in the vast online space. It is not effortless to access data sources that offer required information, nor to follow revised data on the Internet.

It is effective to realize so called “one-stop service” by establishing a portal site in order to solve these problems. Of paramount importance is to design the portal from a user’s standpoint. Also useful for SMEs would be portal sites specialized in specific industries, or Vortals (Vertical Portals).

(b) Capacity Building

In order to utilize IT as a tool for promoting international trade by SMEs, capacity building is required in the fields of both IT and international trade.

The case studies presented by the participants in this research gave details on the positive effects of IT introduction on: streamlining of administrative work at the individual firm level; improvement in production management and quality control; encouragement of better market access; improved customer service; etc. Important to achieve these are continued attempts by individual firms under the leadership of top management. It is necessary for governments to encourage such business efforts.

In order for an SME to introduce IT successfully, its management executives need to understand information concerning IT usage and its benefits, and share such information with their employees in order to facilitate adoption and implementation of new management systems. In reality, even executives do not necessarily obtain and recognize enough information on the “best practices” of SME IT usage. In addition, lack of financial sources and IT-related human resources are serious obstacles common to SMEs in every country. Although today SMEs can obtain IT tools at low costs that are provided by various institutions through websites, SMEs can not utilize such instruments effectively without understanding the potential and manner of IT operation.

On the other hand, trade-related tasks require not only comprehensive knowledge of overseas markets, but also the enforcement capabilities to do business negotiation, acquire certificates of quality standards, and to process cumbersome procedures. In addition to practical affairs such as international trading systems and international standards, foreign language and business culture are also recognized as important fields of capacity building in order to promote inter-regional trade. Distance learning and e-learning that interconnect educational institutions via the Internet may also be useful tools.

(c) Formation of Virtual Clusters

Group cooperation among SMEs is considered an effective scheme to foster export industry development and promotion. It enables small firms to achieve scale economies and enhance bargaining power. These benefits make it feasible for SMEs to invest in IT and involve themselves in e-commerce.

The expected gains from formation of industrial clusters, which associate firms belonging to a specific industrial category with affiliate business located within a geographically narrow zone, include encouragement of knowledge and technological transfer from universities to businesses and within participant firms, and productivity increase through promotion of competition among companies. It should be noted that the conservative and prudent procurement policies of large firms and trade practices based on long-term contracts are often insurmountable hurdles for SMEs trying

to participate in traditional supply chains that have a pyramidal structure composed of a large firm at a top and the first- and lower-tier suppliers.

In the Internet age, SMEs will be able to find business opportunities from forming Internet-based network-type business groups that are more flexible than pyramid type ones. A concrete example of such group is when SMEs specialized in a specific manufacturing process form a collaborative unit in accordance with technical requirements to meet an order to produce units of parts for fabricating a particular end product. In the case of Internet-based network-type association, it is possible not only to network firms placed within an industrial accumulation but also to create a “virtual cluster” that links up with cooperative networks set up in different regions.

Conditions for formation of virtual clusters include mechanisms for at least coordination among associate firms (e.g. administrative structure of portal site(s)), and for quality assurance (e.g. acquisition of international standards). Technological transfer via academic, business and governmental circles will be a key element for ensuring sustainable development of industrial clusters.

Just for reference, Annex 1 presents a number of case examples encountered in our country studies.

(d) Trade Facilitation

Burdensome trade-related procedures and high transportation costs relative to large exporting enterprises are substantial barriers for SMEs seeking to export their products. Although transportation costs are partly caused by transport demands and negotiation between private carriers and exporters, it is also well-known that inefficient handling of trade-related documents overseen by governmental departments raises the total cost of international trade.

Trade facilitation includes extensive countermeasures against these problems. The subjects to be examined are, for example: improvement of access to information on trade-related policies and regulations; simplification of trade-related procedures; mutual recognition of sanitary and phytosanitary measures; digitalization of trade-related procedures such as customs clearance, sanitary and phytosanitary measures, and certificates of origin; and establishment of a “single window system” that interconnects various computerized systems related to international trade and transportation.

A single window system unifies public institutions such as customs authorities, quarantine stations, banks, and airport and port authorities and facilities. In addition, trade-related service providers can transform themselves into a “virtual trading company” that offer one-stop service by carrying out all of the trade-related operations from e-marketplace to transport arrangement, trade finance, and so on.

(e) Improvement of Infrastructure for E-business

Harmonization of business rules based on legal and dispute-settlement systems and common technical standards are required to facilitate international e-commerce. The governmental sector can provide SMEs with incentives and opportunities to gain experience with electronic transactions by computerizing tax collection, public procurement, and other public services. In Chile, most of the applicants to government-to-business e-commerce (B2G) are SMEs, and B2G contributes considerably to expanding the transaction value of e-commerce.

(2) Policy Suggestions to and Future Policy Issues for the FEALAC

Taking into consideration the results of the International Seminar and Country Studies, we outline below (a) policy suggestions that are short-term policy issues and (b) future policy agenda to be examined as mid-term policy issues. Parts of these issues are common to the 10 suggestions made by the young leaders of the FEALAC member countries (Annex 3).

(a) *Policy suggestions: Establishment of a portal site*

It is recommendable that a portal site be established that is specialized in SMEs, international trade, and foreign investment, as a platform to promotion of international cooperation between the FEALAC member states. The portal will provide contents that should include at least (1) files for exchange of effective business practices, case studies and news and information related to SMEs; (2) lists of contact persons; and (3) links to institutions in charge of SME development and international trade, and FDI promotion. The website should be established as quickly as possible, based initially on the recommendations of this study, and then enhanced continuously.

(b) *Future policy agenda*

In order to deepen inter-regional integration, in the medium and long term the FEALAC member states should deal with issues identified in this research project to improve business infrastructure and SME support programs. The study group recognized the following policy agenda to be discussed at a FEALAC working group:

- Establishment of a network of researchers and research institutions to observe SMEs, to carry out case studies, share experiences, and compile statistics on IT, SMEs, trade and investment;
- Business e-learning: including business culture and foreign languages;
- Formation of virtual clusters: sector-specific international cooperation for regional development (in the sectors of agriculture, tourism, and so on);
- Building business telecommunications infrastructure;
- Harmonization of the technological standards, industrial standards and authentication, IT security such as mutual recognition of e-signature, and legal and regulating systems; and
- Trade facilitation.

References

- APEC (1994) “The APEC Survey on Small and Medium Enterprises”, APEC Committee on Trade and Investment, coordinated by the Ministry of Economic Affairs, Chinese Taipei.
- Aykut, Dick and Ratha, Dilip (2003), “South-South FDI Flows: How Big are they?” *Transnational Corporations*, Vol. 13, No. 1, UNCTAD, Geneva, April.
- Cao, Kay and Scrimgeour, Frank (2004), “HACCP/RMP Adoption in the New Zealand Meat Industry”, prepared for presentation at the AARES Conference, Melbourne, Australia, February.
- Comisión Intersecretarial de Política Industrial, Secretaría de Economía (CIPI) (2003), “Observatorio PyME México Primer Reporte de Resultados 2002”, Mexico, March.
- Guaipatín, Carlos (2003) “Observatorio MIPYME: Compilación estadística para 12 países de la Región”, Inter-American Development Bank, Washington, D.C., April.
- Infocomm Development Authority (IDA) (2004), “Executive Summary of Annual Survey on Infocomm Usage Businesses for 2003”, Singapore, June.
- Instituto Nacional de Estadística, Geografía e Informática (INEGI) (2001), “Micro Pequeña, Mediana y Gran Empresa. Censos Económicos 1999. Estratificación de los Establecimientos”, Mexico, December.
- Kuwayama, Mikio (2004), “Latin American South-South Integration and Cooperation: From a Regional Public Goods Perspective” Serie Comercio Internacional No. 50, Santiago, Chile, ECLAC.
- Kuwayama, Mikio, Jose Carlos Mattos, and Jaime Contador (2000), “Trade and Investment Promotion between Asia-Pacific and Latin America: Present Position and Future Prospects”, Serie Comercio Internacional No. 9, Santiago, Chile, ECLAC.
- Lall, Sanjaya (2000), “The Technological Structure and Performance of Developing Country Manufactured Exports, 1985-1998”, QEH Working Paper Series No. 44, Queen Elizabeth House, University of Oxford, UK, June.
- OECD (2002), *Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development*, Paris.
- Pyramid Research - Centro de Investigación de las Telecomunicaciones (CINTEL) (2003), “Estudio del Mercado de Servicios de Banda Ancha en Colombia”, Proyecto PNUD/COL/96/020, Bogota, Colombia, December.
- Secretaria de Economía (2003), “Observatorio PyME México: Primer Reporte de Resultados 2002, Comisión Intersecretarial de Política Industrial”, Mexico, March.
- Small and Medium Industries Development Corporation, Malaysia (SMIDEC) (2004), “SME Performance 2003”, June.
- UNCTAD (2004), *World Investment Report 2004*, Geneva, September.
- Verwaal, Ernst and Donkers, Bas (2001), “Customs-related Transaction Costs, Firm Size and International Trade Intensity”, Erasmus Research Institute of Management (ERIM), Erasmus Universiteit Rotterdam.
- World Bank (2004), *Global Development Finance 2004: Harnessing Cyclical Gains for Development*, Washington DC, March.
- World Bank (2005), “E-Strategies: Monitoring and Evaluation Toolkit”, Washington DC, January.

Annex 1

Practical Examples of IT Usage by SMEs

Title	Type of use	Details
CHINA		
Xinmin Textile Technology Co Ltd. (Silk textile cluster in Shengze, Wujiang City)	Corporate Management & Strategy	The internal information management level inside this labor-intensive enterprise specializing in silk products is relatively low. This firm has not established perfect informationized management of supply chain. Internal management such as production plan, procurement, production, inbound logistics and outbound logistics is still organized through traditional meeting and telephone, except that e-mails as well as IP call and real-time communication by MSN are used more frequently in supply chain management, which helps to reduce communication costs. Xinmin gets most of its customers from attending global fair of textile and clothes, where it can directly communicate with old and new clients and establish business relations and will improve mutual trust. Then clients will log on the website of Xinmin to get access to more information about the enterprise and its new product. Therefore, it is necessary for enterprises to build their own websites in order to expand clients. E-business has not been adopted in silk textile's export channel.
Software export-oriented cluster in Hangzhou	IT Sector/Firm Development (Public)	Most of the firms located in this cluster are: 1) established after 2002; 2) small in scale with about 100 employees, and 3) increasing exports dramatically. These firms are fully equipped with PC, and Intra/Internet, and utilize their websites mainly as a showcase and a helpdesk. Communications with their clients are made by using: 1) XML for data exchange; 2) e-mail and IP telephone; 3) video meeting system to discuss problems in software development; 4) the Internet for product delivery; and 5) traditional method of international payment. They exploit foreign markets mainly by: 1) attending various fairs; 2) obtaining software development commissions from foreign clients through international bid, and 3) taking advantage of former network of institutes and employees to provide development projects. Development of the cluster was encouraged by: 1) policy support by national and local governments such as tax incentives; 2) IT infrastructure building promoted by governments; 3) increase in supply capability of human capital; and 4) close international relationship.

Title	Type of use	Details
Electric appliance enterprises in Cixi City of Zhejiang Province (Hongyi Electronics and Singfu Electric Group)	Corporate Management & Strategy	Hongyi Electronics and Singfu Electric are labor-intensive medium enterprises specializing in electric appliance production. Hongyi introduced ERP system, with which established SCM partially. Internal information system of the enterprise is linked to customs and production place, and import and export status are monitored by e-customs application. Hongyi Electronics started online trade from 2002. However, online sales are relatively few with total e-business taking below 5% of the enterprise's sales. Singfu Electric is a typical OEM manufacturer. Singfu Electric uses computers in daily management, and real time production manufacture: receiving orders, procurement, production and inbound and outbound logistics. Singfu develops and maintains a website itself and set up IT division. The Intranet is mainly used for inter-personal communication and the outside network is mainly used for product advertisement and communication with dealers as well. Both firms expanded exports by attending various professional fairs.
Electronics cluster in the Ningbo Bonded Zone	Corporate Management & Strategy	The interviewed four firms (3 Taiwanese) are located in the Ningbo Bonded Zone where since 2004 e-customs application is spread to all the export firms. Three Taiwanese labor-intensive enterprises with characteristic of assembly line production use IT applications that are extension of management system of their parent firms. Yoengyang Technology, a computer shells manufacturer, has established a complete information management system, SCM system and a website to advertise the firm and its products. Yeongyang does not have a plan to established e-business platform. The reason lies in its steady client channel and questioning of risks in online payment. So it is enough to contact with clients by email. Lessons from the cluster include: 1) export business in the form of OEM/ODM is basically conducted through original export channel without expanding new markets by Internet; and 2) implementation of e-customs will promote IT utilization in export enterprises, leading to the situation where business cannot be conducted without PC or Internet connection.
IT industry cluster in Suzhou	Corporate Management & Strategy	IT usage in this export-oriented IT cluster reflects the level of IT usage by multinationals. Sampo Electronic Technology invested by Taiwanese firms has established an ERP system, connected to the servers located in Taiwan via dedicated line, and uses the same information system as mother company. Video meetings are often held to make SCM in good operation. The firm trains new employees in order to ensure the increase of the firm's IT application efficiency. Suzhou BenQ's export business came from its mother company in Taiwan Province of China, therefore, the company connects with its export customers through its mother company, which enables customers to learn or to download the information such as the export time, date of board, name of the shipping line, arrival time and destination. Its website is a platform for online orders. Sales value on e-commerce platform accounts for 20% of the total sales value. Suzhou Victory Technology is a complete local enterprise whose information management

Title	Type of use	Details
		level is much lower than the Taiwanese. However since March 2004, the company has been launching its ERP and SCM system.
Shanghai Guochi Import & Export Co. Ltd.	Supporting Services (Private)	This is a small company specialized in import and export of glass. It receives order from abroad and then transmits it to local glass SMEs, or sells manufacturers' products to international market. At present, Guochi receives its orders mainly from all kinds of exhibition that enable it to establish face-to-face communications and business trust easily with customers. After that, Guochi sends its glass sample to foreign customers, which can enter into the phase of business deal and later make orders. E-mail and fax respectively account for half of the foreign trade communication channel. The confirmation of orders takes the means of fax in order to preserve receipts while e-mail is used for communication. The main functions of Guochi's website are products exhibition and introductions of the company. The website is supported by Global Sourcing's e-commerce platform. Export through e-commerce only represents 5% to 10% of the total export.

JAPAN

Quantitative analysis on IT usage in two SME clusters: Higashi-Osaka (Osaka Prefecture) and Ohta Ward (Tokyo)	Empirical Analysis of factors promoting IT usage by SMEs, Problems of IT usage, and Policies recommendation	This empirical analysis based on the field surveys of two SME clusters, showed that various factors significantly affect IT usage by SMEs including: (1) 'self-renovating type' in managerial behavior; (2) 'amount of capital' and the 'data-using type' of managerial behavior; and (3) the number of regular employees, restructuring the whole business process of IT expectation, and 'incentive-type' of managerial behavior. The problems for the IT developed group are identified as security, coordination with business partners, and funds for IT investment, while those for the developing group are lack of leadership, difficulty in catching up with technological changes, lack of confidence concerning returns on investment, and the long time required to introduce IT. SMEs in the developed group called for policies such as low-interest loans, tax exemptions and subsidies for IT investment, along with various deregulations. The less developed group tends to request policies such as IT seminars and training for PC operation and building homepages, which can be summarized as human resources development required for the introduction of IT.
Shoudan Jouzu (Better Matching)	Supporting Services (Biz Matching) (Public)	This is one of the activities of iMedia, an Osaka City organization established in 2001. It aims to match supplies and demands for IT products so as to promote IT venture businesses. Through this site, SMEs are automatically furnished with information regarding all business transactions that potentially meet their requests. Buyers can receive replies for their purchase orders in a short time. On the web page of each registered SME, a history of their matching and past estimations is shown, reinforcing the reliability of participating SMEs. In order to make the site effective, success stories of participating SMEs, registration

Title	Type of use	Details
		assistance for SMES not familiar with PCs and the Internet, and free IT consultation are offered.
Kyoto Shisaku Net (Prototype Network)	SME-SME (S-S) Partnership (Private)	A “virtual” group of 10 Kyoto-based SMEs in the machine and metal processing industry. They constructed a B2B Internet network, and specialized in producing samples. Using the Internet, they can reply to clients in a much shorter time. Clients are now able to accept samples that are currently at the R&D stage.
Kagoshima Construction Market (Construction Market)	S-S Partnership (Private)	This “virtual” SMEs group in the construction sector was established to strengthen the economic basis of SMEs and to revitalize local economies. This group tries to lower the cost of building traditional wooden houses with modern facilities by utilizing IT. The virtual network reorganizes related firms and artisans, and transforms the distribution network by establishing the SCM. Its activities, in general, are: (a) by operating CAD/CAM centers jointly, each member firm can outsource jobs such as estimation, costs management, purchase of materials, and construction management; (b) by utilizing CAD, firms can quickly obtain quantities and costs and present them to clients; (c) all materials are determined quickly and ordered through the CAD center, which delivers them to the right places at the right times (just-in-time); and (d) through web cameras, owners of houses and related firms can monitor the construction process at remote locations. Records of the construction are made available on their websites, and this increases the reliability of member firms.

REPUBLIC OF KOREA

LG Electronics and IT Equipment Industry	Large-SMEs (L-S) Partnership (Private)	LG Electronics has implemented the “M-to-M (Machine-to-Machine) Integration Project”, which networks the parent company and SME partners since 2002. LG completed successfully the first phase of the pilot system that integrates three SMEs equipped with ERP in Changwon Area, the Republic of Korea to share information on orders, production plans and warehouse stocking of LG, and available production capacity, inventory, and performance of SME partners. LG expanded the project to 15 SMEs in 2003 and planned to expand to a total of 32 partners in 2004.
DiCON Co., Ltd.	IT Sector/Firm Development (L-S Partnership) (Private)	This LCD monitor manufacturer was established in 1990. The firm has been continuously making great efforts for products development and market expansion in the LCD field. The company has succeeded in proactive product innovations with their own technology and exports to 30 world companies and 50 domestic customers.
BtexB (Vortal for Textile)	S-S Partnership (Private)	A vortal site for the knit industry managed by BtexB Ltd. BtexB was created in the form of consortium of off-line knit companies and online e-commerce solution companies. At the BtexB website, all members of the knit industry exchange their own information and knowledge and share their process of purchasing and handling raw materials and

Title	Type of use	Details
Tae Kwang Ind. Co.	S-S Partnership (Private)	shipping facilities. As a result, the knit industry can reduce costs and expand the market.
		This shoe manufacturing company specialized in OEM system exports entire production of sporting shoes to NIKE. In the headquarters in the Republic of Korea, the firm dedicates itself to R&D and sample production, while mass-production is being performed in China and Viet Nam. In the Republic of Korea, (1) project, (2) mold and (3) development teams collaborate each other and with NIKE and exchange design data between them. In 2000 the firm established TRUST, IT-based composite manufacturing system to manage entire processes from order to product forwarding via collaboration between the headquarters in the Republic of Korea and overseas local factories. TRUST encompasses ERP, PDM (product data management) and KMS (knowledge management system). The firm also introduced information systems for product development management and product lifecycle management. The firm has founded an IT company called “Shoetech” to promote selling and exportation of its digital shoe manufacturing system and cooperation system to shoe manufacturing companies delivering goods to NIKE on OEM basis.
Silkroad 21	Supporting Services (Public)	Silkroad 21 was devised by the Ministry of Commerce, Industry and Energy (MOCIE) as part of a five-year plan from 2000 to 2004, managed by the Korea Trade-Investment Promotion Agency (KOTRA), and sponsored by the Small and Medium Industry Promotion Cooperation (SMIPC), the Korea International Trade Association (KITA), the Korea Trade Network (KTNET) and others. The objective is to establish a national infrastructure for e-commerce enabling “one-stop” access to all trade-related information currently dispersed among different organizations. Buyers and sellers might log on then to the website (silkroad21.com) to buy and sell goods.
E-trade Korea	Supporting Services (Public)	E-trade Korea project is a national drive to foster the Republic of Korea into a global e-trade hub. As a part of it, KOTRA integrated two e-trade sites, silkroad21 and Kobo, into Buykorea, an upgraded B2B e-marketplace for SMEs in February 2005. The site is not only equipped with general services such as search engine, e-catalogue, trade-related information provided by KOTRA, marketing information uploaded by user firms, but also hold real-time video trade consultations via the Internet. KOTRA aims to transform the portal into a total one-stop service e-trade portal by adding online financing services. According to a survey by KOTRA, 31.1% of SMEs were using e-Trade whereas 40.5% of large firms were using it.
T-page Global	Supporting Services (Private)	The firm, established in 1996, introduced Tpage.com that provides a full-solution package for global trades to execute an entire transaction via a website, procure the necessary financing and organize shipment. The site’s “Tsearch” search engine is an initiative specializing in subjects relating to international trade. It provides traders with a posting

Title	Type of use	Details
		system. Users can post offers to buy or sell that are automatically transferred and posted to all other trading websites. Tsearch puts a vast amount of information on suppliers or buyers listed internationally at the fingertips of traders by searching all other trading websites simultaneously.

SINGAPORE

Richland Logistics Services	Supporting Services (Private)	RichLand has two principal activities: transportation management; and airport cargo terminal handling and supply chain services. Its Transportation Management System (TMS) launched in 2001 is a web-based system that allows users to track their cargo delivery status online, while an EDI system allows the delivery status to be transmitted to customers' systems. The Customer Feedback Management System was developed to centralize feedback from customers and allow the company to respond in a timely manner. In 2002 RichLand introduced the Inbound Management System (IMS) and Wireless Warehouse Management System (WWMS). The IMS allows users to electronically capture shipping information and use it for permit declarations. The WWMS is used to manage inventory at free trade zone (FTZ) warehouses. It processes information scanned from bar codes on the cargo, allowing real time updating of information relating to the movement of goods. The challenge Richland faced to adopt its IT systems was staff acceptance and adaptation. Adequate attention must be given to training staff.
-----------------------------	-------------------------------	---

Uniseal Waterproofing	Corporate Management & Strategy	This is one of the leading waterproofing companies whose core business is to provide roofing and waterproofing solutions to residential and commercial properties. The Wireless Sales Force Automation System gives staff instant access wirelessly to information regarding customers and available warehouse stock via PDAs. Wireless Project Tracking system was implemented to improve the company's project management, specifically, to facilitate monitoring project schedules, manpower allocation and costing. The system allows project managers and supervisors to use PDAs to retrieve real-time project information and submit updates on project progress and resource usage. It has also improved payment tracking and reduced administration and processing costs. The CRM system implemented in 2004, which is not wireless, tracks information on customers and potential customers regarding enquiries, problems faced and service provided. Data from the CRM is analyzed to identify weaknesses and recurrent problems, and to determine their causes.
-----------------------	---------------------------------	---

THAILAND

Chatchawal Orchid Co., Ltd.	Corporate Management & Strategy	This manufacturer and exporter of orchid cut flowers started its business by exporting orchids to the United States through the connection with the Thai-owned orchid importers located in the United States. The owner's experience of training at the Japanese co-operative helped
-----------------------------	---------------------------------	--

Title	Type of use	Details
		<p>the firm create connection with some Japanese importers and started to export products to Japan. However, the company realized that human networks were not sufficient to expand its market globally. The company started introducing IT by getting technical support from NESDAT, a government agency. However, there were several problems dealing with the government agency, therefore the company switched to hire one private company to create company website and the management system. After the company set up its own e-mail and website, the company is able to contact new customers (mainly supermarket stores in Japan) and get their orders. Since there are some concerns by customers on the product safety such as pesticide, the company plans to set up the digital cameras at the working site.</p>
Victor Packaging Co., Ltd.	Corporate Management & Strategy	<p>This tube packaging manufacturer started using the Internet in 1999. The customers can send the specific design of products with the correct colors in three-dimensional blueprints through the Internet. This way makes the company reduce difficulties in designing the structure of products and the product decoration upon the customer requests. Since the company focuses on the long-term key customers, e-commerce is not important for the company at the moment. However, the company has its profile in PowerPoint and distributed this information through e-mail to new customers. The company is constructing its own website not to reach new customers, but to send the signal to the market that the company equipped with the new IT technologies. Website is also useful for the company new recruitment. Announcement through the company website can screen the IT-literate applicants from IT-illiterate ones. In production process, the company purchased two computerized numerical controller (CNC) machines with the software of CAD and CAM for designing moulds. However, the shortage of IT officers is the most crucial problem of IT usage.</p>
Nuntiya Care Stone Co.,Ltd. (NCS Group)	Corporate Management & Strategy	<p>This company began its business in a traditional gemstone wholesaler based on Chanthaburi Province, located in the east of Bangkok. In 1998, the group began to experiment in online sales. Initially listing 5 items on eBay. After that, Thaigem.com, the web, was born with only 3 persons in charge of e-commerce. Today, the company is listing over 1.6 million individual items online. Starting with only 6 gem types, Thaigem.com used to purchase most of its gems in Chanthaburi. Now, Thaigem.com sources gems from 60 countries, stocking over 400 gem types. Fast delivery is one of company successes. After the deal has been done, the products would be delivered to customers within 24-72 hours. All products are refundable with no question asked. Price competitiveness is one success factor for online trading. Thaigem.com can cut prices because it buys everything in bulk straight from the cutters in full quality range.</p>

Title	Type of use	Details
VIET NAM		
Viet Nam Chamber of Commerce and Industry (VCCI)	Supporting Services (Biz Matching) (Public)	VCCI launched the first national e-commerce portal “Vnemart” in 2002. Its core services are: product display and introduction; online marketing and advertisement; online transaction and negotiation support; transaction information monitoring; and customer relationship management. There are two types of members, i.e. VIP Members that passed the training courses of VCCI and Basic Members. As of June 2004, its services had been expanded to the total of ten sub-sectors, including handicraft (77% of registered Vietnamese firms), textile and garment (5%), leather and shoes-making (3%) and others (15%). The number of members increased to 910, including 225 foreign members in various continents, and 2,848 kinds of products were showcased with 250 transactions. SMEs accounts for 65% of the total registered Vietnamese firms. About 10,000 visits to the Vnemart per day. Government ministries, agencies and organizations support the initiative strongly. They act as members of the Advising Board of the Vnemart. The Vnemart’s operation is financed by the State budget and VCCI. The Vnemart provided free services until the end of 2004.
Vietrade	Supporting Services (Biz Matching) (Public)	Vietrade is a governmental agency responsible for management, coordination and development of trade and related investment promotion activities, operating under the Ministry of Trade (MOT). In 2001 Vietrade designed the website. There are about 300,000 visits to the website a month. Up to now, 1,086 enterprises (78% from the garment and textile, 14% from the aquatic and sea products, and 8% from the leather and shoes-making sub-sector) have registered with “Business Directory”. SMEs occupy 45%. As the website is available for free participation, its operation is completely financed by the State Budget. The website is somehow successful as the main tool and the official portal of the Ministry of Trade in providing commercial information. The website also meets demands of enterprises for being listed on it. However, users can find simply company names, their telephone numbers/ addresses and just names of their products. No exhibition or showcases of products are found. Specific descriptions or offers of products are also unavailable.
Booking Vietnam.com (Tourism Sector)	S-S Partnership (Public)	This is a virtual travel agent connecting hotels. 89% of this hotel network members are SMEs. Although 72% of the SME hotels are equipped with computers and 63% have Internet connections, only 3% of them have their own websites. Their major marketing channel is travel agents. Eighty-one percent of its member SME hotels see the site as the single place for their Internet presences. The technology involved in the transaction is not too complicated and available at affordable price. A typical transaction flow among a client/agent, BookingVietnam, and its procedure is the following: 1) A client initiates the transaction by sending request to BookingVietnam via the website’s Booking Cart; 2) BookingVietnam then sends to the Client/Agent a service

Title	Type of use	Details
		agreement; 3) The Client/Agent signs the service agreement and sends to BookingVietnam via e-mail or fax a copy of the service agreement and a copy of the bank receipt; 4) BookingVietnam sends to the Client/Agent a confirmation via e-mail or fax; 5) BookingVietnam then e-mails or fax the booking form to the member hotel; 6) the member hotel confirms with Booking Viet Nam (by phone, fax, e-mail).
ARGENTINA		
Cordoba Technology Cluster (CCT)	IT Sector/Firm Development (Public)	CCT is a civil organization in the Province of Cordoba created in 2001. CCT is related with the “Development of Productive Chains Program”, executed jointly by governments and private sectors. Its objective is to improve productivity of SMEs and economic development through joint actions in the informatics, electronic and high-tech, furniture and agro-industrial sectors. CCT was the first attempt to set up a Productive Collaboration Association in the software industry. In order to increase externalities generated from the cluster, training programs on CMM are executed. Each individual firm will use a standardized process for software development under CMM rules. Cordoba Technological Institute was created with technical and financial support of IBM, Intel, Microsoft and other leading firms to develop human resource capabilities. After this initiative, another technological poles have emerged, for example, in Rosario, Province of Cordoba and Tandil, Province of Buenos Aires.
Dupont ApexProgram	L-S Partnership (Private)	This is a program announced by Dupont in 2000 for Dupont’s customers (mostly SMEs) with export capabilities, who hoped to export added value products instead of raw materials. Its participating companies are offered supports on: i) consulting about operative matters (legal services, customs procedures, banks operations, IT, promotional regimes, brand names registration, etc); ii) accessibility to use Dupont’s suppliers services (logistic, banks, customs agents, transport companies, information networks, etc); iii) know-how and management capabilities to make easier getting financial resources; and iv) assistance to develop strategies and to prepare business plan. At the end of 2003, 51 firms were performing exports under this umbrella. Dupont can add sales through the customers’ exports, secure customers networks, gain new customers as a consequence of the existing customers’ successes.
Belgrano Department (Province of Santa Fe)	Partnership (Cluster Development) (Public)	The Belgrano Department located in Rafaela city concentrates 30% of the national production of seeders, pulverizers, harvesters and tractors. The industrial cluster exports higher priced products (US\$ 2,148/ton vs national average US\$ 274/t). The determinants of its success is the followings: i) institutions for policy and planning; ii) economic institutions (Small Enterprise Business Association, Technology & Innovation Centre, Enterprise Development Centre); iii) LED (local economic development) Initiatives; iv) Enterprise development (e.g. incubators); v) Horizontal cooperation actors and Public-Private

Title	Type of use	Details
		Partnership; and vi) Learning processes (e.g. regularized knowledge transfers (Training)). Since 2003 JICA's experts give in-company training, technical support in marketing and international trade to the present or potential exporting SMEs of Rafaela.
BRAZIL		
Vortal of Ornamental Stones Cluster in Espírito Santo (ES) State	Supporting Services/ (Cluster Development) (Public)	Ministry of Science and Technology's "Regional Action" program support to establish a "vortal" for local arrangements to develop SMEs and regional clusters, which uses the Internet to collate and widely diffuse information on the specific sector in one location. Many of these sites are available in more than one language, have a product catalogue, offer price quotes by e-mail and allow client registration. The ornamental stones sector in the ES State employs technologies related to information provision, customers' need to see stones' colors and patterns stones before purchase. One hundred thirty-nine ES firms (11.6% of sector's total) had registered with the "vortal". The two private websites "Marble Website" and "The Way to the Stones Website" provide information similar to the "vortal" in Portuguese and English although the vortal is available only in Portuguese. They also offer differentiated services such as the stones catalogue. E-commerce is not yet a reality in the sector. There are only a few isolated and limited experiences, such as price quotes by e-mail.
Aeronautics Industry Suppliers in São José dos Campos	L-S Partnership (Private)	In 2002, 11 SMEs of the cluster, most of which were founded by former EMBRAER employees, formed High Technology Association (HTA) with the support of the government export-support agency APEX. Since then, APEX has supported it to participate in international fairs and missions and contributes to the member companies' ISO 9000 certification program. HTA member firms have a relatively high level of IT use such as CAD/CAM. However, there's a low level of Internet and e-commerce use among them and there's no use of EDI or any form of e-commerce. Companies may receive orders and claims from Embraer's website, but there is no type of inter-firm e-commerce. Only 4 (36 per cent) of the firms have their own website. Due to the highly specialized nature of sector, personal contacts are the most important factor in the establishment of export relationships. Thus, participation in fairs and missions are seen as a main channel to establish business relations. Internet is rarely used to this end.
CHILE		
Traceability	B2B Partnership (Public)	Under the framework of public private partnership diffusion of measures for food safety based on international standards such as GAP (Good Agricultural Practice) and establishment of paper-based traceability are promoted. For the purpose of buiding IT system for traceability, a Chamber of Commerce and a NPO established a company to offer ASP service. On the other hand, the Government is constructing a research center related to IT with a suppor of the

Title	Type of use	Details
		Government of Japan, where industrial sectors and universities will jointly research for developing traceability systems.
COLOMBIA		
Zebra Electronica	Corporate Management & Strategy	This manufacturing of electromagnets and electronic security products makes use of IT for its internal management, development (CAD), and so on. The use of website is limited to information and support for clients. Although IT has not been the most important factor for its growth, IT has allowed the firm to: 1) identify new suppliers in Asia; 2) improve customer services and technical supports; increase contacts with potential client; 3) improve communication with overseas potential clients; and 4) improve internal administrative processes including controls of accounting, production and procurement.
Itansuca Ltda	Corporate Management & Strategy	This leading firm in the consulting, design, auditing and purchase management area for the energy sector created a policy for handling magnetic files and an unique site to store information of each project, and developed a strategic plan to optimize IT investments. IT usage enabled the firm to: 1) improve internal and external communications; 2) improve customer relationship; 3) improve project managements; 4) improve handling and storing of project files; 5) increase exports by using e-mail; 6) reduce communication costs; 7) optimize information resources and software purchase; 8) improve information handling security; and 9) improve internal administrative and management processes.
SIART: Information system for crafts - Artesanias de Colombia	S-S Partnership (Public)	Artesanias de Colombia works to foster the competitiveness of the handcraft sector under the framework of public-private partnership. SIART (Integrated System of Information and Advising for the Crafts), is a new portal of Artesanias de Colombia developed with the support of Inter-American Development Bank (IDB). In line with the agreement with the Ministry of Communications, the craftsmen can make use of the SIART through the public telecenters. The services SIART offers to the craftsmen include those in the area of: i) virtual advisories in design; ii) product assessment to participate in fairs, publish products info in the virtual gallery and to export; and iii) Categorized product catalogue, Virtual Gallery, Contacts Directory, and Virtual Library. Aiming at North American peoples and Colombians and other Spanish speakers living in the U.S. the organization opened the first Center of Distribution in the United States, where can organize events like Show Rooms in coordination with the Proexport Office in Miami, and gave a franchise license to Handmade Gallery. The organization's website in the U.S. has a virtual store facility supported by an e-commerce platform.

Title	Type of use	Details
EL SALVADOR		
HealthCo Products Company (Apiculture Sector)	Corporate Management & Strategy	HealthCo commits to offer to its customers the highest quality ingredients elaborated exclusively for HealthCo by outside scientific consultants specialized in preventive health. Its honey processing plant complies with all requirements to export its products to Europe. Its laboratory is operated under the strictest control that beyond the requirements of, for example, the Good Manufacturing Practice (GMP). These are realized by modern IT and other equipments and the highest-quality primary materials. For marketing and sales, HealthCo has an Intranet that connects 5,000 distributors and sales persons around the world. The firm also has a SCM system that is connected to a network of its partners such as honey supplier, and packing, logistics and transportation services.
Software Alliance S.A. de C.V. (IT Sector)	Corporate Management & Strategy	This is a Salvadorian small business dedicated to manufacturing software, especially administrative solutions for SMEs and to the scientific investigation and development in the software industry. Is a part of the EQUIBANK group. The firm created a strategic tie with Israeli Magic Inc. in order to receive technical assistances and distribute Magic's products in El Salvador. It also signed commercial agreements with a Chilean firm to expand to other Latin American markets, especially Chile and Mexico. With this vision, the firm has made several efforts that include those for registering with exporters' support programs and obtaining a CMM certificate.
MEXICO		
Infocenter of the Quintana Roo Hotel Association (Buyers Club)	L-S Partnership (Biz Matching) (Public)	As a part of the Inforcenter Cancun project promoted by the World Bank, NAFIN (a development banking institution), Quintana Roo Hotel Association (Cancun), an e-market "Buyers Club" was initiated in 2003 to: 1) support local small suppliers to be linked to the hotel sector of Quintana Roo State with a modern information system; 2) support the suppliers with new schemes of attention in financial programs, training and technical assistance to connect them to a virtual hotel business network; and 3) promote the production-chain development of the tourism sector in the State. As of June 2004, 272 hotels and 991 suppliers are registered with it.
Cemex(Cement/Concrete Sector)	Corporate Management & Strategy	This world 3rd biggest cement and concrete company, led by a top management under the philosophy of "Cemex Way", has invested a great quantity of resources in acquisition and development of IT. Its information structure called "e-enabling" focuses on improving the interaction with the clients and optimizing its global supply processes. Besides, through its subsidiary company CxNetworks, emphasis is given to the creation of alternative sustainable growth sources by founding new and innovative IT businesses.

Title	Type of use	Details
Freightminds (Logistics Sector)	Corporate Management & Strategy/ Supporting Services (Private)	This Mexican group is dedicated to providing web based solutions for the freight forwarding, logistics and cargo handling. The aim is to fill increasing demands for a systematic approach to shipment creation, tracking, performance measurement as well as a comprehensive industry and customer database management tool, together with warehouse operations visibility, all via the internet. Freightminds developed a system to facilitate SME international trade, with the following modules: e-CRM; e-FOM (Freight Operations); e-WOM (Warehouse Operations); e-BIM (Business Intelligence); and e-FMC (FreightMinds Consulting).
PERU		
Exportimo S.A.C. (Wood Sector)	Corporate Management & Strategy/	This export furniture producer introduced IT mainly for internal management to calculate unit costs and keep production records. Now, IT are used for design based on workstations to use CAD tools, manufacturing, administration and finance. In its production processes, the firm implemented an order tracking system based on bar code technology that enables to obtain at each step of the process data on how many pieces were finished and how many are in progress, then this information is compared with the original order and allows to check if the committed time of delivery will be achieved. The firm also has a web presence at its partner SouthCone, with a virtual catalogue of its products produced by Exportimo, which is more important distribution channel in United States.
Perumarketplaces	Supporting Services (Biz Matching) (Public)	This E-Commerce program led by PROMPEX (Commission for Export Promotion), through Portal, perumarketplaces.com, provides SME exporters with a tool that facilitates their presence in the Internet for promoting their products. The participant companies receive a “website” inside the Portal, a virtual marketplace, a system for proposal requests and so on. In the first month after launching the Program, the 82 affiliated companies received more than 3,100 visitors to the Portal, More than 65% of the visitors were outside of Peru, mainly the United States.

Source: Country Papers of the project.

Annex 2

Major Policy Issues related to Direct Exports

Policy Issues	Detailed Items
Access and Infrastructure	Tariffs and duties (Elimination of import duties) (Review legislation about tariffs on IT products) Training Financing Coverage Internet fair rates Regulation (competition policy)
Get Business Online	Online government (taxes, procedures, procurement) Encourage SMEs to play in the market Networking of SMEs through IT Development of e-marketplaces Regulation - consumer protection and dispute settlement International standardization Quality certification (enterprise and products)
Enter Into Contracts Online (Authentication and Certification)	Public Key Infrastructure (PKI) Governmental e-procurement system Legal framework Harmonization of laws Mutual recognition system Mechanisms for dispute settlement
Trade Facilitation	Single window system Traceability and applied research International e-trade network Trade insurance for SMEs Norms of Origin Certification Taxes on e-Commerce Technical barriers Information on trade procedures and logistics for SMEs

Source: Produced by the participants in the international seminar *Information Technology for Development of Small- and Medium-sized Exporters in East Asia and Latin America*, held on 23-24 November 2004 at ECLAC.

Annex 3

Invitation Program for Young Leaders of the FEALAC Member Countries, SMEs Promotion and IT (from February 20 to March 2, 2005)

–10 SUGGESTIONS FROM YOUNG LEADERS–

1. Develop a united FEALAC member web portal to include the following:
 - Leads on IT tools (made available on the website);
 - Online and face-to-face IT training for SMEs to enhance financial skills;
 - A database of IT providers;
 - Market metrics, standardized indicators for all FEALAC countries, and an optimized matching system;
 - A database on SME-related regulation, and law, with the aim of creating an enabling legal framework for SMEs; and
 - A business information database controlled by government agencies, including linking virtual galleries and e-commerce sites

The portal should include reference to the ASEAN+3 SME Network, which aims to provide web-based information in Southeast Asia and far-eastern countries. The network is currently managed by Republic of Korea.
2. Provide basic IT infrastructure that SMEs need to be competitive in the global economy (power, broadband).
3. Encourage more inter-FEALAC business rounds, trade conventions, industry-related trade shows and business matching forums.
4. Improve enterprise education and the promotion of effective local and international practices, including:
 - A promotion and education plan for SMEs, to be carried out by individual FEALAC countries;
 - Sharing of case studies, practical experiences of companies, and Best Practice from both the Government and Private sector, including workplace productivity;
 - Encouraging links between research providers (academia) within FEALAC countries;
 - Enhancing long distance learning, including the creation of a virtual incubator and entrepreneurship development;
5. Strengthen the role of private national and local (intermediary) organizations in SME promotion, such as Chambers of Commerce; and
6. Map SMEs and SME organizations and networks, including highlighting national or local focal points in FEALAC countries;

7. Encourage the sharing, and movement of entrepreneurs and skilled workers in FEALAC countries (database).
8. Each FEALAC country should establish an action plan to improve access to finance for SMEs:
 - Establish a website on financing information for SMEs as a ‘one-stop shop’;
 - Encourage knowledge transfer to promote effective practices among financial institutions and improve financial products for SMEs;
 - Create a FEALAC fund for SMEs, or look at existing Overseas Development Funds that can support FEALAC SMEs;
 - Establish programs to provide tax relief or rebates for SMEs that invest in IT for their businesses.
9. Commission a feasibility study on the role of FEALAC in promoting economic development opportunities in the region. The study will inform the creation of a possible FEALAC SME Working Group.
10. Establish a FEALAC Young Leaders network to encourage continued information exchange.

Source: <http://www.mofa.go.jp/region/latin/fealac/program0503/suggestion.html>.

Annex 4

Policy Framework for Development of SME and IT in the Researched Countries

CHINA

IT POLICY INSTITUTIONS

- Ministry of Information Industry (MII) (Established in 1998)
 - State Science and Technology Commission
-

SMEs POLICY INSTITUTIONS

- Ministry of Foreign Trade and Economic Cooperation (MFTEC)
-

IT-RELATED POLICIES

- IT strategic plan / Tenth National Economic Development Plan
 - System Reform Scheme of Telecommunications (2001)
 - Spark Project (1985): Provision of technical support for TVEs (Township and Village Enterprises)
 - Instruction of China's E-Government Construction
-

SMEs-RELATED POLICIES

- Slogan of “Small enterprise, big employment”
- Preferential policies
 - ✓ Refund of export duty
 - ✓ Free trade zone (processing trade)
 - ✓ Electronic customs
 - ✓ Preferential tax policy for SMEs
- Establishment of new hi-tech firms in the industrial development or export-oriented zones
- Experiment of the Credit Guarantee System of SMEs (1999)
- Creation of credit department for SMEs within the major State-owned commercial banks (1998)
- Establishment of a stock exchange market for SMEs in Shenzhen market
- Establishment of SMEs development centers within government institutions

LEGAL INFRASTRUCTURE

- Small and Medium Enterprises Promotion Law (2002)
- Electronic Signing Law (issued in 2004, come into effect on May 2005)
- Copyright Law
- Regulations on Protection of Computer Software
- Registration Method of Computer Software (1990)

JAPAN

IT POLICY INSTITUTIONS

- IT Strategic Headquarters (Prime Minister of Japan and his Cabinet)
- Ministry of Economy, Trade and Industry (METI)
- Ministry of Internal Affairs and Communications (MIC)

SMEs POLICY INSTITUTIONS

- Small and Medium Enterprise Agency, METI
- JETRO (Japan External Trade Organization)

IT-RELATED POLICIES

- e-Japan strategy (2001)
 - ✓ (i) Establishment of ultra high-speed networks to access to the Internet; (ii) Establishment of e-commerce; (iii) Realization of e-government; (iv) Human resources development for IT
- e-Japan strategy II (2003)
 - ✓ Seven targeted areas for intensive IT application: (i) medicine; (ii) food; (iii) life; (iv) finance for SMEs; (v) education; (vi) employment; and (vii) administrative services

SMEs-RELATED POLICIES

(International Trade)

- Overseas market research projects: Investigation on overseas markets for the possibility for future export – JETRO
- Overseas exhibition projects
- Overseas missions for export: Exchange and sales meetings during missions
- Overseas coordinator projects: JETRO dispatches business coordinators all over the world

(Trade Facilitation)

- 24-hour active port facilities
- Automated customs clearance systems: “One Stop Service” (Single Window system)
- Preliminary Inspection System: Speeding up the import process
- Scientific inspection machines
 - ✓ Large-scale X-ray inspection machines
 - ✓ RFID (Radio Frequency Identification) will be utilized for international distribution of goods.

(FDI Promotion)

- Established the Japan Investment Council (JIC)
- Five important fields of the JIC
 - ✓ (i) Providing information; (ii) Establishment of FDI environments; (iii) Reform of administrative processes: promotion of “one-stop administration”; (iv) Establishment of living conditions and employment; (v) Reforms of local as well as central government

(Business Promotion)

- Practical training for startups
- Legal support for startups: “Iyen-startup”, a special exemption for small businesses.
- Financial support: public organization such as the Shoko Chukin Bank (The Central Cooperative Bank for Commerce and Industry)
- Tax exemptions
- Supports for marketing
- Supports for R&D: Supports for small businesses to participate in ministries’ R&D activities
- Incubation: Most public incubators offer so-called incubation managers
- Dispatching specialists to venture businesses: Local governments and public organizations hire retired business persons and engineers and dispatch them.

(Digital Divide)

- The following measures are required in order to nurture IT specialists with qualified ability who assist SMEs in the spread of high level IT technology: (a) standardization of IT skills; (b) nurturing IT coordinators; (c) nurturing IT associates; and (d) nurturing specialists who evaluate IT security.
- As solutions for technological issues of SMEs regarding IT utilization, there are the two projects:
 - ✓ The project for strengthening strategic technologies:
 - ✓ The project for strategic support and activation of IT investment: (i) SME owners’ exchange meetings; (ii) training of SME owners; (iii) consulting for business planning; (iv) consulting for IT investment; and (v) presentation meetings of IT utilization.
- Provision of low-interest funds to SMEs
 - ✓ (i) financial assistance systems that work through public financial institutions; (ii) systems for guaranteed loans; (iii) systems for loaning to SMEs; (iv) systems for leasing machines and equipment to SMEs; (v) projects for installment of strategic information equipment; and (vi) systems of loans for IT investment through public financial institutions.
- Deduction of investment expenditures from taxes
 - ✓ (i) tax reduction systems for investment in general by SMEs; and (ii) tax reduction schemes for IT investment by SMEs
- Infocenters
 - ✓ The e-Small Business Agency and Network Project
 - ✓ Operation of portal sites such as “J-Net 21”
 - ✓ Provision of technological information through the Techno-knowledge network

(E-government)

- Core objectives of the “e-Japan strategy”

- ✓ Objectives: (i) provision of efficient, transparent, safe and citizen-oriented administrative services, and (ii) establishment of efficient and optimally beneficial public works.
- ✓ Guidelines: (a) Citizen-oriented administrative services; (b) Accountability and transparency; (c) Universal design; (d) Collaboration with the private sector; (e) Assuring the privacy, reliability and safety of the information system; and (f) Collaboration of governmental organizations and international standards.
- E-procurement
 - ✓ In order to promote e-applications, all offices of government are asked to plan and establish suitable information systems to simplify the process of application.
- Customs and other trade-related procedures
 - ✓ Customs: (a) Preliminary Examination System; and (b) Instantaneous Approval System
 - ✓ The Customs Procedure Execution System (CuPES)
 - ✓ Sea- and Air NACCS (Nippon Automated Cargo Clearance System)
 - ✓ Port EDI system
 - ✓ Single window system: Interconnection of these systems
 - ✓ Security measures: ultra-sensitive cameras, large X-ray equipment (IC tags and RFID)
- E-tax and e-payment
 - ✓ Experimental trials in November 2000. Fully implementation by June 2004 – The National Tax Agency
 - ✓ Tax and fee payment systems are in development which utilize the current “Multi Payment Network (MPN)”, which interconnects financial institutions with governmental agencies via leased circuits.
- Cryptograph
 - ✓ In February 2003, the MIC and METI organized Cryptograph Research and Evaluation Committees (CRYPTREC) that determined the list of cryptographs which are recommended for e-government.
- Government Public Key Infrastructure (GPKI)
 - ✓ GPKI is being constructed
 - ✓ GPKI consists of BCA (Bridge Certificate Authority) in the MIC and CAs (Certificate Authority) of each ministry.

LEGAL INFRASTRUCTURE

- Fundamental Law for SMEs (amended in 1999)
- IT Fundamental Law (2000): The government’s basic IT strategy
- Promotion Law of Creative Activities By SMEs
- Law of Promotion of New Businesses
- Special Law of Revitalization of Industrial Power
- Individual Information Protection Act (2005)
- Legislation of Digital Signature and Authentication (2001)
 - ✓ The government admitted 21 specific authentication businesses (as of June 2004)

- Fundamental Law of IRP Strategy (issued in November 2002, and implemented in March 2003)
 - ✓ Others such as the Patent Law, Copy Right Law, and Anti-Trust Law were reformed.

REPUBLIC OF KOREA

IT POLICY INSTITUTIONS

- Ministry of Information and Communication (MIC)
- Ministry of Commerce, Industry and Energy (MOCIE)
(Industry Informatization Subcommittee)
 - Sub-organizations under MIC
 - ✓ National Computerization Agency
 - ✓ Korea Association of Information and Telecommunication
 - Sub-organizations under MOCIE
 - ✓ Korea Institute for Electronic Commerce
 - ✓ Korea CALS/EC Association
 - ✓ Electronic Commerce Resource Center (ECRC)
- Korea Agency for Digital Opportunity and Promotion (2003)

SMEs POLICY INSTITUTIONS

- Small and Medium Business Administration (SMBA)
- Sub-organization under SMBA
 - ✓ Small Business Corporation (SBC)
 - ✓ Korea Information Management Institute for Small and Medium Enterprises (KIMI)

IT-RELATED POLICIES

- Master Plan for Informatization Promotion (1996)
- Cyber Korea 21 (1999)
- E-Korea Vision 2006
- Industry Informatization Promotion Plan
- 5-year plan to eliminate Digital Divide (2003)

SMEs-RELATED POLICIES

- MOCIE: Promotion of e-commerce (B2B) in 6 industries (Electronics, Automobiles, Shipbuilding, Steel, Machinery and Textiles)
- SMBA: 1) Trade promotion, 2) Trade facilitation, 3) FDI promotion, 4) Business promotion (incubation, entrepreneurship), etc.
- SME Technology Innovation Promotion Plan (SMBA, on preparation stage)

LEGAL INFRASTRUCTURE

- Framework Act on Informatization Promotion (1995)
- Framework Act on Electronic Commerce (FAET) (1999)

- Electronic Signature Act (ESA) (1999)
- Act on Promotion of Utilization of information and Communication Network and Data Protection (2001)
- Act of Elimination of Digital Divide (2002)

SINGAPORE

IT POLICY INSTITUTIONS

- Ministry of Communication and Information Technology (1999)
- Info-Communications Development Authority of Singapore (IDA) (1999)
- National Science & Technology Board (NSTB)

SMEs POLICY INSTITUTIONS

- Ministry of Trade and Industry (MTI)
- Organizations under MTI:
 - ✓ Economic Review Committee (ERC)
 - ✓ Entrepreneurship and Internationalization Sub-Committee (EISC)
- Economic Development Board (EDB)

IT-RELATED POLICIES

- The Technopreneurship 21 (T21) Initiative (announced in 1999)
 - ✓ T21 is an initiative involving high-level government and private-sector efforts to promote high-tech entrepreneurship sector in Singapore. The lead agency has been transferred from NSTB to EDB in 2001.
 - ✓ T21 covers four areas: education, financing, regulations and facilities.
 - ✓ Pro-Enterprise Panel (PEP), created in 2000, conducts activities such as evaluating suggestions from business, and implements an annual survey of regulatory agencies' pro-enterprise orientation.
 - ✓ Initiatives by T21: T21 provided a number of initiatives and measures to stimulate the entrepreneurship such as Entrepreneur Investment Incentive (EII), the Directors and Advisors for Technopreneurial Enterprises (DATE) program, and the Startup Enterprise Development Scheme (SEEDS).
- Local Enterprise Technical Assistance Scheme (LETAS)

SMEs-RELATED POLICIES

- SME 21 Master Plan (10-year strategic plan, launched in 2000)
 - ✓ Three major targets to achieve by the year 2010: 1) double productivity of the retail sector from \$ 28,000 to \$ 56,000, 2) treble the number of local SMEs with sales turnover of \$ 10 million and above from 2,000 to 6,000, 3) Quadruple the number of local SMEs with e-commerce transactions from 8,000 to 32,000.
 - ✓ The Promising Local Enterprises (PLE) Program (1995)
 - ✓ Objective: The program aims to nurture strong local enterprises to become Asian MNCs. The Economic Development Board is the lead agency of this program.

- ✓ 3C approach comprising of co-investment, collaboration and consolidation was announced in 1999 to further intensify the PLE program.
- Action Community for Entrepreneurship (ACE) (launched in May 2003)

LEGAL INFRASTRUCTURE

- E-Commerce and Electronic Transactions Act (1998)
- Electronic Transactions Regulations 1999: Certification Authority

THAILAND

IT POLICY INSTITUTIONS

- Ministry of Science, Technology and Environment (MOSTE)
- Ministry of Information and Communications Technology (Established in 2002)
- National Information Technology Committee (NITC): Established in 1992 to execute and coordinate the IT development policy.
- National Science and Technology Development Agency (NSTDA)
- National Electronics and Computer Technology Center (NECTEC)
- Electronic Commerce Resource Center (ECRC) (Approval on 1998)

SMEs POLICY INSTITUTIONS

- Ministry of Industry
- National Committee for the Promotion of SMEs
- Institute of Small and Medium Enterprises Development (ISMED) (1999)
- Office of SMEs Promotion
- SMEs Promotion Funds

IT-RELATED POLICIES

- IT-2000 (approved in February 1996)
 - ✓ Five- year policy framework from 1996 to 2000.
 - ✓ Main objectives: 1) Invest in an equitable information infrastructure, 2) Invest in people to create well-educated population and IT human resources, 3) Invest for good governance.
 - ✓ Agenda 1: 1) implement five-year Rural Thailand Communications Expansion and Modernization Program, 2) ensure a reasonable benefit share to the rural region, 3) establish independent telecommunications regulatory body to review and reform existing Telecommunications Acts and other related Acts.
 - ✓ Agenda 2: 1) implement National School-Information Action Program, 2) establish a National Interactive Multimedia Institute, 3) intensify IT manpower production.
 - ✓ Agenda 3: 1) launch a nationwide Government Information Program, 2) convert IT planning an integral part of the annual government budgeting exercise and IT policy research an ongoing effort.
- IT-2010 (approved in March 2002)
 - ✓ Ten-year policy framework.

- ✓ Three guiding principles: 1) invest in knowledge-based human capital, 2) promote innovation, and 3) invest in information infrastructure and information industry promotion.
- IT Master Plan (2002-2006) (approved in March 2002)
- ✓ Utilized as a guideline for the IT strategy implemented in each ministries.

SMEs-RELATED POLICIES

- Law on the Promotion of SMEs (2000)
- Industrial Restructuring 5- Year Plan (1998-2002)
- Industrial Settlement Zones

LEGAL INFRASTRUCTURE

- Data Protection Law
- Thai Credit Bureau Law (privacy of financial information)

VIET NAM

IT POLICY INSTITUTIONS

- Ministry of Culture and Information
- Ministry of Science, Technology and Environment
- Ministry of Post and Telecommunication
- Telecommunication Association
- Viet Nam Electronics Business Association
- Viet Nam Software Association
- Viet Nam Association for Information Processing
- Cryptographic Committee of the Government (CCG)

SMEs POLICY INSTITUTIONS

- SMEs Development Encouragement Council (Governmental level)
- Ministry of Planning and Investment (MPI):
 - ✓ SMEs Development Department
 - ✓ Technical Assistance Centers in four cities.
- Ministry of Trade
 - ✓ Viet Nam Trade Promotion Agency (Vietrade)
- Other organizations:
 - ✓ Viet Nam Chamber of Commerce and Industry (VCCI) (Business community)
 - SME Promotion Center (1994)
 - Vnemart (e-trade floor of VCCI for business community) 2002
 - ✓ Viet Nam Cooperatives Alliance
 - ✓ Rural Industrial Enterprises Association

IT-RELATED POLICIES

- Project on Computerization of Public Administration (Decision 112/2001/QD-TTg).

- Master Plan for Internet Development (Decision 33/2002/QD-TTF).
- Master Plan for Application and Development of IT in Viet Nam up to year 2005 (Decision 95/2002/QD-TTg).
- Pilot Project on E-tax Declaration by General Taxation Department, Ministry of Finance.

SMEs-RELATED POLICIES

- Human Resources Training Program for 2004-2008
- Export Support Fund (1999)
- Export Support Credit Fund (2001)

LEGAL INFRASTRUCTURE

- Law on Enterprises (2000)
- Law on Electronic Transaction (expected in 2007)
- Decree 44/ND-CP (2002) : Legality of e-signatures and e-documents in banking operation.
- Decree on Certification Authority (CA) (expected by the end of 2004)
- Electronic documents, mechanisms and policies on ICT that are in line with international common practice would be completed in 2010.

ARGENTINA

IT POLICY INSTITUTIONS

- Secretariat of Communications
- National Office of Information Technologies (ONTI)
- Science Technology and Productive Innovation Secretariat (SECyT)

SMEs POLICY INSTITUTIONS

- Sub secretariat of SME and Regional Development (SSEPyMEyDR)

IT-RELATED POLICIES

- National Program for the Information Society (PSI)
- Fiduciary Fund for Promotion of the Software Industry (FONSOFT)
- Science Technology and Productive Innovation National Plan Project
- Argentine Integrated Scientific and Technological System (SICTIAR)
 - ✓ Portal site “Science and Technology Electronic Library”
 - ✓ Supercomputer “CLEMENTINA II”
 - ✓ Video Conferencing Network
- Education System Improvement Program (1345/OC-AR, IADB)

SMEs-RELATED POLICIES

(International Trade)

- Export Groups Program
- First Export Support
- Foreign Trade Information System

- Articulation between Big Companies and SMEs
- Proargentina.gov.ar (Portal for SMEs Export Promotion)

(Trade Facilitation)

- Assistance Program to set up Productive Collaboration Associations
- Legal assistance

(Business Promotion)

- FONAPyME (National Development Fund for the Micro, Small and Medium Enterprise)
- FoMicro (National Fund for the creation and consolidation of Micro business)
- Bonus rate loans
- MyPEs II (Global Program of Credit to the SMEs)
- Italian Credit for the supporting of SME
- Reciprocal Guarantee Societies Program (SGR)
- Business Re-conversion Support Program (PRE)
- Agencies Network

(Digital Divide)

- Fiscal Credits for Training
- Federal Program for Training and Technical Assistance
- FONTAR (Fondo Tecnológico Argentino)

(E-government)

- Gobiernoelectronico.ar (E-Government web page)
- The official Web “Crystal” (www.crystal.gov.ar)
- E-procurement (a part of the Crystal)
- E-customs system “Sistema María”

LEGAL INFRASTRUCTURE

- Law of Promotion of the Software Industry (2004)
- Argentine Law 25,506 “Infraestructura de Firma Digital” (2001)
- The trademark legislation (Law 22,362)

BRAZIL

IT POLICY INSTITUTIONS

- Ministry of Science and Technology (MCT)
- Ministry of Communications (MC)
- Ministry of Development, Industry and Foreign Trade (MDIC)
- National Institute of Information Technology (ITI), Presidency of the Republic (<http://www.iti.br/twiki/bin/view/Main/QuemQuem>)
- National Research Council (CNPq)
- Executive Committee of Electronic Government (2000) which has eight technical committees (2003) for e-government development
- Internet Governance Committee Brazil (CGI.br)

IT POLICY SUPPORT INSTITUTIONS (non-governmental)

- Brazilian Chamber of Electronic Commerce (camara e-net)

SMEs POLICY INSTITUTIONS

- Ministry of Development, Industry and Foreign Trade (MDIC)
- Brazilian Export Promotion Agency (APEX)
- Brazilian Service to Support Micro and Small Companies (Sebrae)
- National Bank for Economic and Social Development (BNDES)
- State Post Company (CORREIOS).
- National Industry Federation (CNI)
- Ministry of Foreign Relations (MRE or Itamaraty)
- Federal Savings Bank (Caixa Econômica Federal - CEF), the largest (government) commercial bank
- The Bank of Brazil (Banco do Brasil - BB), the second largest (government) commercial bank)
- Innovation Agency (FINEP), under the Ministry of Science and Technology
- Ministry of Labor and Employment (MTE)
- General Secretary of the Presidency of the Republic
- Ministry of Communications
- Ministry of National Integration
- The Amazon Bank (BASA)
- The Brazilian Northeast Bank (BNB)
- The Federal government savings bank (Caixa Economica Federal, CEF)

IT-RELATED POLICIES

- Strategic Option-Software, National Industrial, Technological and Foreign Trade Policy (announced November 26, 2003)
 - ✓ New PROSOFT-Program for the Development of the National Software and Related Activities Industry (BNDES)
 - ✓ National Program for Software and Services Certification (INMETRO-National Institute of Metrology)
 - ✓ Software and Services Export Program (MDIC, MCT and APEX)
 - ✓ Program to Support Emerging Areas (high-performance computing, games, climate, communications) (MDIC/MCT)
 - ✓ Shared Library of Software Components (MDIC/MCT)
 - ✓ Incentive Program for the Development of Open Source (Software Livre) Software (ITI, MCT and FINEP)
 - ✓ Information Technology Forum (MDIC/MCT)
 - ✓ Digital Inclusion
 - Promote digital inclusion in micro and small enterprises. Goal: reach 30 thousand firms by 007 and establish National Digital Inclusion Program through the National Network of Information and Business Telecenters.
- Bylaw of National Informatics Policy (Law 11.077, of December 30, 2004)-under discussion

- New 2001 National Informatics Policy- hardware (Law 10.176/01, of January 11, 2001):
 - ✓ R&D priority
 - ✓ Development of products for developing countries markets
 - ✓ CTInfo – Sectoral Fund for Information Technology
- Funds strategic R&D projects, including information security.
- Telecommunications Universalization Fund (FUST) (MC)
- The 1991 Informatics Policy (Law 8248/91)
 - ✓ Incentives to preserve local equipment manufacturing and R&D activities in the IT sector.
 - ✓ The IPI (industrialized goods tax) rebate, which had been stipulated by the 1999 policy, was further extended by a law approved by Congress until the year 2013.
- National Research Network (RNP in Portuguese)
 - ✓ RNR aimed at developing Internet links at science and technology institutions.
- The program for software exports (SOFTEX 2000)

SMEs-RELATED POLICIES

(International Trade)

- Federal Program of Entrepreneurship (PBE)
 - ✓ Main thrusts: management training; micro financing; and post-credit monitoring or enterprise assistance.
 - ✓ Complementary activities: SMEs’ digital inclusion; support of the productive arrangements; and strengthening of the handcraft segment.
- Small Size Firm Entrepreneur Program (EPP) – MDIC
- BNDES Export Promotion Programs
- Program of Technology Support to Exportation (PROGEX)
- Program of New Exports Arrangements (PNPE)
- Project National Network of Trade Agents (REDEAGENTES).

(Trade Facilitation)

- Foreign Trade Platform (FTP) – BB
- Exporter´s Portal (<http://www.portaldoexportador.gov.br/>) – (MDIC)
- Exporter´s Window (<https://www.exportadoresbrasileiros.gov.br/>) – MDIC
- Brazilian Trade Net (<http://www.braziltradenet.gov.br/>) – MRE
- PROEX (Programa de Financiamento às Exportações) – BB
- Program Easy Export (Exporta Fácil) – CORREIOS

(Business Promotion)

- Programa Brasil Empreendedor (PBE)
- Micro, Small and Medium Enterprises Support Program – BNDES

(Digital Divide)

- Internet II project – RNP
- Development of “popular computers” (affordable computers)
- The 0i00 service: to enable Internet users to pay local call fees
- SOFTEX – BNDES program: to provide financial support for software development and marketing activities as well as acquisition of equipment and training

- Financial packages to support the sale of computers to small business and domestic users – BB
 - Infocenters of Information and Business
 - Enterprise Informatization Program: a credit line for SMEs to buy computers – BB
 - Brazilian Program of Digital Inclusion (PBID): to be launched in 2005
 - ✓ “Casa Brasil”: Infocenters located in schools and in rural zones, frontiers and remote regions
 - ✓ Long-distance education: to offer primary education
 - ✓ Connected PC: to offer a cheaper PC with access to the Internet to micro enterprises and low-income population
 - Program of Technological Support to the Small Companies (PATME)
- (E-government)
- Executive Committee of Electronic Government (2000)
 - Eight technical committees (2003)
 - ✓ (i) Digital Inclusion; (ii) Online Services and Websites Management; (iii) Open Software Implementation; (iv) Systems Integration; (v) Network Infrastructure; (vi) Knowledge Management and Strategic Information; (vii) Government to Government; (viii) Legacy Systems and License
 - IT Systems
 - ✓ COMPRASNET: E-procurement portal
 - ✓ SISCOMEX: the integrated system of foreign commerce
 - ✓ The Brazilian Payment System (SPB).

LEGAL INFRASTRUCTURE

- Code of Customers Defense
- Project of Law number 1589/99
 - ✓ Certification of electronic signatures
 - ✓ Use of a cryptographic system based on public or asymmetric key
- The 3585 and 3587 presidential decrees: Official documents for normative acts to be transmitted electronically
- Brazilian Public Keys Infrastructure (ICP Brazil)
- Provisional Measure 2200: regulate the Brazilian digital certification system

CHILE

IT POLICY INSTITUTIONS

- SUBTEL (Sub secretariat of Telecommunications))
- Ministry of Economy and Energy
- Digital Action Group (Grupo de Acción Digital, GAD)
- Santiago Chamber of Commerce (CCS)
- Ministry of Education
- National Commission of Scientific and Technologic Investigation (CONICYT)
- Chilean IT Companies Association (ACTI)

SMEs POLICY INSTITUTIONS

- Ministries of Agriculture, Economy, Education, Finance, Foreign Affairs, and Labor
- Chilean Economic Development Agency (CORFO)
- Technical Cooperation Service (SERCOTEC)
- Chile Foundation
- PROCHILE: Export Promotion Agency
- Banco Estado (State Bank)
- Santiago Chamber of Commerce (CCS)
- National Center for Productivity and Quality (ChileCalidad)
- Instituto de Desarrollo Agropecuario INDAP
- Servicio Nacional de Capacitación y Empleo SENCE
- Fondo de Inversión y Solidaridad Social FOSIS

IT-RELATED POLICIES

- Digital Agenda (Agenda Digital) 2004-2006
 - ✓ The goal of the agenda for the bicentenary in 2010: Chile will be a digitally developed country, or be ranked to level of the OECD member states, for the bicentenary.
 - ✓ The action plan for the period 2004-2006: (1) access; (2) education and training; (3) e-government; (4) computerization of firms; and (5) IT industry; and (6) juristic- normative framework.
 - ✓ Agreements among Universities (Universidad Técnica Federico Santa María de Valparaíso) to develop academic programs to support introduction of ICTs into SMEs.

SMEs-RELATED POLICIES

(International Trade)

- Tax Incentives, Credit instruments (CORFO), and Guarantee Fund for Small Businesses (FOGAPE) (Banco Estado)
- Various services for exporters provided by PROCHILE

(Trade Facilitation)

- Economic Complementation Agreements (ECAs) and Free Trade Agreements (FTAs)
- E-customs system – Customs Authority
- Electronic Invoice system (Factura Electrónica) – SII (Internal Revenue Service)
- Port logistics
- Online services of the Santiago Chamber of Commerce (CCS)
 - ✓ Comexonline: Provision of information and services related to: library; database access; support services; and international business
 - ✓ E-certchile: Digital Certificate Authority
 - ✓ Movimiento Marítimo Aéreo: Publication on itinerary of maritime and air cargos operated by principal firms in Chile
 - ✓ Rutacert: Vehicle monitoring system that enables users to access position information certified by CCS and to improve fleet dispatch control

(FDI Promotion)

- The Foreign Investment Committee is in charge of the policy.
- The Internal Revenue Service (SII) have jurisdiction over the tax incentives.
- Various programs of the CORFO to develop SMEs and the high-tech industry as the followings
 - ✓ Program TODOCHILE: Development of the regions and encouragement of decentralization
 - ✓ High Technology Investment Program: Special incentives for investments in high-tech projects
 - ✓ Regional Investment Platform: to transform Chile into the regional business hub of multinational companies operating in Latin America

(Business Promotion)

- Science & Technology and Human resource development
 - ✓ Ministry of Education and CONICYT
 - ✓ Fund for Scientific and Technological Development (FONDEF)
 - ✓ National Fund for Scientific and Technological Development (FONDECYT)
- CORFO's policy instruments to improve productivity and quality control, promote SME linkage, investment, and technological innovation, and support start-ups.

(Digital Divide)

- Human Resource Development
 - ✓ National Service for Training and Employment (SENCE): a tax incentive scheme for company based training
 - ✓ Digital Alphabetization (Alfabetización Digital): Ministry of Education's initiative of providing workers, entrepreneurs of micro firms, and housewives, with a training in IT
 - ✓ Education and Training in English
- Technical support of SERCOTEC
 - ✓ Establishment of the infocenter networks for SMEs in alliance with the Solidarity and Social Investment Fund (FOSIS) in order to diminish the digital divide between firms.
 - ✓ Provision to SMEs with IT training courses of the Digital Alphabetization Program
 - ✓ Portal REDSERCOTEC, through which SMEs can access supports.
- Access
 - ✓ Telecommunications Development Fund (FDT) – SUBTEL: Fund to subsidize projects for development of universal access.
 - ✓ INFOCENTERS – Networks of school (ENLACES), the Libraries, Archives and Museums Office (DIBAM), National Youth Institute (INJUV), and SERCOTEC

(E-government)

- The Electronic Government Agenda 2002-2005
 - ✓ The activities of this Agenda are closely related to the Administration's project for Reform and Modernization of the Government.
- Applications
 - ✓ "Trámite Facil": A portal site to facilitate access to necessary information and services

- ✓ “Sitioempresa”: A portal site for businesses to offer public information and procedures
- ✓ E-procurement (ChileCompra)
- ✓ Customs Information System (ISIDORA)
- ✓ Project to develop Single Window for External Trade
- ✓ Portal of State Payment
- ✓ Tax Declaration
- Electronic Invoice (Factura Electrónica)

LEGAL INFRASTRUCTURE

- The Law on Electronic Documents, Digital Signature, and Electronic Certification Service (Law No.19,799) (2002)
- The industrial property provisions (Law No. 19,039) (1991)
- The law on intellectual property (Law No. 17,336)
- The Law for the Protection of Private Life (Law No.19,628) (1999)

COLOMBIA

IT POLICY INSTITUTIONS

- Ministry of Communications
- Ministry of Commerce, Industry and Tourism

SMEs POLICY INSTITUTIONS

- Ministry of Commerce, Industry and Tourism
- Superior Council of Foreign Trade (CSCE)
- PROEXPORT Colombia: export promotion agency
- Coinvertir: a division of the PROEXPORT in charge of FDI promotion
- Foreign Trade Bank of Colombia (BANCOLDEX)
- Regional Foreign Trade Advisory Committee (CARCEs)
- National Learning Service (SENA)
- Colombian confederation of the Chambers of Commerce (CONFECAMARAS) and major Chambers of Commerce of Colombia (Bogotá, Medellín, Cali, Bucaramanga, and Cúcuta)
- Colombian Association of SMEs (ACOPI)
- Colombian Institute for the Science and Technology Development (COLCIENCIAS)

IT-RELATED POLICIES

- Agenda de Conectividad (Ministry of Communications)
 - ✓ The task is directed to: 1) Citizens; 2) Companies; and 3) Public administration.
 - ✓ Projects: Online Government (Gobierno en Línea); High Speed National Academic Network (Red Académica Nacional de Alta Velocidad); Project PRYMEROS; and Project CUMBRE.

- Policies focused on the corporate sector
 - ✓ Project PRYMEROS: a project to improve competitiveness of SMEs by utilizing IT
 - ✓ Incentives for technological innovation in SMEs
 - ✓ Quality standards and certification – SENA
 - ✓ Implantation of barcode and EDI
 - ✓ Agroindustrial Clusters
- Promotion of National IT Industry

SMEs-RELATED POLICIES

(International Trade)

- Law 007 of 1991: a regulatory frame of the Colombian foreign trade policy
 - ✓ Creation of the Ministry of Foreign Trade
 - ✓ Creation of the Foreign Trade Bank of Colombia
 - ✓ Definition of Free Trade Zones
 - ✓ To continue the Certificate of Tributary Reimbursement (CERT)
 - ✓ Determination of the composition and functions of the CSCE
- Strategic Exporter Plan (Plan Estratégico Exportador, PEE) 1999-2009
 - ✓ To increase and diversify exportable goods and services
 - ✓ To stimulate and increase FDI
 - ✓ To increase productivities of companies
 - ✓ To regionalize exporting activities
 - ✓ To develop exporting culture
- Program EXPOPYME – PROEXPORT: a program that offers to SMEs tools and consultancy to develop exporters' culture and therefore exports
- Plan Vallejo
 - ✓ Regime that allows to temporarily importing inputs with total or partial exemption of taxes, in order to use them exclusively in the production of goods or services for exports.
- CARCEs
 - ✓ Virtual committees composed of the public and private sector, universities and research centers of the Colombian regions, aiming to promote the exporter culture, competitiveness and growth of the regional exports.

(Trade Facilitation)

- Online government
- FTAs
- Project of Rationalization and Automation of Foreign Trade Procedures – document CONPES 3292 of 2004, and Creation of Single Window of Foreign Trade

(Business Promotion)

- National Innovation System – COLCIENCIAS
- Supports to create incubators – SENA
- PRODES program – ACOPI: a SME linkage program
- Regional Productivity Centers

- Program “Promotion of the Productivity and the Competitiveness through the Creative Use of the ICTs”
 - Program “Strengthening the Competitiveness of the Production Chains through the Creative Use of the ICTs: Support to the Agroindustrial Production Chains”
 - Technological Development Centers
- (Digital Divide)
- COMPARTEL – Ministry of Communications: a program to facilitate universal access to telecommunications services
 - ✓ Compartel Rural Telephony Program
 - ✓ Compartel Social Internet Program
 - ✓ Compartel Broadband Connectivity Program for Public Institutions
 - TELECENTROS – Compartel Social Internet Program and FONADE (National Development Fund)
 - FOMIPYME (Colombian Fund for Modernization and Technological Development of SMEs): Credit
 - Project CUMBRE (Agenda de Conectividad): to facilitate the access to postgraduate IT programs
- (E-government)
- Online Government (Agenda de Conectividad): Online payment; Electronic Procedures; Electronic Procurement; Government Intranet; Online Government Nationwide; Centralized System of Information Consultations
- LEGAL INFRASTRUCTURE
- Law 527 of 1999 (E-commerce Law)
 - Certicámara (certification of digital signature) – Chambers of Commerce of Bogotá, Medellín, Cali, Bucaramanga, and Cúcuta and CONFECAMARAS

EL SALVADOR

IT POLICY INSTITUTIONS

- Technical Secretariat of the Presidency
- National Council of Science and Technology (CONACYT)
- Computer Science National Committee (CSNC)
- Salvadoran Net of Internet (SVNet): Administration of the top level Salvadorian domain (.sv)
- INFOCENTERS (local connectivity center)

SMEs POLICY INSTITUTIONS

- Ministry of Economy
- National Commission of the Micro and Small Company (CONAMYPE)
- National Agency of Export Promotion (Exporta El Salvador)

IT-RELATED POLICIES

- “Connectivity Agenda: Towards the Knowledge Society”
 - ✓ Access to the infrastructure
 - ✓ Generation of contents

- ✓ Education and training
- ✓ Online companies
- ✓ Online government and municipalities
- ✓ Development of the IT industry
- Science & Technology Policy
 - ✓ Program of Technological Administration Support to the SMEs – CONACYT
 - ✓ The project “Improvement of quality control and environmental administration in SMEs” – CONACYT and IADB

SMEs-RELATED POLICIES

(International Trade)

- Export Program for Micro, Small and Medium Enterprises (EXPRO) – USAID and Government of El Salvador
- FAT (Fund of Technical Assistance) – CONAMYPE
- BONOMYPE (Training Fund Program) – CONAMYPE
- CEDART (Artisans Development Centers) – CONAMYPE
- Center of Entrepreneurial Procedures – CONAMYPE
- FOEX (Fund of Exports Promotion) – Ministry of Economy
- Credit Programs of the Multisectorial Bank of Investment (BMI)
- SGR (System of Reciprocal Guarantees for the Micro, Small and Medium Rural and Urban Enterprises) – BMI
- Law of Export Reactivation: fiscal incentive
- Regulation of Free Zones: fiscal incentive

(Trade Facilitation)

- Foreign Trade Integrated System (SICEX) – CENTREX, BCR (Export Procedures Center, Central Reserve Bank)
- TELEDESPACHO (computerized system of the Department of Customs Receipts)
- General Treaty on Central American Economic Integration and other FTAs

(FDI Promotion)

- A new legal framework to simplify the investment’s formalization process:
 - ✓ Investments’ Law, Commerce Code, Commerce Registry Law, Mercantile Bond Law and Accounting Regulator Law
- National Investment Office (ONI)
- PROESA: a government agency dedicated to promoting investment
- Monetary Integration Law: Dollarization

(Business Promotion)

- Program “Set up Your Idea” (Emprende tu Idea, ETI)

(Digital Divide)

- ESCUELA 10 Program
 - ✓ To improve (1) Pedagogical, (2) Management, and (3) Evaluation processes
- CYBEROLIMPIADAS (Cyber Olympics): a contest for development of educational website participated by students
- INFOCENTROS: an info-center initiative

- Red del Desarrollo (Development Net program)
 - ✓ An initiative to link SMEs to sources of information and other resources by using the INFOCENTROS network
 - CONECTATE (Computers and Internet access for public schools)
- (E-government)
- SICEX – CENTREX.BCR
 - TELEDESPACHO (e-customs)
 - System of Electronic Tributary Declarations (DET) - General Office of Internal Taxes

LEGAL INFRASTRUCTURE

- Law of Electronic Trade is in authorization process.

MEXICO

IT POLICY INSTITUTIONS

- National Council of Science and Technology (CONACYT)
- Ministry of Economy

SMEs POLICY INSTITUTIONS (mainly for development of the software sector)

- Ministry of Economy
- BANCOMEXT (International Trade Development Bank)
- NAFIN (Nacional Financiera): Development Bank
- AMITI (Mexican Association of the IT Industry)
- CADELEC (Electronic Productive Chain Center) in Jalisco
- AMIRE (Mexican Association of Incubators and Enterprise Network)
- CANIETI (Electronics and IT Industrial Union)
- Ministry of Finance (SHCP). Tax incentives for technology innovation

IT-RELATED POLICIES

- PROSOFT (Program for Development of the Software Industry):
 - ✓ To promote exports and attraction of investments
 - ✓ Education and formation of persons competent in software development
 - ✓ To establish a legal framework for promoting the software industry
 - ✓ To develop the domestic market
 - ✓ To fortify the local industry
 - ✓ To attain international levels in the capacity of software development
 - ✓ To promote construction of basic and telecommunications infrastructure
- e-Mexico initiative
 - ✓ A national technology project to eliminate the barriers to get information and public services.

SMEs-RELATED POLICIES (mainly for development of the software sector)
(International Trade)

- Programs involved by Ministry of Economy, BANCOMEXT, AMITI, and CADELEC

(Trade Facilitation)

- Regional and bilateral FTAs

(Business Promotion)

- Programs for Business Incubators – CONACYT and Ministry of Economy
- Entrepreneur Program – NAFIN and CONACYT: angel capital
- Credit guarantee program – NAFIN, Ministry of Economy, CONACYT and commercial banks
- SME Fund – Ministry of Economy
- AMIRE (Mexican Association of Incubators and Enterprise Network)

(Digital Divide)

- e-Mexico initiative
- Telesecundaria program: distance learning
- Teachers' training
- Virtual university programs for workers training
- University technology entrepreneurs programs- UNAM, ITESM, Guadalajara University, IPADE
- Guarantee Fund to promote IT usage by SMEs – Ministry of Economy, NAFIN, Intel Mexico and Santander Bank
- Inforcenter initiatives

(E-government)

- E-government system is one of the priority areas of e-Mexico.
- Korea-Mexico IT Center

LEGAL INFRASTRUCTURE

- Amendment of the Mexican Commerce Code on electronic signatures
- Federal Copyright Law
- Industrial Property Law
- Federal Criminal Code
- Science and Technology Law

PERU
IT POLICY INSTITUTIONS

- Commission for Development of the Information Society (CODESI)
- National Office of Electronic Government and Informatics (ONGEI)
- National Institute of Statistics and Informatics (INEI)
- Ministry of Transport and Communications (MTC)
- Peruvian International Cooperation Agency (APCI)
- Peruvian Association of Software Producers (APESOFT)
- National Council of Science, Technology and Technological Innovation (CONCYTEC)

SMEs POLICY INSTITUTIONS

- PROMPYME (SMEs Promotion Center)
- PROMPEX (Export Promotion Commission)
- CODEMYPE (National Council for the Development of the Micro and Small Company) – Ministry of Labour
- Ministry of Production
- ADEX (Exporters Association of Peru)

IT-RELATED POLICIES

- National Plan of Science, Technology and Innovation (PNICyTe)
- Program Huascarán: IT usage for public schools
- National IT Development Plan 2003-2006 – INEI

SMEs-RELATED POLICIES

(Expansion of product markets)

- Government Procurement: Law N° 26850
- Formation of clusters among small companies – PROMPEX and PROMPYME and others

(SMEs support services)

- CITEs (Technological Innovation Centers): Technology transfer and creation
- SIICEX (Integrated Information System of Foreign Trade)
- Credit to SMEs
 - ✓ FOGAPI (Guarantee Fund for Loans to the Small Industry)
 - ✓ FONREPE (Fund for backing SMEs)

(Digital Divide)

- Strategies for capacity building of the citizens designed by age group, which include establishment of the National Center for Adaptation of Technology (CNAT) within the CONCYTEC.

(E-government)

- ONGEI is in charge of promoting and coordinating the national e-government system.
 - ✓ Installation of online services through the State's Website
 - ✓ Development of the State's intranet and a single window to serve all citizens
 - ✓ Training of government officials
- SEACE: State E-Procurement System
- CONSUCODE- National Council for Government Procurement
- TELEDESPACHO: E-customs procedures system

LEGAL INFRASTRUCTURE

- Law N° 28015 and the Supreme Decree 009-2003-TR on the Promotion and Formalization of the Micro and Small Company (2003)
 - ✓ Creation of CODEMYPE; training and technical support to SMEs; public procurement.
- Intellectual Property – INDECOPI (National Institute for the Defense of Competition and Protection of Intellectual Property)

INFORMATION TECHNOLOGY FOR DEVELOPMENT OF **SMALL AND MEDIUM-SIZED EXPORTERS** IN **LATIN AMERICA AND EAST ASIA**

PART II:

Latin America

Argentina

Brazil

Chile

Colombia

El Salvador

Mexico

Peru

Asia

China

Japan

Republic of Korea

Singapore

Thailand

Viet Nam

ARGENTINA

Ernesto M. Rodríguez Rodríguez

I. Introduction

Despite the most recent economic crisis, Argentina continues to see an increase in the number of individuals going online, and there is optimism about the numerous entrepreneurial opportunities available. In 2002 (the peak of the crisis), the number of persons going online in the country was more than 14 percent higher than in the previous year.

Available figures indicate that good ideas and entrepreneurial spirit are in ample supply. Local costs for IT personnel are lower than in other countries, while well-trained information technology (IT) developers are available to participate in multinational projects.

Many Argentines are using the Internet for online banking and some Argentines living abroad access local supermarket websites to purchase food for their impoverished relatives in Argentina. The country has a high level of connectivity in the region, estimated for the end of 2004 at more than six million users, amounting to 18% of the population. While an increasing number of people are logging on, there is a continual effort to bridge the digital divide: only 5 percent of individuals outside the country's capital of Buenos Aires have access to the Internet.

There is strong demand for information on the part of Argentines, and this has generated a demand for technology. However, the government-supported educational systems (national, provincial, municipal) cannot adequately address this demand. Thus, though individuals are informed of the existing technology in the course of their education, they are unable to access it, creating an "abyss" between those who can afford training in tandem with their formal education and those who cannot. Loans from multilateral institutions provide for several plans to make substantial improvements in the two areas most important for reducing the digital divide: the educational system and SMEs.

Surprisingly, the most important barrier to eliminating this divide arises from the lack of trust on the part of social groups regarding the long-term sustainability of government efforts and the lack of access to such measures. This sentiment is the result of the constant changes and habitual corruption typically associated with state subsidies.

II. Present status of the IT market and of IT usage by SMEs

A. MARKET ESTIMATES

This chapter outlines the size of Argentina's IT market, measured in annual sales for each category, in millions of US dollars. The following information was prepared on the basis of surveys and market estimates developed in Argentina by Trends Consulting, using IDC Worldwide definitions and methodology. Table 1 shows the market estimates for services activities, packaged software, hardware, storage, peripherals and networking for the period 2002-2007.

TABLE 1
IT SPENDING IN ARGENTINA, 2002-2007
(US\$ millions)

	2002	2003	2004	2005	2006	2007
Services activities						
Planning	55.1	65.5	90.1	117.6	141.2	170.1
Implementation	203.9	238.6	314.5	403.9	493.1	595.1
Maintenance and support services	134.9	151.1	183.2	224.4	269.7	324.0
Operations	56.9	69.1	96.3	126.8	160.0	194.9
Training and education	14.2	17.0	23.1	30.4	38.3	46.0
Services Total	465.1	541.3	707.3	903.0	1,102.3	1,330.0
Packaged software						
System infrastructure software	56.6	72.4	95.7	118.4	140.8	148.4
Appl. development and deployment	51.4	68.4	93.1	116.4	138.5	149.3
Applications	64.9	82.7	112.4	131.3	155.5	161.3
Packaged software total	172.9	223.5	301.2	366.1	434.8	459.0
Hardware Systems						
High-end enterprise servers	5.6	8.8	6.9	6.2	6.7	6.7
Mid-range enterprise servers	14.3	23.8	26.7	28.7	28.4	27.8
Volume servers	15.1	27.0	32.4	33.6	34.8	36.8
Total servers	35.0	59.6	65.9	68.5	69.9	71.4
Personal computers	129.4	325.2	413.8	562.6	700.0	765.5
Traditional workstations	1.9	3.8	4.5	6.0	5.3	4.0
Total clients	131.3	329.0	418.2	568.6	705.3	769.5
Systems total	166.3	388.5	484.1	568.6	705.3	769.5
Storage						
Disk systems	20.9	36.6	49.6	65.7	82.3	98.1
Tape automation	5.2	8.6	11.3	14.4	17.5	20.1
Storage total	26.1	45.2	60.9	80.2	99.8	118.2
Peripherals						
Printers and MFPs	14.5	68.5	118.3	159.0	206.5	258.6
Smart handheld devices	5.5	7.9	10.3	11.5	12.7	14.0
Other add-ons	2.5	6.3	7.9	12.9	20.0	23.1
Peripherals total	22.5	82.7	136.5	183.4	239.2	295.7
Networking equipment						
Total networking	87.0	124.9	154.2	171.2	177.4	165.0
Hardware total	301.8	641.3	835.7	1,071.8	1,291.6	1,419.8
Packaged software total	172.9	223.5	301.2	366.1	434.8	459.0
Services total	465.1	541.3	707.3	903.0	1,102.3	1,330.0
Total IT Spending	939.8	1,406.1	1,844.2	2,341.0	2,828.6	3,208.8

Source: prepared for this report by Trends Consulting using IDC worldwide definitions and methodology.

TABLE 2
E-COMMERCE IN ARGENTINA 2002-2007
(US\$ millions)

	2002	2003	2004	2005	2006	2007
E-commerce						
Business to Business	55.2	99.0	155.6	210.1	78.5	471.5
Business to Consumer	226.7	353.5	544.9	808.6	1,108.8	1,729.7
Total E-commerce Spending	281.9	452.6	700.5	1,018.6	1,187.2	2,201.2

Source: prepared for this report by Trends Consulting using IDC worldwide definitions and methodology

B. PENETRATION OF IT AND E-COMMERCE BY SMEs

This study analyses the status of the Information Technology (IT) market in small- and medium-sized enterprises in Argentina, defined as those companies with fewer than 500 employees (microenterprises –less than 10 employees– are not included). The incorporation of IT in this segment of the corporate market is a dynamic process with a behaviour that differs according to the type of company and sub-market.

First, the uses and trends in the way that SMEs administer the resources they allocate to support IT technology and functions used in their businesses are analysed. The result describes IT practices in this segment as a consequence of the analysis of SME demand, and in particular the resources allocated to the IT area in terms of budget and organization.

IT spending by Argentine SMEs can be broken down as follows:

- 28.6% on hardware;
- 22.6% on software;
- 21.7% on communications (excluding voice); and
- 27.1% on services.

Comparing these percentages with the same figures for all Argentine companies (including large corporations), the following conclusions can be reached:

- They spend **LESS** on **HARDWARE**;
- They spend a similar percentage on **SOFTWARE**;
- They spend **MORE** on **COMMUNICATIONS** (excl. voice); and
- They spend **LESS** on **SERVICES**.

Viewed on the basis of the size of the investments planned, companies assign more importance to investment in enterprise resource planning (ERP) Applications (the projects that demand the most resources). This investment is followed by investment in corporate websites, intranets and extranets, and then by investment in Business Intelligence, and lastly, the migration to and/or installation of Operating Systems and the Development of specific Vertical Applications for each business (this latter point is evaluated differently in each vertical market).

E-Commerce Practices

Only 21.7% of Argentine SMEs have developed some type of business-to-business (B2B) solution. The penetration of business-to-consumer (B2C) is even smaller: 14.5%. Table 3 “PENETRATION BY PC, INTERNET AND E-COMMERCE IN THE ARGENTINE SME MARKET” shows the most significant values characterizing the development and penetration of Internet and e-commerce in the Argentine corporate market.

**TABLE 3
PENETRATION BY PC, INTERNET AND E-COMMERCE
IN THE ARGENTINE SME MARKET**

	2001	2002	2003
Installed base of PCs in SMEs	895,905	904,153	907,456
Total installed base of PCs	3,113,043	3,126,710	3,140,378
% of SMEs /Total Market	28.8%	28.9%	28.9%
Internet access devices in SMEs	57,564	63,114	80,755
Total internet access devices	163,150	174,861	226,728
Mobile phone devices in SMEs	203,648	213,831	286,533
Total internet devices in SMEs	1,157,117	1,181,098	1,274,744
Total internet devices	4,633,849	4,768,112	5,372,931
	25.0%	24.8%	23.7%
Devices using Internet in SMEs	536,585	541,272	617,417
% Total devices using Internet in SMEs /total			
Internet devices in SMEs	46.4%	45.8%	48.4%
Internet users in SMEs	537,607	544,159	691,812
Total Internet users (unadjusted)	3,326,892	3,932,838	4,246,397
E-commerce in SMEs	\$ 677,839,551	\$ 338,958,302	\$ 500,382,104
TOTAL E-commerce	\$ 1,567,744,722	\$ 876,762,062	\$ 1,353,177,148
	43%	39%	37%
B2B in SMEs	\$ 664,727,102	\$ 328,674,876	\$ 491,546,919
TOTAL B2B	\$ 1,454,859,013	\$ 704,937,441	\$ 1,057,092,589
B2C in SMEs	\$ 13,112,448	\$ 10,283,426	\$ 8,835,185
TOTAL B2C	\$ 112,885,709	\$ 171,824,621	\$ 296,084,559

Source: Trends Consulting, 2004.

III. SMEs' development in the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMEs IN THE OVERALL ECONOMY

It is not easy to formulate what should be considered to be an SME in Argentina. The Under-secretariat of SMEs and Regional Development (Subsecretaria de la Pequeña y Mediana Empresa y Desarrollo Regional) definition of SMEs is as follows:

Micro: up to \$ 1,800,000 annual sales (approx. US\$ 600,000)

Small: from \$ 1,800,000 to \$ 10,800,000 (approx. US\$ 3,600,000)

Medium: from \$ 10,800,000 to \$ 86,400,000 (approx. US\$ 28,800,000)

On the other hand, the Consejo Federal de Inversiones (Federal Council on Investments) defines SMEs as companies with up to 100 employees. For the Central Bank and other regulatory agencies, it is as follows:

TABLE 4
SMES DEFINITIONS ACCORDING TO THE CENTRAL BANK OF ARGENTINA

Limits According to Sector	Industries, Mining and Fishing	Commerce and Services	Transportation	Agriculture and Livestock
Employees	300	100	300	0
Annual Sales	\$ 18 million (approx. US\$ 6 million)	\$ 12 million (approx. US\$ 4 million)	\$ 15 million (approx. US\$ 5 million)	\$ 1 million (approx. US\$ 333,000)
Productive assets	\$ 10 millions (approx. US\$ 3.3 million)	\$ 2.5 million (approx. US\$ 833,000)	0	\$ 3 million (approx. US\$ 1 million)

Source: Trends Consulting, 2004.

According to the National Economic Census of 1994, the number of SMEs is divided as shown in the following table:

TABLE 5
IMPORTANCE OF SMES ACCORDING TO ADDED VALUE AND NUMBER OF EMPLOYEES

	Manufacturing industries		Commerce		Services	
	% of the Added Value	% of total employees	% of the Added Value	% of total employees	% of the Added Value	% of total employees
1 to 3 employees	4	9	32	58	27	25
4 to 25	17	27	42	29	25	28
26 to 50	10	11	10	5	9	9
51 to 150	19	19	7	4	10	10
Subtotal	50	66	91	96	72	73
More than 150	50	34	9	4	28	27
Total	100	100	100	100	100	100

Source: National Economic Census 1994, INDEC, Ministry of Economy, Argentina

The association of SMEs (APYME) indicates that SMEs currently represent 95% of the total productive firms and 65% of employed persons (unemployment 14.4%, underemployment and social plans 15%). See http://www.apyme1.com.ar/acciones/reg_notas.asp?IdNota=86.

More details may be obtained from a February 2003 IDB study of medium-sized companies (based on the Bank's definition of such companies).

TABLE 6
PRESENCE OF SMES IN EXPORTS
(Millions of US\$)

Economic sector	Number exporting	Total exports*	Average Export*	Export/Total Sales
Agricultural and cattle	16	521	33	28%
Commerce	43	943	22	9%
Building	6	175	29	10%
Industrial	120	2.528	21	16%
Mining	0	0	0	0%
Services	19	362	19	3%
Total	204	4.529	22	11%

* millions US\$.

Source: IDB, February 2003.

According to public statements by Roberto Lavagna, Minister of Economy (Day of Industry, 26 August 2004), exports will amount to US\$ 33.5 billion this year, with an encouraging 13% of exports during the first semester accounted for by SMEs. Last year, SMEs accounted for only 10% of the total. This gain is significant, since the total volume of exports will have a net positive gain of US\$ 3.9 billion this year. If one considers only industrial exports, SMEs have an even greater share, representing 20% of the total. Another important consideration is the increasing number of SMEs exporting products: in 2003, two-thirds of exports were carried out by such firms.

According to an internal paper of the Ministry of Foreign Affairs, during the first half of 2004, there were 8,700 SMEs involved in exports. Moreover, the study indicated that 40% of total exports to the Republic of Korea were carried out by SMEs, while for Taiwan Province of China this figure was 56%.

B. CASE STUDIES ON USE OF E-COMMERCE AND SUPPLY CHAIN MANAGEMENT

1. Córdoba Technology Cluster (Polo Tecnológico de Córdoba)

The CCT (Córdoba Technology Cluster) is a civil organization located in the Province of Córdoba, in the center of Argentina. It was established in February 2001, and is made up of technology firms located in Córdoba. These firms decided to form a cluster in order to create competitive conditions for exports and to promote the internationalization of local software products, while fostering alliances and encouraging stronger integration with larger technology firms abroad.

The CCT is closely related to the “Programme for the Development of Productive Chains,” and was conceived as an integrated effort by the City of Córdoba Development Agency and the Córdoba Science Agency and the Foreign Trade Chamber of Córdoba, and is partially funded with technical cooperation funds from the Inter-American Development Bank.

The external funds are from the Multilateral Investment Fund MIF/AT 511. The objective of the project is to improve the productivity and economic development of small businesses in the province of Córdoba through joint actions designed to strengthen business cooperation, and to raise the level of productive efficiency and commercial capacity by creating a group of businesses in the informatics, electronics and high-technology sectors, as well as a group concerned with furniture and agro-industrial products. The MIF funds total US\$ 1,082,640.

The CCT was the first attempt to set up a Productive Collaboration Association for the software industry. Following this initiative, other technology clusters have emerged in Argentina, e.g., in Rosario, in the Provinces of Córdoba and Tandil, in the Province of Buenos Aires.

This concept arose as an attempt to create a cluster centered on a group of innovative local firms attempting to expand its activities by using innovation as a tool for gaining a competitive advantage. As a result of conversations with government authorities, they became increasingly aware of the importance of major multinational firms. The provincial government granted multinational firms a number of tax advantages: tax exemptions, land at concessional prices, and other incentives. The most important multinational companies in the sector already had a commercial presence in Córdoba and, as a consequence, could serve as a channel for disseminating information concerning a potential cluster.

Historically, Córdoba has been a culturally developed province with a significant number of high-quality university graduates. Well-trained human resources were available, though certain career changes would be required to meet the current personnel needs. The supply of trained human resources and the announced investments were a central issue for attracting suppliers of collateral services and technical support institutions. Given Córdoba's particular cultural patterns, including the practice of sharing business among two or three companies (often a single company may be unable to handle a large volume of business), the cluster concept has been relatively easy to promote.

Regional public policies implemented during the last 10 years produced favorable conditions for developing an advanced IT environment at the national level. This could be seen particularly in the active efforts of provincial authorities to support the creation of a technology cluster.

Commitments: A cluster's success depends largely on strong commitment on the part of its members. In this case, the founders established certain common criteria, to be applied regardless of the particular firm carrying out a given business.

These criteria can be summarized as follows: The main business activities are to be located in Córdoba; thus, a company could have activities outside the province of Córdoba, but its core operations must remain in Córdoba. This principle has been applied with considerable flexibility, but the important point was the emphasis on encouraging the development of business activities in Córdoba.

Another widely applied principle was the internationalization of activities. All of the founders have been involved in exporting some of their products or services. The most difficult criterion involved limiting individual interests and fostering a culture of partnership and cooperation, without endangering local competitiveness. The last part of this principle was subject to challenge in cases where a group had influence within a particular geographic area.

The Founders made the decision that an expansion in the overall mass of business would provide the best opportunity for the cluster's success, and therefore invited other actors –public and private– to be involved in developing the cluster project.

A strong commitment was made to create a technology cluster centered on innovation and ongoing improvement as a basis for continued survival. The development of the cluster's programs was focused on this challenge. In a country in which a single city (Buenos Aires) played a dominant role within the nation as a whole, this was used as a reference point for gaining support on the IT project. A proactive attitude was adopted at the institutional level, and efforts to monitor the cluster's progress were implemented.

Vision of the government's role: The government must take an active role in assuring the cluster's success, since small markets such as Argentina lack the volume to justify certain investments. Access to other markets may be affected by various types of barriers.

Institutional involvement is needed to foster development of the cluster, not only through the creation of an IT Secretariat, but also by acting as a facilitator in creating sustainable conditions, coordinating policies among different levels (national, provincial, municipal), offering information through databases, and conducting new studies. The creation of the proper conditions for development of the cluster involves measures oriented toward:

- ✓ Promoting improved competitiveness through incentives;
- ✓ Creating programs to develop firms and human resources;
- ✓ Emphasizing export programs and promoting clusters abroad;
- ✓ Granting equal conditions to local and foreign companies;
- ✓ Providing easy access to credit;
- ✓ Eliminating distortions and asymmetries in the region;
- ✓ Redirecting investment in infrastructure and project development;
- ✓ Stimulating foreign investments in specific projects; and
- ✓ Playing an active role in fostering integration, common business, and alliances between local and non-local firms.

The cluster's vision: Within the context cited earlier, the emerging vision became clear:

- Linking competence and cooperation as a trigger for innovation;
- Increasing export volumes over the long term throughout all international areas;
- Giving the cluster a major role in the domestic market;
- Choosing a province with the best conditions as the location for new international projects, thus creating a need for the supply of goods and services by new local firms; and
- Promotion of a “brand name” for the products.

Founders: The initial members of the cluster were:

DISCAR S.A.; INVEL S.A.; IPP S.A.; INTERWAVE S.A.; LEMPERT & ASOCIADOS S.A.; MKT S.A. (organizer); PROMINENTE S.A.; SISCARD S.A.; VATES S.A.; and VOIP GROUP ARGENTINA S.A.

New members: IMPSAT; Ayi y Asociados; ThinkSoft Argentina S.A. (formerly Carlos Carballo y Asociados S.R.L.); Deloitte & Touche; CBA Solutions; CompuServe; Comsys; Colegio Universitario IES Siglo 21; MECER; Galander S.A; Harriague & Asociados; Horovitz, Kravetz y Asociados; Institución Cervantes; InterCom; Iplan; IR Comunicaciones; Kanav; Kuantika; Marck; Netizen; Price Waterhouse & Coopers; Qplus Consultores S.R.L.; Serbal Technologies; Silica Networks; and Techtel.

Cluster Programmes – Cordoba Software Factory: The proposed goal was to develop software based on international standards, oriented to exportable applications and software engineering, developed by and located within Cordoba SMEs. Common business strategies had to be designed to promote the concept and the products. At present, training programmes for lower-level CMM have been executed. Financial support from the provincial government helped in this initial stage. In order to reach CMM Level 2, the IDB has approved US\$ 120,000 for training purposes. Ten firms are preparing their procedures for this new step. For the second semester of 2004 they are planning jobs requiring 80,000 programming hours. For 2005 they are planning 250,000 hours. At present, the Cordoba Software Factory has a consulting and programming staff of more than 1,500 people - a figure that includes the addition of specialized personnel.

Cluster Programmes: Unified Development Platform. The proposed goal involved congruency, through use of a standardized development platform. Each individual firm will have appropriate resources to develop a standardized process (individually or as members of a pool). The present status indicates that the cluster has a unified platform license supporting development of software under CMM rules.

Cluster Programmes: Cordoba Technology Institute. The proposed goal was to improve and develop human resources capabilities, a valuable resource in terms of the cluster's future. The Cluster has created the ITC (Cordoba Technology Institute), with technical and financial support from Intel, IBM, Microsoft, and other IT leaders. All of the local universities have been included in the programme, in order to provide updated content, generate R&D activities and promote IT research. The Institute may be considered a virtual entity, acting as a channel to obtain resources and coordinate actions. In the words of the Cluster's Executive Director: “We continue with our efforts to expand the specialized human resources in Cordoba. To expand means to provide them with the appropriate training to meet external business needs. The cluster's activities, designed to meet a growing demand, are oriented to strengthening the specialization efforts, working in collaboration with the universities. This is an ongoing item on the cluster's agenda.”¹

The lessons learned from the above-mentioned initiatives, along with their advantages and consequences, are considered in Chapter V, “Conclusion.”

¹ Basic Cluster information: Hipólito Yrigoyen 146 - 15th floor, Córdoba Business Tower, 5000 Cordoba, Argentina. Executive Director: Manuel San Pedro.

2. Dupont Apex Programme

At the end of 2000, the multinational corporation Dupont announced a programme to link up groups of potential exporters (primarily SMEs) with the company in order to improve supply to other countries. These firms were Dupont's customers, and the idea was to export added value products instead of raw materials. In March 2001 steps were taken to create the following three groups: (i) textile manufacturers; (ii) electrical materials; and (iii) industrial hardware.

Support offered by Dupont to the participating companies included: (i) consulting on operational matters (legal services, customs procedures, banking operations, IT, promotional schemes, brand name registration, etc); (ii) accessibility to use Dupont's supplier services (logistics, banks, customs agents, transportation companies, information networks, etc); (iii) know-how and management capabilities to help in obtaining financial resources (banks, SMEs, the Secretariat, other companies, etc.); and (iv) assistance in developing strategies and preparing business plans (including topics such as branding, marketing, export qualifications, logistics and the international Dupont network). During 2003, new groups were organized to begin a new programme with DUSA, a joint venture of Dupont with the Turkish company Sabanci. At the end of 2003, the status of groups carrying out exports under this umbrella was as follows:

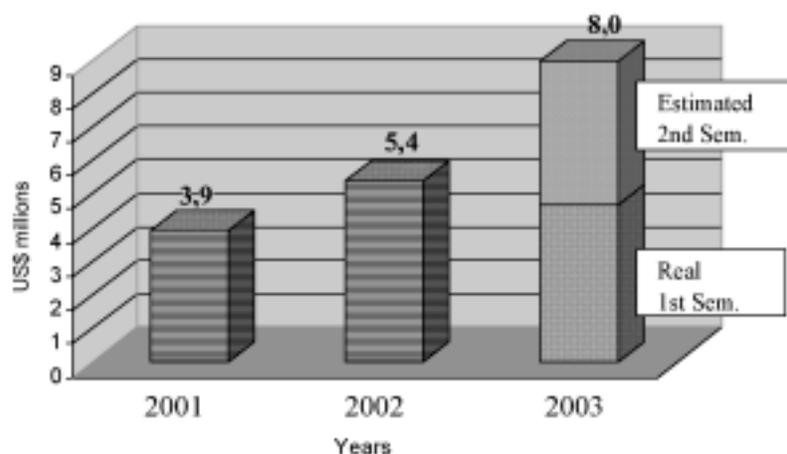
TABLE 6
NUMBER OF PARTICIPATING FIRMS

Group Exports	# of firms
Textiles and clothing (2 groups)	12
Architectural and equipment	5
Painting and coating materials	5
Electrical products	5
Lighting appliances	4
Products for the Oil industry	20

Source: www.sepyme.gov.ar/index.php?btn=2&a=comex&b=proyecto.

Changes in exports were significant, as illustrated in the following graph. In the case of certain exporters operating as individual firms, the total exports exceeded US\$ 10 million in 2003.

FIGURE 1
EXPORTS OF PARTICIPATING FIRMS



Source: www.sepyme.gov.ar/index.php?btn=2&a=comex&b=proyecto.

The main benefits for Dupont's customers included: (i) ability to access foreign countries as a result of good information sources, capacity to analyse the information, and facilitation of commercial relationships; (ii) better internal organization and use of IT; (iii) new products for the domestic market, as a result of designs geared to meet foreign demand; (iv) new sources for financial resources; (v) compliance with international regulations, improvement in quality, and better prices for products or reduction of costs; and (vi) new dynamics for dealing with exports outside the group. In August 2003 the Exporters' Chamber granted the 2003 Export Prize to Dupont Argentina, based on the development of the Apex programme.

Lessons learned from this programme, along with their advantages and consequences, are considered in Chapter V, "Conclusion."

3. Profiling export-oriented industries

A sample of 18 export-oriented industrial firms² was selected, and data regarding their IT spending and projects during the first four months of 2004 were collected. (The original idea was to gather data from the first semester, but not all companies were able to provide such information). The companies included represented a wide variety of industrial sectors, thus avoiding the traditional export products, which involve relatively little use of technology.

The range in sales among companies for last year varied from a minimum of US\$ 4 million to a maximum of US\$ 690 million. Average billings for 2003 among the sampled companies was US\$ 77 million. Estimated billings for 2004 are anticipated at US\$ 82 million. Total billings for the 18 companies in 2003 reached US\$ 1.39 billion. Total estimated billings for these companies in 2004 could be as high as US\$ 4.4 billion. The companies have an average staff –administrative combined with service and marketing personnel– of 180. The average number of factory workers is 151. The average total number of employees is 357. The total of IT personnel in the sample is 137, representing an average of approximately 8 persons per company. In terms of types of employment, 62% of the personnel is permanent staff, while third-party staff or part-time contractors account for 38% (85 persons in the first case and 52 in the second). This 38%, representing non-permanent contracted IT personnel, amounts to an average of 3 persons per company, though the distribution is inconsistent, with a greater number of contractors in development areas and only a few in technical-support areas.

IT Spending

The IT spending considered for this case includes infrastructure investment, hardware, software, IT services (consulting, integration, development, training, outsourcing), communications equipment (excluding traditional telephone services) and internal expenses (personnel, operational expenses, supervision). Depreciation is not included.

IT spending during 2003 exceeded US\$ 13 million, and a similar figure is estimated for 2004. The relation of IT spending to sales is a common indicator used for comparative surveys to ascertain the degree of IT insertion in the specific business. For the sample considered, the ratio reached 1.0% in 2003, falling to 0.9% in 2004, representing very poor levels compared to international standards.

However, the relative importance of IT spending may not necessarily be related directly to the volume of sales. Research for the entire market shows the following: There is a ratio of 2.6% for the last segment of SMEs (dividing the SMEs evenly into four segments according to level of sales), while the average ratio for the rest is 1.6%. It is important to point out that this average value exhibits a large variation, pointing to the fact that these companies are operating in

² The sample contains data on: Anselmo Morvillo; Astra Zeneca; Aventis; Boheringer; Carboclor (Sol Petroleo); Cemento Avellaneda; Cipet; Corandes; Dow Quimica; Dupont; Envases del Plata; Flora Danica; Merk Quimica; Nike; Ondabel; Sintoplast; Sociedad Com, Del Plata CGC; and VASA Vidrieria Argentina.

different vertical markets. The larger companies have increased billings, though they report relatively stable IT spending, while the companies in the lower segments, based on sales, are increasing their IT investment. One possible explanation may be that improved performance is more visible for the less technologically equipped companies. This is particularly true when their IT usage is below international standards.

Expenditures, divided between internal and external sources, remained virtually unchanged in 2003 and 2004. The actual and estimated expenditures to third parties for 2003 and 2004 are presented (in percentage terms) in the following table:

TABLE 7
IT SPENDING BY COMPONENTS

Year	Hardware	Software	IT Services	Data Communications	Other
2003	33.1%	21.9%	22.8%	19.4%	2.8%
2004	35.4%	20.9%	21.9%	18.9%	2.8%

Source: prepared for this report by Trends Consulting using IDC Worldwide definitions and methodology.

Projects

Table 8 is intended to show the importance assigned to the projects, based on budget allocation. Internet-related areas (sites, commerce, intranet), as well as new applications and server consolidation, represent priority concerns.

This could indicate that companies are not adopting a balanced approach, based on the relative importance given to different areas in budget allocation. The most significant example is the Internet/extranet/website case: 61.1% of the companies consider it a strategic matter but only half of these companies are budgeting resources accordingly. Another dominant project area is that of server consolidation, with companies considering this as the top strategic goal and therefore allocating the corresponding resources. This is a typical defensive measure aimed at reducing costs and improving efficiency, but it has no decisive impact on future development. Among the main reasons for giving high priority to both of these areas is the desire to consolidate and develop new foreign markets.

TABLE 8
PROFILING EXPORT-ORIENTED INDUSTRIES

	Internet extranet and/or web-site	VoIP	Mobile Computing	Storage	Server consolida- tion	Out- sourcing	Security	New applications	Changes in Operational Systems	Regularisa- tion of licenses
Resources	50.0%	16.7%	16.7%	33.3%	55.6%	22.2%	38.9%	44.4%	33.3%	11.1%
Strategy	61.1%	11.1%	27.8%	38.9%	66.7%	27.8%	44.4%	50.0%	38.9%	11.1%

Source: prepared for this report by Trends Consulting using IDC Worldwide definitions and methodology.

Main projects for 2004: Projects viewed as more relevant for 2004 by top management - based on only the first reply to the question) are: integration with SAP; migration from Windows NT to Windows 2000; CRM using Siebel; development for PDA (replacing salespersons' notebooks); price and cost allocation; communications unification; upgrading to Windows 2000 server for a Meta 4 server; regional centralization of IT services (elimination of outsourcing); development of a new portal; addition of modules to ERP for planning and budget, fixed assets and purchases through public bids; updating sales agents' versions of applications; VoIP – messaging integration; ERP consolidation in branches; hardware consolidation; migration to SAP; extension of VPN's coverage; upgrading from SAP R3 version 4.5 to Enterprise; hardware renewal/contract renegotiation

Application software: The following table indicates the low presence of CRM, SCM and E-Procurement in the sampled companies.

TABLE 9
PRESENCE OF APPLICATION SOFTWARE

	CRM	SCM	B2B	B2C	ERP	Payroll	HR	e-Proc
New application planned	5.6%	0.0%	11.1%	0.0%	0.0%	0.0%	5.6%	0.0%
Functions to be added	5.6%	0.0%	11.1%	11.1%	22.2%	5.6%	5.6%	5.6%
Product change planned	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Already have a product of this type	22.2%	11.1%	22.2%	0.0%	72.2%	77.8%	27.8%	5.6%
Do not have a product of this type	61.1%	88.9%	55.6%	88.9%	5.6%	16.7%	61.1%	88.9%
Total	100.0%							

Source: prepared for this report by Trends Consulting using IDC Worldwide definitions and methodology.

No real leadership position in this market can be identified, given that so few companies are using this tool.

Internet developments: Java Platform is preferred (see the sample of companies) over net technology for Internet developments.

Decision-making support: Some 38.9% use Data Warehouse or Data Mart tools, while 11% are employing Data Mining tools. Some 33.3% have Online Analytical Processing (OLAP) tools, and 22.2% have Enterprise Information Systems (EIS). More than 55% of the sampled companies have announced their intention to improve the utilization of EIS.

Development of applications: Decisions to be made regarding purchases relate to the selection of international or national packages, or of custom developments.

Managers give special attention to quality when they are considering international products, but accept less developed documentation in the case of local products. Most Argentine software houses have had a short business life, making this a high-risk undertaking.

While for some managers a brand name may be more important than the price, (e.g., risk sharing), for the owners managing companies the price factor may be more relevant.

Internet presence

Website: Having a Website is considered a “must,” but resources for updating and improving sites are not a permanent fixture and are more dependent on the actions of competitors.

TABLE 10
WEBSITE

Has one	83.3%
Planned for 2004	11.1%
No response	5.6%

Source: prepared for this report by Trends Consulting using IDC Worldwide definitions and methodology.

B2B: Existing implementations are primarily related to closing deals, rather than to self-decision. Most SMEs believe that the market is not yet ready for widespread use.

B2C: Export-oriented companies consider the Argentine market too small, and logistical problems occur when long distances are involved.

E-mail: Nearly all employees use e-mail; in the case of Internet usage, on the other hand, more than 60% of users are constrained by various limitations, ranging from non-authorization to

the imposition of content filters. Only 38% of the companies provide full Internet access to every workplace.

Motivation for IT investment

Requirements of external markets were a driving force for new IT investments.

TABLE 11
CAUSES OF IT INVESTMENT

Motivation	%
Domestic markets' old requirements	27
Domestic markets' new requirements	35
Requirements of previous external markets	38
Requirements of new international markets	33
Cost reductions	28
New product lines	16
Other	13

Source: prepared for this report by Trends Consulting using IDC Worldwide definitions and methodology.

External services

Many articles explain the advantages of outsourcing, but the statistics (see next page) show that the movement toward this modality is slow.

4. Belgrano Department (Province of Santa Fe)

The territorial and sectoral agglomeration of companies, known as the Belgrano Department or the Rafaela case, is an example of competitiveness, profitability and sustainable export capability. When this movement began, no one spoke of clusters or poles; rather, this was regarded as a confluence of interests driven by public and private actors.

The Belgrano department (40,000 inhabitants) hosts 30% of the nation's production of seeders, pulverizers, harvesters and tractors. In many small towns in this region, unemployment is nonexistent. The industries located in the city of Rafaela, with an average of ten employees each, exported an equivalent of US\$ 108 million in 2003. The price per exported ton was US\$ 2,148, compared to the national average of US\$ 274 per ton.

The trend of locating small factories close to complementary –and competitive– colleagues (involving the same productive chain) made it possible to counterbalance the pressure of open markets, financial constraints and globalisation. According to World Bank terminology, Rafaela is a case study in LED (local economic development). MERCOSUR played no significant role in this success. Many firms are quality certified, and some are exporting to the European Community.

The World Bank points to the following as being vital to success: (i) an institution for policy and planning, such as the Municipal LED Training and Research Institute (ICEDEL); (ii) economic institutions that play a major role, such as the Small Enterprise Business Association (CAPIR), the Technology & Innovation Centre and the Enterprise Development Centre; (iii) a range of LED Programme Initiatives, such as locality development (infrastructure and physical planning); (iv) enterprise development (incubators, enterprise support services; innovation); (v) horizontal cooperation between municipality, local business associations, and new small-enterprise association and NGOs; and (vi) learning processes: Standardized Knowledge Transfers (Training), Organizational Learning in Local Public Agencies, and a strategic plan for the city.

JICA (Japan International Cooperation Agency) Senior Volunteers Programme

Pursuant to an agreement with JICA, two Japanese international trade experts have been working, since April 2003, on the Programme for the Internationalisation of Local Companies. Its project goals are to provide in-company training, and technical support in marketing and international trade to SMEs that are presently involved in exporting or are potential exporters, with an emphasis on fostering and expanding the internationalisation of Rafaela's industrial milk processing and metal/mechanical SMEs.

The Japanese experts have visited 33 Rafaela firms relating to the following sectors: metal/mechanical, car parts, food, furniture and packaging. In 15 cases, market penetration studies and preliminary sales efforts were performed, using Japan as the reference market. In addition, introductory training and contact facilitation with Japanese companies were carried out for companies without previous export expertise, such as Marengo (candy) and EMC (furniture).

Other agreements:

Recognizing the need for exchange and for widening the horizon of local inhabitants, two other academic agreements were signed, one with the State of Baden-Wuerttemberg (Germany) and the other with the city of Fossano (Italy).

Prizes:

Companies located in Rafaela have won several prestigious prizes in recent times. Bio-cheese produced by Sucesores de Alfredo Williner S.A. won the "Dr. Arroyo" prize (sectoral chamber in Spain). This company also received the ArgenINTA prize for agro-alimentary quality.

C. PROBLEMS FACED BY SMEs IN PARTICIPATING IN THE TRADE-ORIENTED VALUE CHAIN

1) *Problems that SMEs encounter in participating in IT networks*

During the period in which Argentina had a fixed, one-to-one exchange rate with the US dollar, most SMEs laboured under severe restrictions due to the lack of competitiveness, and IT investment was not considered a priority.

Following that period, the ongoing instability and constant rules changes made for a bleak scenario. When the situation began to revert to greater stability, with a more predictable future, winners and losers emerged. SMEs geared to exporting or to selling products to large exporting companies were the undisputable winners (with sales at dollar values, and a greater portion of costs in devalued pesos). These companies have invested in IT over the last two years, and have acquired equipment and general-purpose software, along with updated ERPs. The next challenge will be to increase participation in IT networks, as part of a second phase. As observed in Case No. 3 (Profiling of export-oriental industries) of this study, only 11.1% have made plans to invest in B2B initiatives in 2004, while response to the question on projected investment in B2C was null. (Notably, only 11% of the surveyed companies had some form of B2C activities).

Education is another key issue. Learning about the opportunities networks may offer individual companies is essential to improving IT development: the unknown may provoke rejection.

An important distinguishing factor among companies is the age of their owners. Enterprises of young owners are more conscious of the role of networking and invest more in this area. They have more information about the power of IT as a tool and utilize it as a key to success.

Another exception to consider is initiatives of large companies such as Techint (Tenaris group), which have forced their suppliers to be electronically connected with the main company, progressively increasing the level of integration with them.

2) *Barriers that inhibit SMEs from participating effectively in supply chains and trade networks*

The most important barrier that inhibits SMEs from participating effectively in large supply chains is a lack of confidence in the ability to act simultaneously as partner and competitor with other companies. Experiences have not always been favourable with respect to this type of cooperation: in some cases only one (or only a minority) has obtained favourable results from collective actions to which all members contributed.

It should also be pointed out that the role of government was not conducive to achieving such goals, with, over many years, twice-yearly changes in policy, new promotion plans, changes in tax rules, effects from non-collectible tax credits from exports and other problems.

From a technical standpoint, many SMEs are ill equipped to deal with the demands of working collaboratively with other companies. Moreover, in many cases owners are sceptical that cooperative actions will optimise their use of resources and that efforts to develop a coordinated plan will provide cost savings and be successful.

IV. Government Policies Designed for SMEs, IT, and International Trade

A. IT POLICIES IN THE COUNTRY'S OVERALL STRATEGY

Decree 252/2000 created the National Programme for the Information Society. The objective was to generate policies and projects in order to use IT to provide broader access to information, knowledge and trade. The State Secretariat for Science, Technology and Productive Innovation was designed to take responsibility for formulation, supervision and coordination. The Secretariat has taken on this goal as part of the Science, Technology and Productive Innovation National Plan.

Another Decree (243/2001) has given the State Secretariat of Communications responsibility for activities related to design and implementation of public policies for widespread use of the Internet and other digital networks, and for development of E-Commerce to foster investment in ICTs and the related human resources. The present governmental structure does not include this Secretariat, having instead a National Office of IT (ONTI), which is responsible for overseeing such issues, but with no specific mandate related to the Information Society. At present, this entity is responsible for issuing digital certificates (digital signature), coordinating networks to deal with government emergencies, updating the Technological Standards for Government (most recently issued in the spring of 2003), coordinating IT forums, promoting and coordinating the development of scorecards and indicators panels for the thousands of national offices (four are in a relatively advanced state of development), and overseeing the E-Government portal (which at present serves only as a link to other sites). Plans for the future include a National E-Government Plan, infrastructure development for bringing digital signatures into widespread use, access to FIRST (international forum), and development of interoperability standards and of a guide to make it easier for citizens to connect with the government.

In August 2004, the “Law for the Promotion of the Software Industry” was approved, aimed at improving the development of Research and Development activities related to programming innovations and certification under international rules. The industry is awaiting the Regulatory Decree, which will make the law operational, and is hoping that the corresponding benefits will begin to be seen in 2005. This plan is oriented to creating improved conditions at 600 firms and 1,300 micro-enterprises, employing 25,000 people, and increasing IT career possibilities for more than 100,000 students. Some of the principal benefits are the possibility of converting 70% of the social charges to tax credits, and establishing an income deduction of approximately 60% for such companies.

The law creates the Fiduciary Fund for Promotion of the Software Industry (Fonsoft) for the purpose of financing software research and development projects, providing for specialized human resources, improving the development process and increasing access to financial aid by new enterprises.

The Science, Technology and Productive Innovation Secretariat (SECyT) will be responsible for organizing and managing the Fiduciary Fund, while the SME Under-secretariat will serve as the enforcement authority for the other measures, including the obligation to publish on an Internet website the Registry of Beneficiaries for this regime.

Due to the ongoing changes, efforts to accomplish this second goal appear to be sporadic. For example, a plan to finance 1 million PCs for individuals was halted because of the general economic crisis, with only 40,000 financed under the subsidized National Bank loans.

Another plan was “one citizen, one e-mail.” Its main objective was to provide no-cost e-mail for all the citizens, but no evidence of an ongoing project was found. A project to provide legal protection for e-mails –a proposal that was distributed to various associations and chambers of commerce during 2002 for comment– is still pending. Another aborted project was a plan involving Argentine businesspersons and the philanthropist Martín Varsavsky, who is associated with the National Administration. Its aim was to connect 40,000 schools in Argentina to an educational Internet portal (Educ.ar). The portal contains numerous educational resources, but it remains unclear whether it will continue in operation.

IT-related policies are included within the Science, Technology and Productive Innovation National Plan Project, 2004, under the direction of the State Secretariat for this area.

Argentine Integrated Scientific and Technological System (SICTIAR)

Its objective is to administer the unique registry of researchers in the country, allowing for the standardization of individual curricula, registration of projects, institutions and research groups, and the processing of such information in developing national Science and Technology (S&T) indicators, as well as the use of these data in administrative issues related to this sector, such as calls for bids and evaluation of the projects. The goal is to have accurate, updated information available, thus allowing for the improvement of planning and evaluation activities. The budget is \$ 2,487,500 (approximately US\$ 800,000).

Actions taken by SECyT to establish the National Science, Technology and Innovation System.

The strengthening actions taken by the Science and Technology Institutions led to the need for establishing mechanisms to allow the science and technology sector to formulate the plan and budget, reinvest strategically its own resources generated by its activities, and efficiently administer staff regulations and wage scales, based on the particular activities involved. There is no specific budget allocated for this programme.

Consolidation of the computing resources supporting scientific and technological research.

This programme has three components:

- a) “Science and Technology Electronic Library” Site. The total budget for 2004 is \$ 11.4 million (approximately US\$ 3,800,000). The site provides Internet access to complete documents and articles from national and international science and technology publications;
- b) Mainframe Clementina II. The budget for the year 2004 is \$ 380,000 (approximately US\$ 127,000). The mainframe Clementina II is a resource specifically suited to research involving highly complex and exacting processes; and
- c) Technological-Scientific-Academic Videoconferencing Network. The budget for 2004 is \$ 168,000 (approximately US\$ 56,000). A multipoint conference unit will

be incorporated and the necessary equipment for simultaneous operation in different parts of the country.

Special support services for innovative SMEs

This category of support includes: (i) identification and analysis of “technology opportunities,” i.e., inventions capable of generating a concrete application in the production of goods and services; (ii) administrative and legal assistance and advice on intellectual property rights protection; (iii) economic research studies to examine the possibility of exploiting the particular invention, financing of market studies and of foreign patenting, based on real possibilities of trading in the markets in which products are patented; (iv) promotion of alliances with institutions specialized in accessing risk capital; (v) promoting the incorporation of university research teams in this system; (vi) creation of a regulatory framework to allow researchers to spin off products when there is no possibility of licensing them to third parties. This provides an incentive for researchers to carry out research that has commercial potential. The budget for 2004 is \$ 1.3 million (approximately US\$ 434,000).

The education programme within the scope of the IDB loan 1345/OC-AR was approved some time ago, and has recently been reformulated in the wake of Argentina’s economic crisis.

More specifically, it will provide computing equipment for the 1,500 secondary schools and 2,500 basic general education schools that are part of Subprogramme I, and for the basic general education schools to be part of Subprogramme II. The total amount allocated for this purpose is US\$ 52.3 million.

B. POLICIES TO SUPPORT SMEs

There are at present numerous measures to encourage SMEs to participate in international trade. For those that become involved in the process, the two most common problems are: poor publicity (given the nature of the target population, publicizing the event in the papers is not sufficient), and the fact that SME managers tend not to bring to their projects a sufficient degree of formality to make them amenable to professional analysis.

There are various tools to support SMEs, ranging from facilities to direct subsidies.

1. Export promotion

Export Groups Programme

This programme (SME Under-secretariat) is designed to guide and encourage the development of sectoral partnerships, for the purpose of achieving more efficient internationalisation of SMEs by providing technical assistance in designing and implementing export strategies. A Partnership Strategy should make it possible to: (i) complement the export supply of companies that experience problems of scale; (ii) improve the capacity of companies to negotiate with customers or suppliers; (iii) facilitate collective learning, while sharing the high costs of gaining entry to other markets; and (iv) develop activities that small companies would be unable to carry out individually. The goal is to reduce the major limitations faced by SMEs, by making it possible to design a joint strategy that can be executed collectively, directing the products to similar trading sectors.

This programme was implemented in September 2000 and presently includes 30 export groups comprising some 250 companies from different sectors.

During 2002 the collective exports of companies involved in the programme grew 58% compared with the previous year, in a period during which there was a 5% decline at the national level. Furthermore, participating companies that were new to the export business experienced an increase of 20%, while at the same time diversifying their markets.

Support for New Exporters

Through the “Support for New Exporters” programme, the SME Under-secretariat provides advice to SMEs located throughout the country on launching export operations. This includes analysing and diagnosing problems, training, and tutorials for designing and implementing a strategic export plan. The system uses assistants, provided through agreements with the national universities, who are responsible for guiding the export process of participating SMEs. The assistants receive training on: (i) export costs and prices; (ii) development of a business plan; (iii) formulation and evaluation of the export plan; (iv) techniques and tools useful in obtaining information on the Internet; and (v) establishing a schedule for meetings with the programme tutors. Companies are required to pay the transportation costs of the assistant, assign him/her a work place and Internet-connected computer at the company’s facilities, and attend periodic evaluation meetings at the official institution.

Foreign Trade Area Information System

The Foreign Trade section of the SME and Regional Development Under-secretariat provides companies with databases maintained by different national and international institutions, as well as information available on different websites. The objective is to assist the SME business sector in obtaining commercial information for purposes of subsequent decision making. The office provides information on: (i) lists of prospective importers; (ii) statistical data; (iii) import regulations in the target countries; (iv) import duties and protective tariffs; (v) trade fairs and exhibitions abroad; and (vi) general information on the target country.

Articulation between Large Companies and SMEs

In recent years, there has been a recognition of the importance of linking producers of different sizes through cooperative efforts and joint activities to enhance awareness of improvements in competitiveness and the effects thereof. Interaction with large companies can generate synergies that benefit SMEs, especially by the time they start business, through enhancing the export culture and expanding companies’ business abroad.

At the end of 2000, the SME Under-secretariat (SSEPyME) called upon the large industrial companies operating within the country to undertake collective, coordinated efforts aimed at incorporating, reincorporating or strengthening exports vis-à-vis a group of SMEs with export capacity and potential.

The SSEPyME takes part in the following activities: (i) selecting the SMEs that will participate, and carrying out necessary technical or feasibility evaluations; (ii) facilitating access to available support tools within the SSEPyME and other national-government offices (which have their own technology equipment and methodology for creating and operating joint projects); and (iii) supervising activities during the course of the project.

The role of the large company is: (i) to facilitate access to the company’s logistical, legal, tax, and other services; (ii) transfer management know-how and, at its discretion, grant advantageous prices for export-related supplies; (iii) facilitate SMEs’ access to financing for operations related to the foreign market; and (iv) facilitate access by trade-related SMEs to the tax credit programme.

2. Trade facilitation

A “Single-Window System for Exports” has been announced on several occasions, but has never been implemented. The last such occasion was in 2002, when the Strategic Plan for Production was published.

The Chamber of Exporters was one of the main supporters of a single-window system, but at present they are satisfied with the improvements made to the Customs system (known as “Maria”), which significantly reduces export time. Moreover, The Chamber of Exporters believes that customs procedures for imports are not onerous.

The automatic processing resulting from the implementation of the Maria system has reduced corruption, and the Chamber is concerned that changes to the present system may result in a re-emergence of some of the earlier practices.

Assistance Programme to establish Productive Collaboration Associations

This programme is designed to supplement the operating expenses of Productive Collaboration Associations, which may be set up with a minimum of 4 members, with the characteristics of SMEs, provided they document 3 years of experience in their area of operation. They are to receive a 50% subsidy for the first two years, with a maximum of \$ 60,000 (approximately US\$ 21,000) per year, through quarterly checking accounts. Possible objectives are: (i) incorporating technology; (ii) increasing foreign trade; (iii) exploiting tourism resources; (iv) improving conditions for commercial purchases; (v) implementing quality-control systems; (vi) fostering production specialization; (vii) enhancing competitiveness; and (viii) providing production support.

Permissible expenses include: (i) establishment of the firm's offices; (ii) wages and social benefits to be paid for staff contracted on a dependant-relationship basis that may be ongoing, in order to meet the firm's needs; (iii) salaries of technical staff contracted for tasks related to the firm's objectives; (iv) expenses for communications and services; (v) trips for commercial purposes; (vi) publicity materials; (vii) maintenance of the building and of equipment located at the firm's headquarters; and (viii) construction of minor infrastructure.

As of the writing of this report, the programme is not yet in operation.

Legal Assistance

The State Secretariat has implemented a programme of Legal Assistance for SMEs. It is designed to answer inquiries regarding the relationship between the SME and the national government in areas related to the firm's operations, promote compliance with current legislation, and collaborate in addressing administrative issues in a timely manner. It provides analysis of legislation in connection with solving problems facing SMEs, relying on past experience and on changes at the national and international levels.

3. FDI promotion

The Investment Promotion Agency (ADI) is a working unit within the Secretariat of Industry, Commerce and Small & Medium Enterprises, which is part of Argentina's Ministry of Economy and Production.

ADI works in two areas. The first of these is institutional promotion: identification of business opportunities in different sectors and regions of the country, and dissemination of relevant information. The second relates to investor support: specifically, a reference centre, specializing in supplying up-dated information on economic, financial, legal, educational, technical, tax-related, and other issues connected with making decisions on investing in Argentina.

ADI works jointly with certain other national and provincial governmental agencies in promoting sectoral investments, while coordinating its external relations through the Ministry of Foreign Affairs, International Trade and Worship, as well as through the commercial offices of foreign embassies within the country.

4. Business promotion

FONAPyME (National Development Fund for Micro, Small and Medium Enterprise)

The Secretariat for Regional Development of Medium and Small Enterprise called for bids totalling \$ 80,000,000 (approximately US\$ 27 million) for existing or potential projects to be carried

out by SMEs or by any other firm (pools, associations). This is intended to obtain financing for carrying out investments that create or broaden the productive capacity of the company and/or bring in new products, services or processes that significantly improve the development, expansion and growth of such companies, and that take into account the potential impact on regional development and job creation.

This consists of three calls for bids for SME projects, encompassing the following main characteristics:

- General call: involves all economic sectors, for \$ 60 million (approximately US\$ 21 million) of financing;
- Call for bids targeting the tourism sector, for \$ 10 million (approximately US\$ 3.5 million); and
- Call for bids targeted to the aquiculture sector, for \$ 10 million (approximately US\$ 3.5 million).

National Fund for the creation and consolidation of micro business (FoMicro)

This fund is designed to create productive units of goods and/or services on the part of unemployed and under-employed workers' groups, and to consolidate existing companies that deal with micro business. The Argentine National Bank (BNA) coordinates this programme in collaboration with the SME Under-secretariat, which is part of the Ministry of Economy and Production.

The purpose of this initiative is to finance individual or joint projects. Along with low rates and individually signed loans, FoMicro will provide, through a network of social organizations, tools to assist beneficiaries with training, consulting and guidance to ensure optimal development on the part of the beneficiary firms.

The beneficiaries may be: (i) projects from new individual or joint micro businesses established as production units for goods and/or services; or (ii) existing individual or joint micro businesses. Financing conditions will be as follows: (i) maximum amount: \$ 30,000 (approximately US\$ 10,400); (ii) minimum amount: \$ 3,000; (iii) annual interest rate: 7%; (iv) term: 48 months, with a grace period of 6 months; and (v) guarantee: personal signature.

Bonus-rate loans

The SME Under-secretariat implemented a system to provide SMEs access to low-rate loans. When it was originally created, a bonus of 3 percentage points was envisaged. Through Resolution 7/2003, this was increased to 8 percentage points.

There will be an initial stage, with a total of 100 million pesos (approximately US\$ 34 million), with 500 million pesos (approximately US\$ 172 million) allocated to the system. As of February 29, 2004, 53 million pesos in loans had been granted to companies within the sector.

Loans are granted through 14 private financing institutions, which bid to participate in the interest Bonus-Rate Regime. The SME Under-secretariat will issue a call for new bids, expanding coverage to include all financing institutions. This will take place in as many phases as appropriate or necessary, increasing loan capacity consistent with the interest rates that participating financial institutions offer to firms applying for loans. The average bonus rate is currently 9.6%, with a base of 6% and a ceiling of 10.75%.

Global Programme for Credits to SMEs (MyPEs II)

This is a trustee's programme consisting of US\$ 100 million supplied by the IDB, and US\$ 100 million supported by the National Government. The original SME programme was suspended due to the economic events of 2001.

To be selected, SMEs must have annual sales not exceeding US\$ 3.5 million, excluding VAT. This figure will be calculated based on the average annual sales of the company over the last three years, based on certified documentation or equivalent legal accounting information.

There will be a maximum loan amount of US\$ 1 million to any given company. Loans will be granted in U.S. dollars. Programme resources will be provided to companies whose activities contribute to reducing exchange risk.

The maximum term of payment for working capital and for prefinancing and financing will be 12 months. For investment financing the maximum term will be 7 years, with possible authorization of a grace period of up to 3 years, provided that the financing objective is justified and is consistent with the criteria of the Bank and of the trustee administrator.

Italian Credit in support of SMEs

Microenterprises and SMEs –including cooperatives– legally established and domiciled in the Argentine Republic and with at least 3 years of trading experience may apply. Italian-Argentine firms will have to be established by parent companies that have operated for at least 3 years in Italy and Argentina. The minority partner, whether Italian or Argentine, must have at least a 15% share in the firm.

Credit applications to a single company, even when they are divided into more than one contract, must have a minimum value of \$ 25,000 (approximately US\$ 31,000) and may not exceed \$ 2.5 million (approximately US\$ 3,125,000), while the total applied for may not exceed 60% of the annual billings. Loans will be granted for the acquisition of goods, raw materials, intermediate supplies, technology transfers, training, technical and commercial assistance, industrial licenses and patents.

Loans will have a repayment term up to 10 years, with a grace period of up to 3 years, and a maximum estimated annual interest rate of 5.2%. In the second call for bids, which closed on November 3, 2003, 370 credit applications were submitted, for a total of \$ 774,000,000 (approximately US\$ 267 million). The total amount of investment for which companies applied was estimated at \$ 1,500,000,000 (approximately US\$ 517 million). This credit line, granted by the Italian government, is being provided using global funds in the amount of approximately \$ 75 million (approximately US\$ 94 million).

Mutual Guarantee Associations Programme

In the Argentine legislation on Mutual Guarantee Associations (Sociedades de Garantías Recíprocas, or SGRs), these are referred to as commercial associations whose purpose is to ease SMEs' access to credit by granting guarantees to assist in meeting their obligations. This is part of the joint strategy involving large companies and SMEs and is also incorporated in official policy.

These associations provide an as-yet little used tool for SMEs and microenterprises to guarantee any financial commitments they may undertake, and addresses the problem SMEs encounter in conducting trade with larger-scale companies.

Problems frequently faced by SMEs, in relation to finance, include: (i) weak internal organization among SMEs, making it difficult, in contracts, for them to establish credibility as regards quantity, quality, permanence, security and hygiene; (ii) lack of information about the region or sector of which they are a part; (iii) evaluation based on net worth rather than on the feasibility of the project involved; (iv) limitations in financing working capital; (v) lack of long-term financing for companies of this scale; and (vi) difficulties in meeting the requirements of mortgage guarantees capable of covering large loans.

Against this background, the State has attempted to facilitate SMEs' access to financing. The aim of the Mutual Guarantee Associations is to grant liquid guarantees to their mutual partners (SMEs) to improve conditions for access to credit (viz., credibility in meeting commitments).

This may be achieved by issuing financing guarantees (loans), technical guarantees (fulfilment of contracts) or trade guarantees (for advance payment of suppliers or customers) and any legally permitted guarantee provided by the signing of Mutual Guarantee Contracts. These may provide their partners with technical, economic and financial advice directly or via a third party contracted for the purpose.

Hands-on workshops

Some of these are currently being conducted, while others have been scheduled for future dates.

- “Export Samples” Workshop, to resolve problems that SMEs face in carrying out export activities.
- Workshops on procedures for collecting refunds and for obtaining CBUs (uniform tax numbers)
- Workshop on completing and analysing export documents.
- Workshop on completing and analysing certificates of origin.

Business Restructuring (strategic and operational change) Support Programme (PRE)

In today’s complex economic environment, subsidies provide an opportunity to assist Argentine SMEs establish a firm footing.

The PRE grants SMEs subsidies of up to 50% for technical assistance projects that include services such as foreign and domestic market studies, development of new products and services, productive infrastructure engineering, commercial plans, quality control certification, etc., capable of strengthening their competitiveness in areas such as: export projects, import substitution and integration in the value chain of customers and suppliers, promoting business partnerships, highlighting their competitiveness and increasing their market presence.

This Programme has a Directory of Consultants (DIRCON), which provides a registry of all professionals participating as technical service suppliers to the PRE. This offers information on consulting services for SMEs and microenterprises requiring professionals to develop their restructuring projects. The programme is presently being reformulated.

Agency Network

The Production Development Agencies Network is a resource designed to help achieve regional and sectoral integration of SMEs and microenterprises. This Network is coordinated by the SME Regional Development Area and by the Under-secretariat for Regional Development, and is designed to promote and develop support policies for domestic firms and contribute to their growth and consolidation within the country.

The agencies are not-for-profit institutions whose objective is to establish relationships with SMEs and microenterprises, and to enhance local and/or regional economic development, through publicity and promotion of public-sector instruments and the direct provision of services to local SMEs and microenterprises. Such services are designed to address needs, identified at the local level, in improving the national competitiveness of these companies.

C. SPECIAL MEASURES TO RECTIFY THE “DIGITAL DIVIDE” BETWEEN FIRMS

1. Human resources

Tax Credits for Training

This regime provides financial support to micro, small and medium enterprises that invest in training their new human resources. The SME Under-secretariat refunds the cost of such training through the issuance of an endorsable Government Credit Certificate, with no expiration date, which can be used to defray national taxes, such as VAT and income taxes, under the AFIP (Federal Public Revenue Administration). Any natural or juridical persons may take advantage of this regime, provided that they have no tax or fiscal liability imposed by the AFIP, for any reason, as of the date on which the project is submitted.

The budget for the Tax Credit Programme is allocated annually in accordance with the provisions of the National Budget. The maximum amount that companies may access is determined by a percentage of the wages paid during the last 12 months. This percentage is set at 8% for SMEs and 0.8% for large companies.

Federal Programme for Training and Technical Assistance 2004

The structure for this programme, organized by the SME Under-secretariat, is open ended, depending on the requirements of the SME. The programme will organize courses and seminars based on the demand. The proposed subject matter must relate to legal and administrative aspects of formalizing companies, improving partnerships, restructuring firms in order to modernize them, promoting entrepreneurship, and developing new products and services. All activities will relate to methodology and IT.

2. Technical aspects

An Assistance Programme, designed to help establish Productive Collaboration Associations, is provided for under N° 2, Trade Facilitation Policies, and is intended to support SMEs in bridging the digital divide that separates small and large companies.

3. Financial aspects

Most loans, as specified under N° 4, Business Promotion Policies to Support SMEs, are for enhancing the IT capabilities of SMEs, with financing rates below those normally obtainable by SMEs.

FONTAR

Fontar (the Argentine Technology Fund) receives funds from several sources (primarily multilateral organizations) and finances public and private projects designed to promote innovation and technological modernization.

This programme is to be carried out through ongoing systems and periodic calls for bids. The most recent annual calls for bids involving nonreimbursable funds (2003) amounted to approximately US\$ 100 million, with a limit of US\$ 100,000 per company, designed to encourage technological innovation. More than 300 projects were accepted beyond the first stage, but as of 9 months past the closing date, technical and financial evaluations have not been completed. This programme includes approximately US\$ 2.7 million for business incubators and for development of technology poles. Last year the total amount was not reached, due to a lack of projects.

4. Infocentres

The main infocentre is the “Gobiernoelectronico.ar” (E-Government website), with hundreds of links relating to different topics. This will be described in the next chapter. There is no official website to provide specific information on rectifying the digital divide between firms.

The “Biblioteca Electrónica de Ciencia y Tecnología” (Electronic Library of Science and Technology, www.biblioteca.secyt.gov.ar) provides access to articles from more than 3,000 specialized journals worldwide, but access is restricted to educators and researchers from public organizations.

D. E-GOVERNMENT TARGETING SMEs AND TRADE PROMOTION

1. Overall strategy/structure of E-Government

There is an official website dealing with E-Government, cited above (www.gobiernoelectronico.ar), which is designed to provide information on numerous topics related to the daily informational needs of citizens. It offers links on many different topics: government offices (national, provincial and municipal), libraries, museums, universities, Argentine newspapers, legislative information, public utilities, social policy, etc.

The official website, “Crystal” (www.crystal.gov.ar), is intended to comply with Article 8 of the Fiscal Responsibility Law, providing information concerning the management of public resources. It includes the following chapters (most of which are available only in Spanish): (i) Budget Execution (detailed version, from 1999 to the most recent month reported); (ii) Procurement (see next subtitle); (iii) Civil Service (information about human resources, salaries, legal framework, etc.); (iv) Retirement Pensions (due to the uncertain status of reforms, this website is not available at present); (v) Public Debt (due to the country’s financial default, this website is presently unavailable); (vi) the Nation’s Financial Statements (most recent balance published is for 2000); (vii) Tax Compliance (still in preparation); (viii) Public Service Regulatory Agencies (information concerning these, along with links to the various agency websites); (ix) Social Spending (still in preparation); and (x) Worldwide Transparency (link).

2. Applications

a. *E-procurement*

This is part of the above-mentioned Crystal website. It contains information about purchases made by numerous offices, the legal framework, and where to obtain information concerning public bids. No electronic procurement is available for government as a whole. Certain decentralized offices engage in electronic purchases, but these are atypical.

b. *Customs and other trade-related procedures*

Customs uses the “Sistema María” (Mary System), providing a comprehensive solution to many of the procedures required for customs clearance. This is essentially the same as other systems with similar “feminine” names, used in other Latin American countries.

Information is available to citizens. One can obtain information on approximately 90% of the total imports and exports involving use of the uniform customs document. Available information includes country of origin, country from which goods were shipped, clearance date, transport information, regional customs office responsible for the clearance, condition of the goods, etc.

c. *E-finance, and/or e-payment*

Private E-finance is well developed in Argentina-or, more precisely, in Buenos Aires and certain large cities. Its use in government is limited, and applies mostly to products and services provided by the private sector. People may send tax forms to banks to request payment via an

electronic charge to their accounts, or they can use automatic tellers to pay taxes: the payment is made to the private financial institution, which in turn reports the payment to the government offices using electronic or paper media). In some cases, people may request that the public office send the forms to their bank or credit card company, which then carries out the electronic payment on the due date. Normally, however, such companies do not have online connections with the government office, and must report using specially formatted paper, tape or disk.

Recently the AFIP (Federal Tax and Customs Administration) introduced electronic payments, though only in certain limited cases, given the complexity of the Argentine tax system.

d. *Other*

MECON (the website for the Ministry of Economy, www.mecon.gov.ar) is one of the most widely used sites in Argentina. It provides information on numerous public activities, legal frameworks, news, and public agencies, and includes many links to public and private sites.

The AFIP (referred to above) provides, through the websites, software for preparing the many different forms required for filings. Information concerning regulations, indexing tables, taxpayers' tax liabilities, and Excel files to calculate interest and charges, are all available through the website.

The Central Bank's website provides information on financial statistics, financial regulations, status of financial debtors (more than five millions people and companies are classified according to their credit ratings), closed accounts (resulting from checks issued with inadequate funds) and other useful information.

INDEC (the National Institute of Statistics and Census) offers a wide variety of analytic information on major national statistics.

E. INSTITUTIONAL ISSUES

1. **Standardization, such as EDI and cryptographic codes, and Public Infrastructure**

The United States, as the primary force behind the Wassenaar Arrangement, and its predecessor COCOM, maintain export controls on cryptographic hardware and software products. The Wassenaar Arrangement is an agreement between thirty-three countries worldwide covering export controls for conventional arms and dual-use goods and technologies.

The decision to transfer or deny transfer of any item will be the sole responsibility of each participating state. All measures undertaken with respect to the arrangement will be in accordance with national legislation and policies and will be implemented on the basis of national discretion.

Argentine Law 25,506 established the "Digital Signature Infrastructure." The law was published in December 2001 and is federal in scope.

Decree 2628/2002 established the detailed regulations, along with an extensive terminology, including definitions or rules for numerous topics.

2. **Intellectual property rights**

The trademark legislation (Law 22,362) provides for the protection of trademarks that have been duly registered with the National Industrial Property Board. Registration requires the payment of a fee.

Protection is granted for a maximum of ten years each time a trademark is registered, but registration may be renewed indefinitely provided the trademark has been used in the last five years.

Argentina has adopted the international classification of goods and services used by the World Intellectual Property Organization. Patents protecting industrial property rights are granted by the

Patent Office for 5, 10 or 15 years depending on the Patent Office's judgment of the appropriate period, upon application by the owner and subject to payment of a fee. No renewals are granted.

Foreign patents may be renewed for a maximum of 10 years, but the term for which their Argentine registration is granted may not exceed the life of the original foreign patent. Patents are transferable by deed and subject to registration by the Patent Office. Patents expire if they are not used within two years of their registration, if their use is interrupted for a similar period or upon the expiration of the term for which they are granted.

In 1967 Argentina became a party to the Paris convention, covering industrial property, and its subsequent amendments, including the 1958 Lisbon Agreement and the 1967 Stockholm Agreement. Control of patent and trademark issuance is the responsibility of the National Industrial Property Board.

Copyrights are granted by the National Register of Intellectual Property upon application and subject to payment of a fee; they protect the authors' rights during their lifetime, and those of their heirs for another fifty years. Anonymous works belonging to organizations and juridical persons are protected for thirty years.

Argentina is a signatory to the Berne Convention (and its subsequent amendments, including the 1971 Paris Agreement), the Inter-American Convention held in Washington in 1946, and the Geneva Convention of 1952 concerning copyrights.

The Congress is currently studying a bill on computer software copyright, not yet specifically dealt with under Argentine law. Law 25,036 modified the general legislation, including an article titled "55 bis" (inserted between articles 55 and 56), considering software material to fall within contracts establishing licenses for use or reproduction, but maintaining unchanged the typology of recognized intellectual rights. As a consequence, they occupy a grey area, subject to judgment based on different interpretational arguments. The result has been that more than 80% of software, commercial or private, is pirated. Most people believe software is free.

V. Conclusion

The foundations for SMEs to develop and establish a presence in the global market seem assured in the current environment, provided that the various efforts undertaken separately produce collective results.

Argentina does not have a long-term strategy widely acceptable to the majority of political parties. As a result, there is no continuity in policy across changes in the presidency or –even more serious– changes in the Minister of the Economy. Lack of entrepreneurial spirit is a major calamity in a country that requires vigorous moves to realize the huge potential that remains unexploited or underutilised, while many other regions, which lack the resources that Argentina enjoys, are succeeding in developing their capabilities.

What is required is a definition, and an agreement to establish the conditions for long-term development in a context of controlled uncertainty.

There are currently various measures to support the activities of SMEs in modernizing their structures, accessing more advanced technologies, and securing information and financial assistance to globalise their sales efforts. However, the needs these measures attempt to meet have not been adequately addressed by the authorities.

Following are some of the barriers facing SMEs:

- ❑ Most financial resources are available only when firms meet certain requirements, which are difficult for SMEs to meet, namely: lack of debt (difficult due to tax and social security contributions) and presentation of disaggregated economic and financial data.

- Lack of confidence in the continuity of government plans.
- Efforts to disseminate information are generally directed at general-purpose newspapers rather than at specific channels targeting the owners of firms.
- There is commonly corruption associated with this type of cooperative effort.
- Sharing personal information is an unwelcome experience for most owners and managers. This attitude is shaped by past negative experiences.

A positive perspective on the situation suggests an emphasis on tools useful in developing SMEs, expanding IT usage and increasing exports, including technology parks, partnership strategies, and the linkage of large companies with SMEs.

This paper has mentioned the Cordoba Cluster, but the general concept could be replicated in relation to other features of the cluster. The experiment is viewed as successful based on a number of factors:

1. It proves that it is possible to organize a network of IT companies for the purpose of selling world-class products and services developed in Argentina or by Argentines, once a decision is made to confront the challenge of technology export, using a collective or partnership strategy to consolidate and facilitate a project that otherwise is difficult for SMEs.
2. The Cluster's members have been interconnected through a productive chain, a phenomenon uncommon in Argentina as a means of adding value.
3. The CCT was the first successful partnership project in Argentina, and has demonstrated the importance of working jointly with the provincial government and other IT actors.
4. This type of programme requires an academic component. In this case, 6 universities were engaged during different phases. This suggests the need to create a technology institute to enhance the skills of human resources.
5. When a non-typical effort is successful, there tend to be efforts to disseminate the example to obtain a replication effect. This can be seen when two clusters or technology poles are operating, while six or seven others are in their initial stages of existence.
6. Business alliances are not a prerequisite for launching a technology pole. The Cordoba and Rosario developments are the results of company agreements, with other components being added during the process. In the case of Tandil, it began as an academic project; the participants then sought to form the pole by inviting companies and authorities to participate in establishing an integrated development.
7. The recently approved law for the development of the software industry is aligned with this idea and may be considered a result of coordinated action on the part of the IT associations and chambers of commerce.
8. Effective dissemination of the idea is a principal factor in increasing the size of the cluster. The CCT group currently includes 36 companies.
9. The cluster concept has been demonstrated to be strong enough to survive during a period in which Argentina suffered one of its gravest economic crises, including external debt default. It is difficult to survive and grow without long-term financing, and most SMEs lacked any type of financing whatsoever. For a period of approximately 18 months, banks were not granting credit.
10. The cluster concept presents promising prospects: software development for customers located in foreign countries could reach 240,000 work hours over the next year.

11. Individual companies made progress in securing jobs abroad. They have increased sales, expanded their portfolios and, in some cases, opened subsidiaries. The process is still in its early stages, but the economic results are meaningful and are close to providing continuity and self-sustainability, opening up the opportunity to other domestic alliances or to the creation of Productive Collaboration Associations with companies in other countries.
12. The relationship with universities has had a highly synergetic effect on both sectors, orienting universities more acutely to demand, while at the same time causing technology companies to update, through the hiring of well-trained human resources.
13. The CCT initiated an important change: sharing information and engaging in joint efforts may be good business in a country where most technology firms thought that the government's purchasing power or parallel import barriers were the only means of assuring profits.

Export groups represent another significant tool for promoting foreign sales. The use of IT to coordinate activities and to standardize procedures and information are vital elements in maintaining the programme's sustainability.

Argentina's experience has demonstrated that achieving satisfactory group performance entails certain risks, and the small minority of survivors among consortia formed since 1983 is a sad testament to the difficulties involved. These include:

- excessive heterogeneity among participating firms;
- lack of balance due to excessive leadership by one firm, creating barriers to solid relations and trust among the group's members;
- discrepancy in goals or lack of agreement in prioritising markets;
- lack of flexibility in negotiations among members and with third parties;
- lack of commitment to achieving the group's objectives, with attention focussed exclusively on the interests of the individual firms.
- financial constraints of some members, hindering the realization of common activities;
- failure to engage in collaborative efforts to build common databases and related information systems;
- failure to define decision-making processes within the group; and
- insufficient power given to the coordinator.

One must, however, be optimistic, given the success that the grouping concept has had in recent years. The Bank of Boston Foundation and the Export.Ar Foundation have a successful export development programme.

At present, 35 groups are in existence, totalling 250 firms whose exports total more than US\$ 70 million. While this may be considered a relatively small figure, the continuity of these groups is highly notable, and is a necessary basis for gaining the participation of other economic actors in this long-term process.

One pending issue for the region is the construction of effective regional networks. Numerous organizations and networks can be found; however, what is involved is mostly intentions, plans and tentative beginnings, with no continuity. They engage in very little coordination, with each network trying to "capture" a niche by specializing in a particular sector or programme, thus creating (as noted earlier) an organizational vacuum for a more holistic approach to regional needs.

References

Websites:

SME Under-secretariat: <http://www.sepyme.gov.ar/index.php?btn=1&a=dyr&b=institucional>
Statistics and Census: <http://www.indec.gov.ar/>
Foreign Trade: <http://www.argentinatradenet.gov.ar/>
Revenue Service: <http://www.afip.gov.ar/>
Investments: <http://www.inversiones.gov.ar/>
Science and Technology: <http://www.agencia.secyt.gov.ar/>
Support to SMEs: <http://www.fundacionbankboston.com.ar/>
Support to SNEs: <http://www.export-ar.org.ar/index.php>

Publications:

Carlos S. Andriani, Rodolfo E. Biasca and Mauricio Rodríguez M., 2003, “Un nuevo sistema de gestión para lograr Pymes de clase mundial,” Grupo Editorial Norma.
Patricio Narodowski, 2003, “El sistema de apoyo a PyMEs en los '90 Avances y dudas,” work presented by the author at the V Congress of the AIV, Reggio Calabria, 2003.
Bleger, Leonardo and Rozenwurcel, Guillermo, 2000, “Financiamiento a las PyMEs y cambio estructural en la Argentina. Un estudio de caso sobre fallas de mercado y problemas de información,” *Desarrollo Económico* vol. 157 (April-June 2000). Buenos Aires, Argentina.
B. I.Niel, R. O. Dichiara, 1998, “Red neuronal de dinámica discreta para formar clusters con atributos de PyMES industriales,” *Asociación Argentina de Economía Política, Anales* 1998, Buenos Aires, Argentina.
World Bank (2002), *Small and Medium-Sized Enterprises in Argentina. A Potential Engine for Economic Growth and Employment*, Report N° 22803-Ar.
Ieral, Fundación Mediterránea –UNDP (2001), *Estrategias de Apoyo a las Micro, Pequeñas y Medianas Empresas*, Eudeba– United Nations, Buenos Aires.

BRAZIL

Antonio José J. Botelho

Paulo Bastos Tigre

I. Introduction¹

This aim of this study is to analyze the nature and scope of information technology (IT) applications used by SMEs and examine the potential of IT as an instrument of trade promotion and industrial development among SMEs. Brazil's recent export drive has produced positive results, partly as a result of renewed trade efforts by SMEs. From 2000 to 2003, Brazilian exports grew from 9.1% to 14.8% of GNP to represent 1% of exports worldwide. In contrast, Brazil accounts for 1.7% of total global IT expenditures.

In 2004 (up to August) Brazilian exports have been growing at the rapid rate of 58% to reach a cumulative total of US\$ 58.5 billion, generating a surplus of US\$ 20.1 billion. Export growth in 2003 (January-June) was 31%. The trade surplus (over a similar period) increased sevenfold between 2002 and 2004. Manufactured (53%) and basics products account for over 80% of total exports. Transport materials, products in the soybean complex and metallurgical goods are the main export items. The top five regional export markets are: the European Union (26%), the United States (20%), Asia, Latin American Integration Association (LAIA) and MERCOSUR (9%).

The number of exporting firms grew by 5.1% from 13,312 in 2002 to 13,996 in 2003 (the growth rate accelerated to 6.8% in 2004/2003); the number of exporting microenterprises and small businesses (MSMEs) grew by just 3.7%, whereas the number of medium-sized enterprises remained virtually constant. In 2003, MSMEs jointly represented 76% of the total number of exporting firms, but accounted for less than 11% of total exports by value.

II. Current situation of the IT market and IT use by SMEs

A. MARKET ESTIMATES

As the world's fifth most populated country with over 180 million inhabitants, Brazil ranks among the top 20 global IT users, although in per capita terms it lags well behind advanced countries and a number of emerging economies, because of its highly skewed income distribution. Table 1 shows estimates of IT market development, according to different sources.

From 1999 to 2002, while IT spending (in US dollars) decreased, it grew in real terms, since the exchange rate suffered a major devaluation during the period. As a percentage of GDP, Brazil's IT spending rose from 3.9% in 1999 to 4.7% in 2002, to represent 1.6% of global IT spending.

¹ The authors thank Felipe Silveira Marques for his invaluable research assistance in this project. His unwavering enthusiasm, diligent research and coherent writing made this report possible.

TABLE 1
IT MARKETS ESTIMATES

IT Market	Brazil			World	
	1999	2002	CAGR (%) 1999-2002	2002	Brazil as % of global spending
IT spending, US\$M ^a	16,300.00	14,900.00	-2.95	\$ 899,000.00	1.66
IT as % of GDP ^a	3.90	4.70	6.42	2.78	-
PCs per 1,000 inhabitants ^b	36.30	74.80	27.25	99.10	-
Internet hosts per 1,000 inhabitants ^b	2.66	12.87	69.13	25.86	-
Internet users per 1,000 inhabitants ^b	20.80	82.20	58.10	97.20	-
Broadband subscribers per 1,000 inhabitants ^a	-	4.50	-	-	-
IT Hardware spending, US\$M ^c	5,782.00	6,891.00*	9.17	\$ 376,119.00*	1.83
IT Software spending, US\$M ^c	1,635.00	1,863.00*	6.75	\$ 196,237.00*	0.95
IT Services spending, US\$M ^c	4,349.00	5,368.00*	11.10	\$ 425,660.00*	1.26
Telecommunications spending, US\$M ^c	30,339.00	31,703.00*	2.22	\$ 1,037,877.00*	3.05
Main phone lines per 1,000 inhabitants ^b	165.40	223.20	10.51	404.00	-
Cell phone subscribers per 1,000 inhabitants ^b	89.30	200.60	30.97	190.70	-
B2B trade in US\$M ^a	165.00	36,500.00	504.79	\$ 916,000.00	3.98
B2C trade in US\$M ^a	77.70	1,400.00	162.16	\$ 251,000.00	0.56
B2G trade in US\$M ^a	-	1,200.00	-	-	-

CAGR (compound annual growth rate) is computed by the formula: $[(Pv / P0) (1/n)] - 1$, where Pv = Present value; P0 = Initial value; n = Number of periods. The result is multiplied by 100 to obtain a percentage.

* 2001 data.

^a Source: E-Consulting Corp. (2003). *Internet Indicators*. http://www.e-consultingcorp.com.br/insider_info/indicadores.htm. E-consulting does not provide definitions

^b Source: International Telecommunication Union (ITU). *World Telecommunication Indicators*. Geneva: ITU, 2003. ITU definitions: *PCs per 1000 population* is the estimated number of personal computers (PCs), obtained from a annual questionnaire supplemented by other sources; *Internet hosts* refers to the number of computers directly connected to the Internet, data were obtained from the Internet Software Consortium and RIPE (Réseaux IP Européens); *Internet Users* is based on nationally reported data; *Main telephone lines* refer to telephone lines connecting a customer's equipment (e.g., telephone set, fax machine) to the Public Switched Telephone Network (PSTN), and which have a dedicated port on a telephone exchange (most countries also include public payphones); *Cellular mobile telephone subscribers* refers to users of portable telephones subscribing to an automatic public mobile telephone service using cellular technology providing access to the PSTN.

^c Source: World Information Technology and Services Alliance (WITSA). *Digital Planet 2002: The Global Information Economy*. WITSA, 2002. WITSA definitions - *IT Hardware*: servers, personal computers, workstations, data communication equipment and add-ons purchased by a corporation, household, school or government agency from a external agent or corporation. *IT Software*: includes the purchase of all software products and external customization of computer programs; excludes expenses related to the internal customization of computer programs (e.g. wages, rent); includes system software and utilities, application tools, and application solutions. *IT Services*: IT service provided to a corporation by an external agent or corporation, above and beyond the services provided by an internal IS team; includes IT consulting, implementation services, operations management, IT training and education, processing services, and IT support services. *Telecommunications*: encompasses expenditures by business, household, Government, and education on public network equipment, private network equipment and telecommunications services.

The evolution of IT infrastructure in Brazil reveals a rapid dissemination of PCs and Internet services, although in many respects at a slower pace than the global average. The number of PCs per 1,000 inhabitants has grown by about 30% per year between 1999 and 2002. Nonetheless, the per capita ratio of 7.48%, compared with the world average of 9.91%, shows that there are still untapped opportunities for growth. In 1999, there were relative few Brazilian Internet hosts – just 3 per 1,000 habitants. By 2002, this number had multiplied fourfold, but it still represents half of the world average. The number of Internet users has also increased fourfold, thereby closing the gap with respect to the global average. Broadband access is still limited, reaching only 0.5% of the population. IT hardware, software and related services have grown by about 10% per year, to jointly represent about US\$ 14 billion or 1.4% of global spending.

In terms of telecommunications infrastructure, Brazil has experienced an investment boom since 1998 when the telecom system was privatized. By the end of 2002 there were 223 fixed

lines per 1,000 inhabitants, compared to 165 in 1999, a 10% increase per year. More importantly, mobile phone use has spread much faster (30%), above the world's average.

B. PENETRATION OF IT AND E-COMMERCE AMONG SMALL AND MEDIUM-SIZED ENTERPRISES (SMEs)

Figures published by e-Consulting show that electronic transactions in Brazil (B2B, B2C, B2G, m-commerce and online retail) amounted to US\$ 47.2 billion in 2002. The 2003/2004 digital enterprise survey, carried out by the Industrial Federation of the State of São Paulo (FIESP) in São Paulo, Brazil's most economically advanced state, reveals that half of all SMEs surveyed did not foresee participation in electronic transactions via Internet (Internet-based EDI) and 20% did not even have a website. In contrast, 72% of the large firms had already implemented electronic transactions via Internet or plan to do so in the near future. Among microenterprises, only 8% make use of B2B for sales; 16% use this for purchases, and just 8% engage in B2C. Among small enterprises, 15% use B2B, for both purchases and sales and 11% engage in B2C. Despite these relatively small numbers, they are significantly higher than in 2003, when only 15% of enterprises claimed to use e-commerce, a figure that had jumped to 26% by 2004.

Another survey carried out by Sebrae-SP revealed that the main uses made of Internet access are: 1- Banking services; 2- Government services; 3- News; 4- Communications (e-mail); 5- Research on business opportunities, prices and suppliers; and 6- Website to publicize business. Furthermore, most SMEs that are IT users are satisfied with their level of IT use and have a relatively up-to-date ensemble of software and hardware. By contrast, SMEs that do not use IT do not perceive clear benefits in its use, or else find it expensive in relation to their current revenue level.

An analysis of e-commerce dissemination completed by Centre for Research on Information Technology and Organizations (CRITO) reveals that among Brazilian firms, large establishments have a higher level of use of the Internet technologies (table 2). All surveyed small firms use e-mail, and roughly 70% have a website. However, when more advanced applications, such as Intranet and Extranet (accessible by suppliers and business partners) are involved, large firms display twice the level of adoption of small firms. For electronic fund transfer and call centres, the difference between SMEs and large firms is less (CRITO 2002, Tigre 2003).

TABLE 2
USE OF E-COMMERCE TECHNOLOGIES

Percentage using ...	Establishment Size ^a		Total	
	SME	Large	Brazil ^b	Global ^c
E-mail	100.0	100.0	100.0	98.5
Website	70.4	80.8	70.7	74.1
Intranet	36.8	71.7	37.7	63.6
Extranet	32.9	44.6	33.2	32.7
accessible by suppliers/ business partners	10.1	33.7	10.7	20.9
accessible by customers	15.5	28.6	15.9	17.8
EDI	35.7	71.9	36.7	44.3
over private networks only	7.0	25.8	7.5	19.4
Internet-based only	6.9	10.4	7.0	8.4
Both	21.8	35.7	22.2	15.9
EFT	52.0	66.5	52.4	43.4
Call centre	45.6	62.5	46.1	32.3

^a SMEs are those with 25-250 employees; large firms are those with more than 250 employees.

^b Responses were weighted in terms of the total number of establishments and employee size within the sector for each country. Survey sample sizes for Brazil by sector are: 68 establishments in manufacturing, 68 in wholesale & retail distribution, and 64 in banking & insurance; by size 98 establishments are classified as SME and 102 as large.

^c Consists of weighted survey responses in 10 countries combined: United States, Mexico, Brazil, Germany, France, Denmark, Singapore, Taiwan, China and Japan.

Source: CRITO Global E-Commerce Survey, 2002.

III. SME development in the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMES IN THE ECONOMY AT LARGE²

Despite the renewed and increasing importance of small firms in Brazil's social and economic development, conceptual and definitional issues still plague statistics and policy arenas. Putting aside the ever intractable issue of the size and weight of the informal sector, any attempt to measure the importance of small firms has to grapple with this complexity.

The Brazilian Small Business Support Service (SEBRAE) adopts one form for policy functions (gross annual revenue) and another for research purposes (number of employees). The Microenterprise and Small Business Statute is the main legal framework for policy formulation. Brazil's central statistical office (IBGE) has a different segment scope (micro and small) and uses yet another criterion to classify small firms in its surveys, based on staff employed, which includes both employees and owners, to allow for the collection of data on micro enterprises with no employees: a micro enterprise employs up to 5 people; and a small enterprise employs up to 19 people. These definitions are linked to a level of annual gross revenue below R\$ 1.5 million (US\$ 500,000).

In 2000, according to IBGE, there were a total of 4.1 million firms in Brazil. Microenterprises and small firms account for 98% of this total. In relation to the labour market of 30.5 million workers in formal companies, SMEs account for 45% of the total; 46.2% in industry, 79.7% in commerce and 29% in services. A special IBGE study of the commerce and service sectors in 2001 showed that small and medium enterprises employed 7.3 million people, accounting for 95.5% of total firms in the sector. The same study detected 2 million SMEs, of which 1.1 million employed staff while 926.8 were family firms. In the industrial sector, the IBGE Central Enterprise Registry, base year 2000, identified 550,000 microenterprises and small businesses, which employ 46% of formal labour.

Between 1996 and 2001, microenterprises and small firms grew in number from 3.1 million to 4.6 million, rising proportionately from 98.9% to 99.2% of the total. They generated 3.5 million new jobs, while medium-sized and large firms only generated 68,000. SMEs also accounted for 14.5 million formal jobs or 56.1% of the total.

Table 3 shows the sector distribution of different categories of MSMEs based on the RAIS 2001 survey.

TABLE 3
DISTRIBUTION OF NUMBER OF FIRMS IN BRAZIL BY SIZE AND SECTOR
2000

Size	Industry		Commerce		Services		Total	
	# firms	%	# firms	%	# firms	%	# firms	%
Micro enterprise	939,267	17.8	2,414,652	45.8	1,923,389	36.4	5,277,308	100
Small	48,314	19.7	88,941	36.2	108,203	44.1	245,458	100
Medium	9,856	33.3	5,724	19.4	13,999	47.3	29,579	100
Large	1,580	7.0	2,955	13.2	17,890	79.8	22,434	100
Total	999,017	17.9	2,512,272	45.1	2,063,490	37.0	5,574,779	100

Source: RAIS 2001 - MTE.

² A broader and more in-depth discussion of the role of MSMEs in the Brazilian economy, and an encompassing, albeit now outdated, overview of strategies and policies to promote their evolution and performance can be found in IETS 2002.

Demographic studies of MSMEs between 1997 and 2000 reveal high annual birth and mortality rates, averaging 19.4% and 12.9%, respectively. In addition to concentrating the largest number of firms, microenterprises also exhibit the highest birth and mortality rates.

B. CASE STUDIES ON THE USE OF E-COMMERCE AND SUPPLY CHAIN MANAGEMENT (SCM) IN SELECTED INDUSTRIES

1. The ornamental stones cluster in the state of Espírito Santo

Ornamental stones represent a key export sector for SMEs, accounting for 6.6% of their total exports, behind timber (16.4%) and machinery and equipment (10.5%), but ahead of furniture and medical-surgical furniture, fruit and footwear.

Growth rates display a rising trend, reflecting the expansion of the market. According to Cunha et al (2003, p. 71), the ornamental stone market, including domestic and external sales, totalled US\$ 40 billion in 2000. Brazil is the world's sixth largest producer, with output of 5.2 thousand tons in 2000 (7.9% of world's production). Its production grew by 45% from 1997 to 2001. Brazil is the world's seventh largest exporter in volume terms, with shipments totalling 1.1 thousand tons in 2001 (4.5% of worldwide exports). The market grew continuously in volume terms between 1996 and 2001, except for 1998, reaching a level of 24,000 tons in 2001. Brazil's exports grew by 47% in that period, outpacing worldwide growth of 39%.

The state of Espírito Santo (hereinafter ES) is Brazil's largest producer and exporter. Its activities in the sector have grown continuously over the last few years, expanding by 150% (in employment and number of firms) since 1994. The sector in ES has around 24,000 direct employees (15% of the jobs generated by ES industry) and roughly 1,200 firms (with an absolute predominance of SMEs). It produces 2.5 tons per year (around 47% of Brazilian total in 2000) and exports around US\$ 222 million (52% of country's total exports in 2003). According to the Brazilian Ornamental Stone Industries Association (Abirochas), in 2006 the sector expects to export over US\$ 750 million and directly employ 30,000 workers.

The ornamental stones sector (mainly marble and granite) in the state of Espírito Santo consists of two main production nodes where most of the extracting and manufacturing firms are located. The first is located around the city of Cachoeiro de Itapemirim, in the state's southern region, and the second, around the city of Nova Venécia, in the northern half.

The ornamental stones sector in ES displays the features of a typical Marshallian industrial district, with a sizeable number of firms in the main productive chain supported by a group of suppliers that provide services and produce general machinery, equipment and inputs in the region.

The number of firms in the sector has experienced sustained growth since 1970, increasing twelvefold between 1980 and 2000,³ even though the Brazilian economy grew slowly in that period. In 1972, there were just 70 firms in ES; less than a decade later, in 1980, the number had risen to 104 (49% growth) and then accelerated to 278 firms by 1990 (167% growth), before doubling again to 530 by 1994. Similar growth rates have been repeated in 1995-1998 (24%) and 1998-2000 (33%). In 2000, there were 1,200 firms, of which 154 (12%) were exporters.

Another key feature of the sector in ES is the absolute predominance of microenterprises and small businesses. According to the Industrial Development Institute of Espírito Santo (IDEIES), on employment criteria 82.3% were microenterprises, 16.0% small firms and 1.7% medium-sized in 1998.

³ Most of the data analysis extends up to 2000, since that is the most recent data available in the sector's union website (<http://www.sindirochas.com.br>).

Despite the small firm size, IDEIES (1998) shows that mortality among enterprises in the sector is not particularly high. In 1998, 54.8% of firms had been in existence for three years or longer, and had therefore survived the period in which small firms tend to close. Only 34.7% of firms (251) had come into being in the previous three years. The figures do not add up to 100% because 76 firms (10.5%) did not reply to this question.

In ES the sector operates as a horizontal cluster with a “ring” structure of governance. No large enterprise coordinates production, and cooperative relations seem to evolve naturally owing to the proximity of small firms within each of the two production nodes.

Production and employees

ES accounts for 46% of Brazilian output of ornamental stones, although its production is concentrated in granite (90% of the state’s total production). It has 34% of the country’s extractive fronts and 57% of the sewing presses.

Espírito Santo is the state where production is technologically most advanced in Brazil. Its firms produce an average of 2,000 tons compared to 520 tons in the country as a whole. Each employee produces 120 tons in ES and 49 tons in Brazil overall, on average, which is reflected in the number of employees per extracting front, i.e. 50 in ES against 91 in Brazil as a whole. In ES, each front produces 6,000 tons on average, compared to a national total of 4,000.

Production in ES is also more automated than in the rest of the country. It uses 2.25 sewing presses per extracting front, while the country overall uses 1.35. ES uses one sewing press for every 22 employees, while the national total is 67. Consequentially, in every four firms in ES, three of them have a sewing press, while in Brazil as a whole only three out of every 19 firms have sewing presses.

The state’s 1,200 enterprises represent 12% of firms in this sector throughout Brazil. On average, each firm employs 17 workers, compared to an average of 11 for the country at large. Overall, the ES stone sector employed 20,000 people in 2000 (19% of the sector’s direct employees), counting formal jobs only. One of the sector’s unions, *Sindimármore*, estimates the number of informal workers at 3,000. Firms had 24,000 employees in 2003 (15% of jobs generated in ES industry). In 1980, there were just 3,200. This number had doubled by 1990 and grew by over 40% until 1994. From 1998 to 2003, the number of formal employees jumped by 118%.

Exports

The value of ornamental stone exports in BR and ES has been growing continuously since 1999. In 2003, the ES exports amounted to US\$ 222 million, up by 31% from 2002 (Brazilian exports grew by 26%), and by 269% since 1999. In the last few years, except for 2001 (up by 10%), the annual growth of ES exports exceeded 30% and without exception outpaced the figure for Brazil as a whole. Consequently, ES exports of ornamental stones jumped from 36% of Brazilian exports of these products in 1999 to 52% in 2003.

TABLE 4
ORNAMENTAL STONE EXPORTS
1999-2004

Year	2004 (Jan-Jun)	2003	2002	2001	2000	1999
ES Total (US\$ million)	116.34	222.00	168.91	127.79	115.84	84.16
BR Total (US\$ million)	223.73	426.92	339.00	280.17	271.77	232.46
ES/BR (%)	52	52	50	46	43	36
ES’s Growth rate (%)	-	31.4	32.2	10.3	37.6	-
BR’s Growth rate (%)	-	25.9	21.0	3.1	16.9	-

Source: SINDIROCHAS (http://www.sindirochas.com.br/exportacao_index.htm).

In the first six months of 2004, exports amounted to US\$ 116 million (up by 20% compared to the same period in 2003), accounting for 52.11% of total Brazilian exports. As mentioned earlier, according to Abirochas, exports are expected to reach US\$ 750 million per year by 2006.

Processed materials now represent 81% of total exports compared to just 36% in 1996. Higher value-added is a distinguishing feature of the ES cluster, since Brazilian exports are generally concentrated in raw material extraction.

Between 1997 and 2000, the number of ornamental stone exporters has grown by 79% in ES, from 86 firms to 154, while in Brazil as a whole the number has grown from 332 to 508 (53%). Thus, ES has increased its share of exporting firms from 25.9% in 1997 to 30.3% in 2000. The main destination for ES exports is the United States, which absorbed 64% in value terms and 32% by weight in 2003. The growth of exports to the United States, in value and weight terms, also involves higher value-added.

TABLE 5
DESTINATION OF EXPORTS
2002-2003

Countries	2002				2003				% change (of US\$)
	US\$ thousand	%	tons	%	US\$ thousand	%	Tons	%	
United States	96,519	57	149,691	25	142,479	64	227,440	32	47.62
Italy	24,573	15	170,120	29	19,646	9	139,513	20	-20.05
China	12,497	7	97,598	17	15,690	7	138,325	19	25.55
Spain	10,486	6	67,460	11	9,199	4	54,367	8	-12.27
Taiwan	3,695	2	27,295	5	6,415	3	49,723	7	73.61
Total	168,797	100	590,311	100	221,778	100	715,353	100	31.39

Source: Villaschi (2004, p. 10).

A 1998 survey by IDEIES on the export intentions of firms revealed that although only 11.3% of firms export, nearly half of SMEs (48.3%) had never exported but were interested in doing so, which suggests good potential for expanding export activities.

Exports by firm

The average export value per firm in ES was US\$ 752,000 in 2000. Exports are not very highly concentrated, since the 10 largest marble and granite companies, according to IDEIES, had estimated exports of around US\$ 14 million in 2003, accounting for 6% of the total (US\$ 222 million).

TABLE 6
TURNOVER AND EXPORTS OF THE 10 LARGEST MARBLE
AND GRANITE COMPANIES OF ES: 2003
(US\$ thousand)

Firm	Turnover	Estimated Exports^a
MARBRASA ^b	10224	5112
ANDRADE MARM. GRAN	8941	1826
VIXTILES	8463	1728
CAJUGRAM	6329	1292
AGG	4677	955
POLIMENTO ITALIANO	4658	951
NEMER	3560	727
MA EXPORT (Aquidabã)	3280	670
MARCEL	2516	514
BRAMAGRAN	2208	451
Total	54856	14226

Source: IDEIES (www.iel-ideies.com.br).

^a Using the ES exports/production average of 20.42%, except for Marbrasa.

^b Using the 50% exports/production average shown on its website (www.marbrasa.com.br).

Export promotion and export policies

Today the sector in ES organizes two annual international fairs. The older of the two, held in Cachoeiro, began in 1989 with just 32 mainly local firms, serving a public of 5,500. In 2003, there were 40% more exhibitors than in 1995, with 320 firms and 32,000 people. Of the total number of exhibitors in 2003, 54% were extracting and manufacturing firms, 24% machinery and equipment producers, 13.2% inhumers and abrasives suppliers, 4.8% were service firms and 4% were the entities of the sector.

Since 1998, the Federal Programme of New Export Arrangements (PNPE) is developing actions to increase the value added of the cluster's exports. The programme has achieved relatively good results, since the share of manufactured exports has grown in this period. Another significant development is that the number of raw block buyers, such as Italy, has decreased, while buyers of manufactured products, such as the United States, have grown.

Another federal programme that will benefit the sector in ES is the anchor enterprises support programme. In the framework of that programme, Total Trading, a trading enterprise specializing in selling to North America, received a US\$ 1.7 million credit to support exports by SMEs in the cluster. Firms sell part of their production to the trading company, which in turn carries out the export operation.

Main Difficulties

The IDEIES survey mentioned above found that the following are the key difficulties facing firms in the export process:

- foreign language;
- lack of experience in foreign business;
- lack of knowledge of the external market, including information and export procedures;
- lack of a marketing strategy and promotion of materials and companies in others countries;

- absence of organizational and technical capacity in the companies to maintain a presence in a competitive market; and
- lack of internal competitiveness in the firms to comply with requirements and international standards.

Abirochas foresees the need for investments in excess of US\$ 1 billion to bring the sector up to date by 2015. The Brazilian Development Bank (BNDES) is currently negotiating a credit facility of R\$ 300 million (about US\$ 100 million). A small share will be destined for the producers and the largest portion to manufactures and equipment makers, in an effort to increase the value added of the sector's exports. According to the Euvaldo Lodi Institute (IEL), affiliated to the National Industry Confederation (CNI), the sector displays a significant technological lag in terms of automation parts and computer science, mainly because there is just one manufacturer of automatic machines in the region.

Promotion institutions

In 2004, the federal government established a working group on “local production arrangements”, which brought together 23 public and private entities, coordinated by the Ministry of Development, Industry and Foreign Trade (MDIC). The group selected 11 local arrangements to receive up to R\$ 20 million (about US\$ 7 million). The ES ornamental stone cluster was one of those selected. The ES cluster was also selected by the federal “New Export Arrangements Programme” (PNPE), as one of the 18 main local arrangements by the Brazilian Microenterprise and Small Enterprise Support Service (SEBRAE), and it is one of the eight clusters studied by BNDES, which is developing a specific credit line for local arrangements and a special line for the ornamental stone sector.

There are also some important institutions at the local level. The sector's main trade association, the Union of Ornamental Marble and Granite, Whitewash and Calcareous Stone Extracting and Improvement Industries of Espírito Santo (SINDIROCHAS), was founded in 1973. It undertakes a range of support activities for the entrepreneurs of the sector, such as job intermediation and legal assistance. The trade group is also responsible for organizing the international fair and a series of training courses in cooperation with other public and quasi-public institutions such as Marble and Granite Technology Centre (CETEMAG), National Industrial Apprenticeship Service (SENAI) and SEBRAE. The trade group maintains a website (www.sindirochas.com.br) providing a vast amount of information about the sector. The Marble, Granite and Calcareous Stone Industries Labour Union of Espírito Santo (SINDIMÁRMORE), founded in 1990, is not well structured to serve workers' needs, but participates in fairs and important sectoral meetings.

Technologies introduced, purpose of IT use and its impacts

The technologies employed in the sector are related to information provision, such as the need for customers to view stone colours and patterns before purchase. For this reason, several ES firms have developed their own websites. In the website registry of local productive arrangements (also known as a vertical industry portal, or “vortal”), 139 firms (11.6% of the sector total) had a website registered. Many of these sites are available in more than one language, have a product catalogue, offer price quotes by e-mail and allow customer registration.

The cluster was chosen to take part in the “Regional Action” programme, developed in partnership with Ministry of Science and Technology (MCT), the National Research Council (CNPq), Brazil's Innovation Agency (FINEP) and the state's science and technology secretariats.

The programme makes use of a technology platform framework that seeks to generate technology demands in the private sector, from knowledge-generating groups (e.g. universities and research institutes), potential customers and other relevant actors for the implementation of cooperative projects (e.g. a university or consulting firm outside the cluster environment).

One of the programme's final activities was the establishment of a "vortal" for the ES local arrangement. The aim of the vortal is to contribute to the development of SME competitive capacity. It uses the Internet to widely disseminate information on the sector that is already available in the Internet in one location.

Similar to the vortal, the sector has two private information websites: one launched in 1999 (Marble Website) and another in 2000 ('The Way to the Stones Website'). They are important to the sector since the vortal, due to its local characteristic, is available only in Portuguese. The languages used in the Marble and The Way to the Stones websites are both Portuguese and English. The private portals are also significant given the nature of services available, such as the stones catalogue.

E-commerce is not yet a reality in the sector. There are only a few isolated and limited experiences, such as price quotes sent by e-mail. CETEMAQ and SINDIROCHAS launched an online business portal (PETRACUS), but this was discontinued because of its high operational costs. The web-based organization MARMOREGRANITO is a trading company specializing in marketing and sales, through e-commerce, business-to-consumer (B2C) and business-to-business (B2B). It has a website (www.marmoregranito.com.br) where it is possible to obtain price quotes.

2. Aeronautics industry suppliers in São José dos Campos

Brazilian aeronautics exports have grown considerably over the past decade, led by a large national firm, Embraer. Driven by Embraer and its foreign first-tier suppliers, exports by SMEs in the São José dos Campos aeronautics vertical cluster have taken off in the past few years, albeit from a small base. A group of exporting SMEs within the cluster has set up a consortium known as the High Technology Association (HTA), to jointly promote their export capacity. The consortium is supported by APEX/MDIC and by SEBRAE/Nacional. Estimated export potential is on the order of R\$ 20 million a year, which could occupy between 35% and 40% of the companies' idle capacity (Bernardes, 2002: 24).

This vertical cluster is led by Embraer, one of Brazil's largest industrial firms and the world's fourth largest aircraft manufacturer. Embraer revenues amounted to US\$ 3 billion in 2003. The cluster is located in the county of São José dos Campos, in the state of São Paulo, which saw its share in the state economy rise from 6.5% in 1996 to 11% in 2001.

Embraer purchases supplies worth over US\$ 60 million from SMEs, 50% in Brazil and 50% from abroad. Over 30 small specialized suppliers are located near its assembly plants. The composition of the cluster is presented in table 7 below.

TABLE 7
VERTICAL CLUSTER OF THE AERONAUTICS INDUSTRY IN SÃO JOSÉ DOS CAMPOS

Product	Firms
Manufacturing, parts and composite materials	Aeroserv (HTA), Autômata Industrial (HTA), Mirage (HTA), Alltec (HTA), Graúna- Carpini & Marques Indústria (HTA), Elane Ferreira Pereira, Metinjo Metalizacao Industrial Joseense, Mirage (HTA), SPU Indústria e Comércio de Peças (HTA), Status Usinagem Mecânica (HTA), Tecplas Indústria e Comércio de Fibras (HTA)
Engineering projects and software systems	Akros, Dynamic Sollutions, Akae, Cenic, Compoende Equipamentos para Ensaios e Serviços Especializados (HTA), Fibraforte Engenharia de Softwares, LEG - Engenharia e Comércio (HTA), New Plotter Engenharia, Poly Card Engenharia e Comércio de Informática,
Decoration / Interiors	C&D Aerospace (USA),
Landing gear	ELEB/LIBERHERR (Brazil/Germany)
Sub-systems	Sobraer (Spain)
Radar	Mectron (Brazil)
Structures	Kawasaki Heavy Industries (Japan) Gamesa (Spain) ENAEER (Chile) (not yet in installed in Brazil) Latecoere (France) (not yet in installed in Brazil)
Windows	Pilkington Aerospace (United Kingdom)
Hydraulic Systems	Parker-Hamnfifin

Source: Bernardes (2001), updated and adapted by authors.

The HTA Export Association

In 2002, 11 SMEs in the cluster formed the High Technology Association (HTA), an exporter association. Member firms have an average of 15 years in the aeronautical sector. Most were founded by former EMBRAER employees, bringing 20 years' experience to bear in several areas. Member firms have complementary capabilities in design and development, machining (CNC / Conv.), composites, surface treatment, and non-destructive tests and assembly.

HTA is a trading company created with the support of support of the Brazilian Export Promotion Agency (APEX) (the process began in 1999). Since then, thanks to APEX financial and organizational resources, HTA has participated in several international fairs and missions. HTA is also responsible for ISO 9000 certification of all of its 11 associated companies (although Embraer re-certifies them when they become suppliers).

The association's main potential clients are aircraft manufacturers and firms that supply aeronautical systems located in the Americas, Europe and Asia. As shown in table 8 below, their revenues have fluctuated wildly over the past few years. In 2003, the smaller firms had a minimum revenue of about R\$ 100,000 and the largest of about R\$ 1.3 million. The average revenue for the group of 11 SMEs was about US\$ 65,000.

TABLE 8
REVENUES OF MEMBER FIRMS OF THE HTA EXPORT ASSOCIATION

Companies	Year			Average
	2001	2002	2003	
Aeroserv	4,482,000.00	1,792,000.00	500,000.00	2,258,000.00
Alltec	995,000.00	853,000.00	710,180.00	852,726.70
Autômata	621,404.00	497,123.00	923,229.00	680,585.30
Bronzeana	301,825.00	282,300.00	327,450.00	303,858.30
Compoende	360,000.00	290,000.00	330,000.00	326,666.70
Graúna	1,634,000.00	1,050,000.00	1,342,250.00	1,342,083.00
Leg	310,000.00	220,000.00	280,000.00	270,000.00
Mirage	1,460,500.00	974,320.00	1,207,300.00	1,214,040.00
Spu	339,500.00	397,700.00	461,615.00	399,605.00
Status	390,597.00	308,926.00	532,632.00	410,718.30
Tecplás	426,106.00	390,597.00	461,614.00	426,105.70
Total	11,320,932.0	7,055,966.00	7,076,270.00	771,308.10

Source: Prepared by the authors on the basis of HTA data.

Of the 11 firms, only three had more than 100 employees in June 2004 (Aeroserv, Altec and Graúna); most had between 30 and 100 employees, and just two had less than 30 (Compoende and LEG). As shown in table 9 below, one of these smaller firms, LEG, has the highest revenue/ per employee ratio reflecting the highly specialized nature of its activities, followed by another small firm (Compoende), which is also active in a high-tech activity, and a large to medium-sized one (Autômata).

TABLE 9
HTA EXPORT ASSOCIATION MEMBER FIRMS:
EMPLOYEES AND REVENUES / EMPLOYEE

	REVENUES (2003)	EMPLOYEES (06/2004)	REVENUE / EMPLOYEE
Aeroserv	500,000.00	150	3,333.33
Alltec	710,180.00	110	6,456.18
Autômata	923,229.00	70	13,188.99
Bronzeana	327,450.00	30	10,915.00
Compoende	330,000.00	17	19,411.76
Graúna	1,342,250.00	150	8,948.33
LEG	280,000.00	8	35,000.00
Mirage	1,207,300.00	145	8,326.21
Status	461,615.00	55	8,393.00
SPU	532,632.00	70	7,609.03
Tecplas	461,614.00	50	9,232.28
Total	7,076,270.00	855	8,276.34

Source: Prepared by the authors on the basis of HTA data.

Enterprises with unique and often high-tech capabilities display the highest revenue per employee. Overall, the group of companies exhibits the wide scope and generally complementary nature of the capabilities of the different firms.

*IT use*⁴

HTA member firms have a relatively high level of IT use, compared to the averages for SMEs in the state of São Paulo, as reported above. On average there are 11 PCs per company and

⁴ This section was based on a survey prepared by the authors and administered by HTA to its members.

one PC for every seven employees. Nonetheless, there is a low level of Internet use and no use of EDI or any form of e-commerce. Companies may receive orders and claims from the Embraer website, but there is no type of supply relationship management (SRM). In terms of software applications firms are quite advanced, making use of the most advanced professional software in their fields: Catia, Master CAM and Autocad, among others. The level of industrial automation is also high with the use of 43 CNC machines involving numerical control and five 3-D Measuring Machines.

Only four (36%) of the firms have their own website. These sites allow customer registration, but some do not even provide information on products and services. Those with websites all post information in 3 languages: Portuguese, English and Spanish.

The HTA website is still at an early stage of development. It only provides static information about the consortium, its products and services, and does not have a reserved area either for its associates or for potential customers; nor does it offer the possibility of registering potential customers, and it has no links to the websites of associate firms.

Exports

Thus far only one of the firms in the group, Aeroserv, has exported over US\$ 3 million in services over the period 2001-2003. In general, the events of September 11 put a brake on the group's initial export plans. In 2004, HTA and its members firms are negotiating exports of about US\$ 50,000, aiming to raise the level to an average of US\$ 3 million within three years.

The initial export effort included an offset clause in respect of imported aircraft, such as the CLX programme (cargo plane) purchased from Spain, which involved a 100% counterpart. The contract provides that Spain will purchase US\$ 30 million in Brazilian aeronautics parts over 10 years. Additional offset-clause exports are under negotiation with Israel for a value of US\$ 500,000 and a number of American customers.

Aeroserv exports had to specialize in design and assembly, which involved sending 50 of its 130 employees to perform related services in Spain. As seen in table 9, Aeroserv suffered the sharpest drop in revenues among HTA companies, falling from US\$ 4.5 million in 2001 to US\$ 500,000 in 2003. Exports accounted for 50% of the firm's revenues in 2001 and an average of 25% in 2002 and 2003. The remaining cut in revenues is explained by the termination of an Embraer contract for development of the LX prototype. There were also some minor exports to France in 2003.

According to HTA, member firms see exports as a way to expand markets and the customer base and thus reduce dependence on Embraer, which on average accounts for 70% of their production. Some firms depend on Embraer for up to 95% of their business. They also seek capacity-building and competitiveness.

The premise lies in the reality of the global aeronautics market, in which aeronautic parts represent US\$ 33 billion per year. The goal of HTA is to capture 0.5% of this market. Some enticing analogies are the fact that USA exports US\$ 14 billion, Canada US\$ 1.3 billion and Spain US\$ 1 billion.

HTA sees the Brazilian Export Promotion Agency (APEX) as a major catalyst for its export drive. Negotiations with APEX began in 1999, and the project was finally launched in 2001 for three years, after which it was extended for another year. A new project is currently under development. The existing project provides support for participation in international fairs and missions, averaging two fairs and two missions per year. It also contributes to member companies' ISO 9000 certification programme. Project costs are shared between the firms (50%) and APEX (50%). The project does not provide technical support to exports, however.

In fact, as volumes are still low, the firms prefer to use private agents for their export sales; but they do not use either government trade facilitation websites or credit lines, considering those

available to be satisfactory. Increasing the number and volume of offset contracts, a major source of business, is perceived by firms as one of the Government's most important contributions.

The firms recognize that they lag about 30% behind the technological state of the art. Other barriers cited include: distance from major markets, freight costs, high input costs (often imported), lack of working capital, lack of investment capital and lack of guarantees. It was also mentioned that Embraer does not award long-term contracts, but just one of a kind of sub-contracting order. This does not generate the necessary incentives for firms to invest in technology and productivity. Competition from imported equipment above a technological level was also cited.

Finally, it was mentioned that the terms, grace periods, and interest rates on financing are generally unfavourable, particularly when compared to competitors from East Europe and Asia which often benefit from government support.

Active pursuit of offset processes is seen as the key strategy to be followed. There is also a need to supply integrated solutions that are as complete as possible. In this regard, there is a need to improve capability in surface treatment technology. Finally, risk sharing is sought with customers.

Generally speaking there is very little use of IT to facilitate exports. There is a widespread perception that because of the highly specialized nature of the sector, personal contacts are the most important factor when establishing export relationships. Participation in fairs and missions are seen as the main channel for establishing business relations, while Internet is rarely used for this purpose. There is no specialized website to search for and screen international trade partners. Export operations are assisted by private agents. In short, IT is not used for trade facilitation.

C. PROBLEMS FOR SMES TO PARTICIPATE IN THE TRADE-ORIENTED VALUE CHAIN

The problems faced by SMEs in participating in IT networks can be subdivided in two groups: those related to their IT capacity, and those related to institutional factors.

The first group includes the high cost of purchasing equipment and operating it, the shortage of affordable quality human resources, and difficulties in identifying the company's IT needs and designing and implementing a strategy to meet them.

The second group includes the limited scope and administrative burden of finance programmes, availability of expertise on the IT functions and needs of SMEs, and a lack of knowledge of sector-specific network and export-oriented IT processes.

The main barriers that prevent SMEs from participating effectively in supply chains and trade networks include the industrial structure (in the case of high-tech sectors), industry fragmentation (in the case of ornamental stones) and, in general the one-size-fits-all format of existing support programmes. The quality of the activities on offer may also be a hindrance to their full integration into trade networks, as exemplified by the resource-poor nature of the websites developed by government.

In relation to exports, Markwald and Puga (2002) claim that SMEs face problems relating to insufficient tax rebates, lack of relevant commercial information, logistical problems and poor credit access. They suggest that policies should focus on strengthening firms that are starting to export, in order to avoid discontinuities in export activity.

Problems for SMEs in introducing and utilizing IT

The main problems with the access to the new technologies signaled by the sector's entrepreneurs are: Small production scale; unfamiliarity with new technologies; access to financial resources; and shortage of specialized workers.⁵

⁵ Villaschi and Sabadini (2000, p. 63).

In order to develop large IT projects such as e-commerce, small ES firms need to cooperate and share. And, at this point, they hit the second problem: a lack of knowledge of IT Technologies. It would be very useful if the sector's fairs placed more emphasis in IT usage. APEX could also play an important role in this sense.

SMEs in high-tech vertical clusters face particular problems toward exports insofar as the nature of the business exposes them very early on to intense international competition. The existence of a lead or anchor firm in a vertical cluster is a mixed blessing, particularly in sectors such as aeronautics in which the subcontracting patterns has developed to the point of relying on a limited number of first-tier suppliers. Breaking into this closed group, often made up of foreign firm, is a hard task. A lead national firm could, in principle, assist SMEs in this endeavor, but it often chooses not to in order to avoid disaffecting key first-tier suppliers, which in turn are tied to their home country's government aeronautics subsidy programs.

The use of IT for exports as well as for strengthening the cluster's overall business capacity is made difficult by the short-term nature of supplier contracts of the lead firm, that prevents firms from pursuing a more long term cooperative strategy. Government programs with a one-size-fits-all format have severe limitations in addressing the particular IT needs of such groupings of firms.

IV. Government policies designed for SMES, IT, and international trade

A. IT POLICIES IN THE COUNTRY'S OVERALL DEVELOPMENT STRATEGY

Since the early 1990s, industrial policy has been shifting towards a more liberal regime. Local industry progressively lost its greenhouse protection and became exposed to international competition. Current Brazilian policy for the IT industry epitomizes this shift from protectionism to liberalism. The liberalization of the IT market for imports and foreign investments in the 1990s altered the industry structure. International IT leaders gradually took over most existing firms and turned away from local design and manufacturing to imports. The locally owned firms that survived were those targeting niche markets, client-specific software, and telecommunications equipment, where the client-supplier relationship was strong enough to withstand foreign competition (Botelho and Tigre, 2001).

The 1991 policy (Law 8248/91) aimed to establish alternative mechanisms to preserve some local equipment manufacturing and R&D activities in the IT sector. The policy consisted of several types of incentives. First, fiscal benefits available until 1999 consisted of a waiver on the industrial goods tax (IPI), resulting in a 15% reduction in the final cost of production. Second, a 50% income tax discount for R&D expenditures was made available to firms in all industrial sectors. Recent measures, however, limited this incentive to a maximum of 4% of total income tax. Thirdly, in order to provide support for new capital investment, a discount of 1% on the income tax payable by companies investing in IT firms was available until 1997. Fourthly, government procurement policy favours the acquisition of IT goods developed and produced in Brazil, as long as they have similar prices to imported equipment. By 1997, 248 firms had benefited from these measures. Parts of the firms' R&D expenses were channelled to government-sponsored R&D programmes. In 1999, the industrial goods tax (IPI) rebate was further extended until 2013 by a law passed by Congress, with a scheduled reduction of fiscal incentives. In order for firms to take advantage of the fiscal benefits, the legislation required a set of complementary actions by firms.

Other programmes based on "positive" policy mechanisms include the National Research Network (RNP) and Softex 2000. RNP aims to develop Internet links at science and technology institutions, and has also boosted commercial use of the Internet by providing infrastructure and technical capabilities. The project is now shifting towards academic and social use through Internet II.

The software exports programme (Softex 2000) was introduced in 1993 with ambitious aims: to capture 1% of the world software market, corresponding to US\$ 2 billion in exports by 2000, and for local firms to capture a 50% share of the national market. Softex 2000 results and prospects are controversial (Botelho, Stefanuto and Veloso, 2003).

Other government-sponsored R&D programmes in IT are aimed at building infrastructure and promoting joint projects between universities and private firms. The main results were the creation of a new cooperative research culture, the standardization of hardware and software platforms, and the provision of incentives for graduate programmes in computer science.

In the framework of the MERCOSUR free trade agreement, Brazil has been negotiating a common policy for international trade and industrial development for the IT sector. So far an agreement has been reached under which the countries' tariffs on imports from outside the Mercosur zone will converge to 16% by 2006.

B. POLICIES TO SUPPORT SMEs

1. Export promotion

The Ministry of Development, Industry and Foreign Trade (MDIC) and the National Economic and Social Development Bank (BNDES) are key institutions involved in the promotion of international trade and new business creation.

One of MDIC's main programmes in the area of new business development is the Small Scale Entrepreneur Programme (EPP), the objective of which is to train the SME entrepreneur in the procedures needed to operate in foreign trade. So far, over 9,000 entrepreneurs from all over Brazil have been through the programme.

BNDES is an autonomous federal public entity attached to the Ministry of Development, Industry and Foreign Trade (MDIC). It provides financing for the export of goods and services through accredited financial institutions, in the following categories: pre-shipment; short-term pre-shipment; special pre-shipment; pre-shipment anchor company; and post-shipment.

To further facilitate access to export credit, the following are available: Guarantee Fund for the Promotion of Competitiveness (FGPC), aimed at facilitating access to credit for micro, small and medium-sized enterprises. Insurance for Export Credit, which covers the commercial and political risk of exported goods and services.

The key policies used to promote SME exports are the Export Technology Support Programme (PROGEX), the Programme of New Export Arrangements (PNPE) and the National Network of Trade Agents (REDEAGENTES).

The purpose of PROGEX is to provide technological assistance to microenterprises and small businesses that want to become exporters, or to those already exporting that wish to improve their performance in external markets. PROGEX supports product adaptation to external markets involving improvement of quality and the productive process; cost reduction; meeting technical specifications; overcoming technical barriers; design and packaging.

PNPE carries out actions to provide stimulation and technological and commercial support to enterprises in sectors with export potential, especially small firms. Its objective is to expand the number and scope of Brazilian exports in terms of products, companies, and markets. Its initiatives include the dissemination of marketing information, stimulation of quality and productivity, help in increasing technological capacity and the incorporation of new technologies in the productive process.

The key aim of the REDEAGENTES is to disseminate an export culture and to guide small businesses on export procedures. It provides free training for foreign trade agents and small-scale entrepreneurs. From the beginning of the programme in 2000 until December 2003, it trained more

than 2,000 foreign trade agents and about 6,000 entrepreneurs and employees. After training, foreign trade agents are integrated into the REDEAGENTES network based on the Internet, where they start to contribute to the process of disseminating the export culture and provide guidance to other small businesses on how to export.

There are also various regional export facilitation initiatives.

2. Trade facilitation

Information system and websites

In late 2002 Banco do Brasil created the Foreign Trade Platform (FTP) as a system especially designed to facilitate and stimulate SME exports. This allows for an online export operation and meets demand from small firms that wish to start exporting. The service streamlines the export process for amounts of up to US\$ 10,000.

From its inception in January 2003 until December that year, the service registered 2,846 exporters and 680 importers, and completed 173 operations valued at US\$ 483,000. Today, there are 4,790 export product offers and 701 importing firms registered. As of November 2004, the FTP assisted 4,281 exporters and 1,153 importers, reaching close to 1,000 operations.

There are three main websites for SMEs that wish to export: the Exporter's Portal (<http://www.portaldoexportador.gov.br/>) and the Exporter's Window (<https://www.exportadoresbrasileiros.gov.br/>), both managed by MDIC; and the Brazilian Trade Net (<http://www.braziltradenet.gov.br/>), managed by the Ministry of Foreign Relations (MRE).

The Exporter's Portal is a major source of information on foreign trade. The Exporter's Window, launched in late 2003, contains a complete catalogue of information on Brazilian exporters. The site has over 25,000 companies registered in cadastre, which also include potential exporters. The BrazilTradeNet offers a virtual space where small exporters can market their products and processes. By late 2003, the site had 13,000 potential exporting firms registered and 9,600 product offers. About 58,000 importers were also registered on the site.

Export finance

The volume of credit in Brazil represents just about one-quarter of GDP, much smaller than in more trade-oriented nations such as China (140 per cent), Republic of Korea (100 per cent) and Canada (80 per cent). In this context, most export financing comes from government institutions. BNDES increased significantly its disbursements to support exports, going from US\$ 400 million in 1995 to US\$ 4 billion in 2003. This volume represents one-third of its disbursements and 5.5% of the country's exported value. However, as of September 2003, just 34% of its export funds went to SMEs (R\$ 8.9 billion).

Banco do Brasil (BB) finances exporting SMEs through its export financing programme (Proex) which currently serves 400 firms: 11% large, 39% medium-sized, 37% small and 13% microenterprises. BB's main export financing instruments are its short term loan programs (of up to 360 days).

Postal service

The State postal company Correios has established the Easy Export programme to take Brazilian products to the four corners of the world. In 2003, SME products accounted for 62% of total sales, and SMEs represented 67% of the exporting firms in the programme.

The export operation can be carried out online. Correios forecasts that in 2004 it will ship over 24,000 export packages abroad, a 75% increase over the previous year.

3. FDI promotion

The MRE website discussed above has an investment attraction area, with an Investors' Map and a page on "Why Invest in Brazil?" In addition, MRE manages its own Investment Promotion and Corporate Technology Transfer System (SIPRI), a network of national and foreign agents. However, the federal government's main effort was until recently focused on the hybrid agency Brazil Invest, which was shut down last July.

4. Business promotion

Brazil has an array of programmes for the emergence and early-development of new businesses (such as incubation), together with entrepreneurship-awareness and capacity-building programmes (Botelho, Jonathan and Gallagher, 2003).

The main policy in support of SMEs is the Federal Entrepreneurship Programme (PBE), which focuses on promoting small and medium-sized enterprises, bringing together many actions from programmes of diverse agents that affect new businesses.

Small businesses have access to smaller interest rate spreads in credit operations. At BNDES, a major source of long-term credit, the average spread for SMEs is 1% per year, while the large business are subject to an average spread of 2.5%. There are also special credit lines for small firms wishing to export in most public banks (Banco do Brasil and Caixa Econômica Federal), and in regional development banks (such as Banco do Nordeste Brasileiro).

Between October 1999 and December 2002, the programme trained 6,070,127 entrepreneurs, assisted 239,206 firms and carried out 5,198,996 microfinance operations, involving R\$ 35 billion (roughly US\$ 12 billion) with an average value of US\$ 2,000.

The financial support lines and BNDES programmes serve the investment needs of companies of any size and sector that are established in Brazil. By June 2003 the BNDES Programme in Support of Micro, Small and Medium-sized Enterprises had undertaken 24,616 loan operations for an average value of US\$ 50,700. Almost half of the loans were made to microenterprises, and these accounted for 29.7% of disbursements.

C. SPECIAL MEASURES TO CORRECT THE 'DIGITAL DIVIDE' AMONG COMPANIES

1. Human resources

By all measures, education levels in Brazil increased substantially in the last decade, including literacy and enrolment indicators at all educational levels. Primary education is now almost universal (95.7%), and 78.5% of the population of secondary school age are already enrolled, compared to under 60% in 1992. Secondary education is usually considered a necessary condition for IT use.

As far as IT technical workforce is concerned, in absolute terms Brazil has a large number of software professionals compared to other developing countries. In Brazil, there are 680 undergraduate courses on IT-related subjects. Each year, about 22,000 students obtain a degree in those subjects, while enrolment totals roughly 190,000. In addition, students from others areas such as applied sciences and mathematics eventually became IT professionals.

In 2000 about 3,000 students were undertaking post-graduate courses in computer sciences, of which 20% were doctoral degrees. In 2000, Brazil graduated less people in IT areas (18,000) than China and India, but when population is taken into account, Brazil exhibits an index of 101 graduates per million inhabitants, three times that of India and almost double that of China. Between 1996 and 2001, Brazil awarded about 87,000 bachelors and over 5,000 master's degrees in IT-related areas (Veloso, Botelho, Amsden and Stefanuto 2003).

2. Technical aspects

Independent committees working in cooperation with Government, universities and business oversee development of the technical aspects of Internet diffusion. The National Research Network (RNP)⁶ is an example of such an institution. It was established in 1989 by the Ministry of Science and Technology and was responsible for introducing the Internet in Brazil. It provides high-speed backbones to universities, hospitals and other social institutions by wholesale purchasing and reselling spare capacity available at private infrastructure providers.

Other policies include the development of affordable computers, since equipment and software costs are major barriers to Internet diffusion in most segments of Brazilian society. Universities and computer manufacturing firms have designed several versions of a “popular computer” with a target price of US\$ 300.

A network computer must be linked to a server, either through local area networks (in the case of schools and other multi-user institutions) or through a remote ISP. Since there are many towns in Brazil without an Internet provider, the Government is launching the OiOO service, which enables Internet users to pay local call charges when dialling long distance to any ISP within the country.

3. Financial aspects

Software firms usually face difficulties in obtaining financial resources from private banks, since they are unable to provide physical collateral. The PROSOFT Softex-BNDES programme provides financial support for software development and marketing activities as well as acquisition of equipment and training.

Another initiative is to develop financial packages to support the sale of computers to small business and domestic users. Banco do Brasil has a financing programme including hardware, software and an Internet service provider. The programme also aims at creating economies of scale in hardware manufacturing in order to make the system competitive in the export market.

4. Infocenters

The investment required to introduce IT is a major inhibitor of diffusion since equipment is relatively unaffordable and employees are less educated than in developed countries. As expected, this barrier affects small firms more than large ones, and those operating in less competitive branches of the local economy.

The universalization of Internet access in Brazil cannot rely on individual PCs alone. While potential demand for computers exists even in micro and informal businesses, investment costs are a barrier to wide diffusion. There are already government programmes⁷ aimed at filling this demand by introducing Internet in small business, such as news stands, post offices, lottery and convenience stores. These would play the role of intermediary between consumers and the net.

The federal government has one major programme of digital inclusion for SMEs: Information and Business Infocentres. Its main goals are to train entrepreneurs and workers in the use of information technologies, promoting the emergence of new enterprises, boosting exports, larger joint ventures between entities and new partnerships, improvement of the quality of products and services, and strengthening of projects for productive arrangements.

There is only one specialized federal credit line –the Enterprise Computerization Programme, operated by Banco do Brasil, but this situation may change since the Government is currently developing the Brazilian Digital Inclusion Programme (PBID) to be launched in 2005. Each of these initiatives is described below.

⁶ *Rede Nacional de Pesquisas*, in Portuguese.

⁷ For example, the Information Society Programme.

Infocenters of Information and Business

By July 2004, 400 infocentres were operating and 10 cooperation agreements had been signed to implement further 163 units. The project's goal is to implement 1,000 infocentres by July 2005 and at least one in each of Brazil's 5,567 municipalities by 2007. For this purpose, the Government is establishing partnerships with public banks and private enterprises. TIM, for example, is responsible for a net of 41 infocentres.

Enterprise Computerization Programme

There is one major credit line for SMEs wishing to buy computers: the Enterprise Computerization Programme, operated by Banco do Brasil. The programme aims to finance the acquisition of computers and peripherals by microenterprises and small businesses, in order to modernize management and facilitate electronic communication between the customer and Banco do Brasil.

Brazilian Digital Inclusion Programme

A government working group is currently drafting the Brazilian Digital Inclusion Programme (PBID) to be launched in 2005. This will have three main axes: "Casa Brasil", long-distance education and connected PC.

"Casa Brasil" will be the new name for the infocentres and will include not only those related to Information and Business, but also infocentres located in schools and in rural zones, and in frontier and remote regions. Distance education will be mainly related to formal education, although the Information and Business Infocentres offer some business-related training. The connected PC is probably the goal that will have greatest impact among SMEs, since its target is to offer a cheaper personal computer with Internet access to microenterprises and low-income population groups.

5. Other

SEBRAE's Programme of Technological Support for Small Enterprises (PATME) aims to convince entrepreneurs that investment in modernization systems can yield returns. The incentives include improvements to products, equipment, methods and production lines. PATME also offers financial support for computerization and can finance up to 70% of project costs.

Another computerization initiative is SebraeTec, launched in 2002. The intention here is to invest in programmes that develop technological capacity among small businesses. Apart from projects to provide advice on computerization, SebraeTec supports the establishment of new software developers, in order to increase the supply of programmes and facilitate access for small firms.

D. E-GOVERNMENT AIMED AT SMEs AND TRADE PROMOTION

1. Overall strategy/structure of e-government

The e-government policy in Brazil is under the responsibility of the Executive Committee of Electronic Government, whose aims include: formulate policies, establish guidelines, coordinate and articulate e-government actions, aimed at providing services and information to citizens.

In 2003 following the election of a new Government, the Committee was divided into eight technical committees:

- Digital Inclusion Committee;
- Online Services and Website Management Committee;
- Open Software Implementation Committee;

- Committee for Systems Integration;
- Network Infrastructure Committee;
- Committee on Knowledge Management and Strategic Information;
- Government to Government Committee; and
- Legacy Systems and License Committee.

2. Some e-government applications

Some of the applications of e-government policy are very important to SMEs, although none is actually targeted on that sector. These include the e-procurement portal (Comprasnet), the integrated foreign commerce system (SISCOMEX), and the Brazilian Payment System (SPB).

E-procurement

The federal government launched its procurement portal in 1997 (<http://www.comprasnet.gov.br>). The site enables firms to obtain online all the certificates needed to do business with Government. It also sends an e-mail to firms alerting them of business opportunities in their area.

Since 2001, the Government has used the portal to make online transactions. These are important initiatives to improve SME participation in government procurement, because it greatly reduces the transaction costs of doing business with the public sector. As a result, the number of SMEs registered in the portal has increased threefold from 33 million in 1997 to 102 million in 2003.

SISCOMEX

SISCOMEX is an electronic trade data management system that integrates the activities of registering, accompanying and controlling foreign trade procedures, by means of a single computerized flow of information. This system provides information to many other systems, of which the most important is the Foreign Trade Information Analysis (ALICE), and plays an important role in keeping trade facilitation websites up to date, such as the Exporter's Portal and BrazilTradeNet.

E-payment

The Brazilian Payment System (SPB) is one of the most outstanding public-private partnerships in banking automation in Brazil. Since April 2002, all transactions involving more than R\$ 5,000 have been settled on the same day (previously the operation took at least one day) and much more securely. The entire banking system is connected to the Central Bank and five other clearing houses that began operations in 2002, online with the SPB deployment schedule. This means that the Central Bank (BACEN) can access detailed online monitoring of banking transactions, manage the liquidity of the financial system more precisely, and therefore minimize systemic risk.⁸

E. INSTITUTIONAL ISSUES

1. Standardization and public key infrastructures

The National Institute of Information Technology (ITI), an autonomous federal body attached to the Civil House of the Presidency of the Republic, is the Authority Certifier Root (AC Root) of the Brazilian Public Keys Infrastructure (ICP-Brazil). As such it is the first authority in

⁸ Antonio José J. Botelho (2004).

the certification chain, executor of the certification policies and norms of operational techniques and approved by the Managing Committee of ICP-Brazil. It has the power to emit, to forward, to distribute, to revoke and to manage the certificates of the Certifier Authorities (AC) immediately below it; to manage the list of certificates emitted, revoked and expired; to execute activities of AC monitoring and auditing, Register Authorities (AIR) and the qualified rendering of services in ICP-Brazil.

It is also within the purview of ITI to stimulate and coordinate scientific research and technological development projects aimed at expanding digital citizenship. In this area, the main line of ITI action concerns the popularization of digital certification and digital inclusion, acting on issues such as cryptograph systems, open software, hardware compatible with open and universal standards, digital convergence of medias, among others.

Digital certification in Brazil was introduced by a law in 2001 (regulated by Provisional Measure 2200) that structured the Brazilian Public Keys Infrastructure (ICP Brazil), a digital certification model.

ICP Brazil consists of a group of techniques, practices and procedures to be implemented by the Government and private organizations to guarantee the authenticity, integrity and legal validity of electronic documents. The managing authority is the ICP-Brazil Management Committee.

The digital certification model adopted in Brazil was conceived by the federal government, based on the logic of public keys. One of the keys, known to the public, is deposited with the Certifying Authority. The other key, the private one known only to the user, is stored in the Digital Certificate. Only a specific private key is capable of “opening” the respective counterpart represented by a public key. When doing so, the final user guarantees digital certification of the operation and, consequently, its legal validity (Mora, 2003).

2. Intellectual Property rights

The National Industrial Property Institute (INPI) is an autonomous federal body, linked to the Ministry of Development, Industry, and Foreign Trade (MDIC). Its main purpose is to implement standards regulating industrial property within the national sphere, considering its social, economic, legal, and technical functions. Another of its functions is to issue opinions on the convenience of execution, ratification and denouncement of conventions, treaties, pacts, and agreements on industrial property.

INPI provides information from among its over 20 million patent documents to companies, government agencies, through specific programmes. It executes special programmes to support domestic enterprises, such as the Patents Promotion Programme (PROMOPAT) which allows one technical group of INPI to act directly in firms, to identify innovations that could have legal protection; the Automatic Information Supply Programme (PROFIN), in which INPI sends regular information contained in patents across the entire world related to the areas of performance of the contracted companies, over the Internet or on paper; the Programme of Incentives for Commerce of Patented National Technology (PROCOMTEC), aimed at small companies and isolated investors wishing to sell or license innovations; and the Programme to Monitor the Technical Evolution of Industry (PROATEC), which aims to subsidize government policy in priority sectors, through technological analyses.

V. Regional Networks

A. EXISTING REGIONAL NETWORKS OR WEBSITES

There are two major types of network using IT to promote SME business. One is national with no focus on specific sectors, and the other is locally or regionally centered on a sector. The networks hosted by Information and Business Infocentres, described above, are a major example of the first, while the portals for local clusters are an example of the second.

The networks hosted by Information and Business Infocentres

Complementing all the information on the website, the site also offers a restricted area for the information trade.⁹ This area displays all online members and offers the possibility of sending instantaneous e-mails, and holding virtual meetings and forums. It also has a large number of virtual communities, some based in a locational aspect, such as the administrative regions, one for each of the five Brazilian regions, others grouped by themes, such as the Thematic Committee in Training and Entrepreneur Capacity, with work groups on Strategic Planning and Management Capacity, and Thematic Committees on Foreign Trade and Integration, Investment and Financing, Legal and Bureaucratic Rationalization and Technology and Innovation. In July 2004, the network had over 800 records (which can be also firms, associations or people).

Portals for local clusters

<http://www.prossiga.br/arranjos/>

Portals are web portals containing online information on some of the Brazilian clusters. They are available for 14 local arrangements in 11 states and 9 sectors.

They are built on the technology platform methodology and are developed and hosted by Programa de Informação para Gestão de Ciência, Tecnologia e Inovação (Prossiga), a federal programme established in 1995 to promote the creation and use of Internet information and communication services, focusing primarily on science and technology, and the country's important socioeconomic activity sectors.

The project approval decision is directly related to the priorities established in the platform negotiation process. Analysis of the merit of a project considers not only excellence but also its relevance, especially its impact on local sustainable development.

⁹ In fact, the area is not very restricted. Anyone who fills a cadastre can enter.

TABLE 10
VORTALS OF BRAZILIAN CLUSTERS

Sector	State	Website
CARNAÚBA	Piauí	http://www.prossiga.br/arranjos/pi-carnauba.html
FLORICULTURA	Ceará	http://www.prossiga.br/arranjos/ce-floricultura.html
GESSO	Pernambuco	http://www.prossiga.br/arranjos/pe-gesso.html
INDÚSTRIA FARMACÊUTICA	Goiás	http://www.prossiga.br/arranjos/go-farmaco.html
MALACOCULTURA	Santa Catarina	http://www.prossiga.br/arranjos/go-malaco.html
MÓVEIS E ARTEFATOS DE MADEIRA	Amapá	http://www.prossiga.br/arranjos/vortais/moveis_ap.html
	Espírito Santo	http://www.prossiga.br/arranjos/vortais/moveis_es.html
	Pará	http://www.prossiga.br/arranjos/vortais/moveis_pa.html
	Santa Catarina	http://www.prossiga.br/arranjos/vortais/moveis_sc.html
PISCICULTURA	Rondônia	http://www.prossiga.br/arranjos/ro-piscicultura.html
ROCHAS ORNAMENTAIS	Bahia	http://www.prossiga.br/arranjos/vortais/rochas_ba.html
	Espírito Santo	http://www.prossiga.br/arranjos/vortais/rochas_es.html
	Rio de Janeiro	http://www.prossiga.br/arranjos/vortais/rochas_rj.html
SISAL	Bahia	http://www.prossiga.br/arranjos/ba-sisal.html

Source: <http://www.prossiga.br/arranjos/>

The vortal service put the first sites online in 2001 and aims to improve SME competitive capacity by offering a set of information, communication devices and varied support to market services through the web. It uses the Internet to widely disseminate the information on the sector already existing on the web, fully described and classified.

The service is relatively highly used. In May 2003,¹⁰ accumulated visits over the last 12 months amounted to 23,000, representing an increase of 10% from the last cumulative figure and 20% compared to those for March. The initial vortal page received 10 visits per day (4,500 visits in 12 months); and, on average, each vortal receives 3.5 visits per day.

Entrepreneurial Portal

The Entrepreneurial Portal is organized in four main areas: Regulations, Directories, Preferences and Entrepreneurial Meetings. It aims to inform trade operators in member countries of the access conditions to the regional market, and provide useful information for the accomplishment of commercial transactions. The Regulation area contains import and duty free zone regulation in each member country, together with basic manuals on import operations. The directories list business associations that are cadastred in the gateway, divided into enterprises and SMEs, and a list of importers and exporters for each country. The cadastre only contains institutional information. The Preferences area shows the tariffs preferences by the country granting it and the country receiving it. Entrepreneurial Meetings contains a list of fairs and missions per country.

The Foreign Trade Information System (SICOEX) is composed of interconnected online databases and consists of data, kept up-to-date since 1995, on member countries' trade, tariff measures and preferences for any product traded within the framework of the 1980 Treaty of Montevideo (LAIA), together with information on laws regulating foreign trade. Since the portal contains all these facilities, in the near future it could host developments such as online settlement gateways that could contribute to the use of IT in SME business promotion.

B. NEW NETWORKS OR WEBSITES IN THE PLANNING STAGE

In June 2004, the federal government launched a new programme to promote SME exports, which consists of financing the export of goods produced by SMEs, in the pre-shipment phase, through credit institutions. The credit can be as much as 100% of the FOB value and will be related to the

¹⁰ This is the latest data available.

long-term rate, plus 1% a year of BNDES remuneration (the programme agent) and remuneration of the credit institution (no more than 4%).

These exporters will operate as anchor enterprises, facilitating indirect export; they can be trading companies, commercial exporters or firms in the supply chain that acquire the production of a significant set of SMEs looking for exportation.

If the programme is successful, the federal government expects to have a good number of anchor enterprises organizing SME exports, through trade nets spread throughout the country. The fact that the federal government is going to launch a major digital inclusion programme made it possible for networks such as the Information and Business Infocentres to grow fast in a few years.

The vortals have been dealing with problems since 2003, when the new government took office. Many expansions plans were interrupted and no new vortal was launched. They are unlikely to expand in the near future.

The São Paulo State Federation of Commercial Associations (Fapesp) launched the National Network of Business Portals (RNPN) in 2003, which now has 6,000 members. The rapid growth of RNPN is based on its philosophy of simplicity in connection to the portal, together with low cost and a safe environment. The portal offers small firms an electronic catalogue, electronic exchange of product and service information, and either targeted or generic quoting.

C. POSSIBILITY OF INTER-REGIONAL LINKS

MERCOSUR is a federal government priority, but online cooperation to promote SMEs is still far from a reality. The official site of the agreement displays only static information, mainly on documents and agreements. There is no database on the site, and entrepreneurs will only find interesting subjects in the documents that are launched.

MERCOSUR has a civil society group on cooperativism, but this is not yet providing any form of online service that can help SMEs. The electronic commerce group also has not implemented any suggestion.

LAIA has a much more developed website than MERCOSUR, but its information is also mainly static. There is also the Entrepreneurial Portal where firms can display information on their services and products and a complete database on commercial trade, tariff measures and preferences among country members (SICOEX) is available.

VI. Conclusion and recommendation

1. Lessons learned

The two contrasting experiences analyzed above first of all show us the importance of paying attention to the nature of the industry and its structure. In the case of aeronautics parts, the small number of firms, their highly specialized production capabilities and the critical role played by the leading firm, Embraer, in the vertical cluster require closer cooperation between firms in order to negotiate better and longer-term contracts with the leading firm, and to develop foreign niche markets which are often part of national industry supply chains. Here, a marketing strategy aimed at building trust with potential customers is needed, given the nature and internationalized structure of the aeronautics end market. This is a long-term process. Furthermore, firms have to be able to integrate their complementary capabilities and make up for those that are lacking, in order to offer foreign customers a more comprehensive solution platform. Finally, in this proto-cluster, non arms-length forward linkages to first-tier suppliers might be more important than backward linkages to even smaller firms, thereby complementing the current direct strictly business linkages to the leading firm. These first-tier suppliers, pressured by end buyers, will be always pursuing cost reductions in services provision and new parts development.

In contrast, in the ornamental stones sector, the cluster is more horizontal and centreless. The relatively large number of firms and the length of the supply chain with several levels of input and equipment suppliers make the formation of stronger and denser networks harder to achieve. The cluster is very active in exports, particularly when compared to other industry-like clusters and other regions. Its success is due in part to previous export promotion policies. The challenge ahead is to sustain momentum and to increase the value-added of exports. The Prossiga website creation programme for local productive arrangements and clusters has been discontinued and it appears no replacement is in sight. The new administration is emphasizing a wholesale policy of telecentre expansion, which, while necessary, may represent a setback in relation to the previous orientation of IT diffusion in terms of targeted local empowerment.

2. Assessment of experiences in export promotion and IT policies for SMEs

It seems that whereas SME export promotion policies in Brazil are entering a second-generation, those for IT are still in their infancy. We are still only beginning to gain an understanding of individual SME IT needs and uses. Nonetheless, we have not yet fathomed the possibilities for IT use in SME networks. Beyond the basic goal of achieving widespread dissemination, there has been little policy development in this area. In regard to broad dissemination, the new government initiative to develop cheap computers could be part of the answer, but that remains to be seen. Moreover, SMEs will still be faced with the problem of obtaining adequate software and, most importantly, qualified IT staff aware of the organizational and strategic challenges facing SMEs.

On the other hand, export promotion policies are becoming more sophisticated and tailor made. The recent emergence of local / regional networks of exporting firms such as the HTA consortium, and the support given to them by APEX, as well as easier use of export portals such as that of Banco do Brasil and export facilities such as those provided by Correios, are a few signs of gradual and important changes in policy. The scope of APEX support for these networks needs to be expanded to include development of IT tools to promote meaningful collaboration and to allow for interactive export activities. This would increase the supply of complete platforms in the case of high-tech sectors, thus capturing greater value-added and providing increased sustainability. Export sustainability is a critical problem that continues to plague SME exports. This has been correctly identified but still remains to be diagnosed, above and beyond the lure of the domestic market once the local economy recovers. Guidance and sustainability by anchor firms appears to be a promising avenue for both SME export capacity-building and sustainability. Care is needed, however, to prevent a strong dependency relationship from developing. In this regard, experimentation could be pursued to involve first-tier suppliers in this support and learning network for export-oriented SMEs

The full potential of Internet-based instruments has not yet been fully grasped by promotion agencies. Full interactivity and high-quality graphical interfaces are critical for breaking into an overcrowded export market. Marketing is often weak or export capability lacking in exporting SMEs, either because of the type of specialized training needed, in the case of high-tech firms, or because of a lack of specialized training in the case of traditional industry clusters. Internet tools can be employed effectively in building the capacities that are lacking.

Internet-based instruments will become even more critical as the focus of SMEs' export promotion policies moves away from individual firms and more toward regional industrial agglomerations (funded by BNDES) and industrial consortia (funded by Sebrae and APEX). In the former, large firms and trading companies will play the role of export gateways to SMEs.¹¹

¹¹ The program was launched by BNDES in August 2004 and its first operation with a trading company was with the firm, South Services Trading, the country's largest footwear exporter, which will receive US\$ 8 million in finance to purchase footwear from SME producers in the state of Rio Grande do Sul. A second operation was closed with Total Trading, described above. Multinational firms have also been playing a similar role. For example, in 2004 Wal-Mart will increase its exports of Brazilian products by 42 per cent, reaching US\$ 120 million.

The increase in e-business over the last couple of years, above the country's growth rate will also indirectly impact the digital inclusion of SMEs. Close to half of SMEs already make use of some sort of Internet operation. A more focused effort on SMEs is called for, preferably in a joint partnership involving the private sector and government, as the latter's expenditures in e-commerce promotion remain quite small and inadequate given the size of the challenge ahead.

3. Assessment of the present situation of regional networks

Regional networks of SMEs in Latin America are still in an embryonic stage. The conflictive state of affairs existing between the two leading MERCOSUR partners, Brazil and Argentina, coupled with Chile's autonomous strategy, does not bode well for the next few years in the absence of a strong policy. Nonetheless, the design of such a policy will require a better understanding of existing relationships (if any), and a mapping of potential relationships, based on complementary products and services, contrasting best practices in export activities and willingness to collaborate across borders in the search for a higher value-added business proposal.

References

- Botelho, Antonio José J. (2004), “IT and the Financial System in Brazil,” a report to the project *Diffusion and Effective Use of Information Technology: A Latin-Asian Dialogue on Initial Conditions and Policy Challenges*, Washington, DC: Institute for International Economics, August 2004, mimeo.
- Botelho, A. and Tigre, P. (2001), “Brazil Meets The Global Challenge: It Policy In A Post-Liberalization Environment”, *The Information Society: An International Journal*, vol. 17, no. 2, Bloomington, IN.
- Botelho, A., Stefanuto, G. and Veloso, F. (2003), “Slicing the Knowledge-Based Economy in Brazil, China and India” MIT/SOFTEX Research - Results in Brazil.
- Botelho, A., Stefanuto, G., Veloso, F. and Amsden, A. (2003), “Slicing the Knowledge-Based Economy in Brazil, China and India” MIT/SOFTEX Research - Final Results.
- Bernardes, R. (2000) “Redes de Inovação e Cadeias Produtivas Globais: Impactos da Estratégia de Competição da Embraer no Arranjo Aeronáutico da Região de São José dos Campos” “, *REDESIST Technical Note no. 23*, Rio de Janeiro, UFRJ.
- Bernardes, R. and Pinho, M. (2002), *Aglomeração e Aprendizado na rede de fornecedores locais da Embraer*, Rio de Janeiro, REDESIST-UFRJ.
- Cassiolato, J. and Baptista, M. (1996), The Effects of the Brazilian Liberalisation of the IT Industry on Technological Capabilities of Local Firms. *Information Technology for Development* 7:53–73.
- Chahin, A. et al. (2004), *E-gov.br: a próxima revolução brasileira*, São Paulo, Prentice Hall.
- Chiodi Filho, C. (2002), “Situação e Perspectivas Brasileiras no Setor de Rochas Ornamentais e de Revestimento”, *First Brazilian Symposium in Ornamental Stones*, Rio de Janeiro, CETEM/MCT.
- Cunha, LM et alli (2003) “Rochas ornamentais: exportações promissoras”, *BNDES Setorial*, no.17, Rio de Janeiro.
- CRITO Global E-Commerce Survey, 2002
- E-Consulting Corp. (2003). *Internet Indicators*. Available at: http://www.econsultingcorp.com.br/insider_info/indicadores.htm.
- Espírito Santo Industrial Development Institute – IDEIES (1998), *Diagnóstico e atualização do cadastro do setor de mármore e granitos do estado do Espírito Santo*, Vitória – ES, IDEIES.
- Euvaldo Lodi Institute – IEL (1999), *Análise da cadeia de valor da indústria de mármore e granito e construção civil do Espírito Santo*, Vitória – ES, IEL.
- Ferraz, G., and Ribeiro, J. (2002) “Um Levantamento de Atividades Relacionadas às Exportações das Empresas Brasileiras” in “O Desafio das Exportações”, Rio de Janeiro, BNDES.
- International Telecommunication Union (ITU). *World Telecommunication Indicators*. Geneva: ITU, 2003.
- Labour and Society Research Institute – IETS (2002) “Criação de um ambiente favorável aos micro e pequenos negócios e desenvolvimento”, IETS Policy Paper no. 2. Available at: <http://www.iets.inf.br/acervo/Policy-Papers.htm>

- La Rovere, R., Tigre, P., and Fagundes, J. (1996) Information Networks Diffusion in Brazil: Global and Local factors. In P. Palvia, S. Palvia, and E. Roche, editors, *Global Information Technology and Systems Management: Key Issues and Trends*. Nashua, NH: Ivy League Publishing. Pages 123-143.
- Latin American Integration Association – ALADI (2003), Estudio sobre Gobierno Digital. *ALADI/SEC/Estudio 153 Rev.1*, Uruguai, ALADI. Available at:
<http://www.aladi.org/NSFALADI/ecomerc.NSF/012ed27bee063f3203256da30066b9b0/3bd8bdddc46c846803256e93004e7555>
- Markwald, R., and Puga, F. (2002) “Focando a Política de Promoção de Exportações” in “O Desafio das Exportações”, Rio de Janeiro, BNDES.
- Ministry of Industrial and Trade Development – MDIC (2001), *Instrumentos de Apoio ao Setor Produtivo*, Brasília, MDIC. Available at:
http://www.desenvolvimento.gov.br/sitio/publicacoes/desProducao/Ins_ApoSetProdutivo.php
- Pinheiro, A.C. et alli (2002) “O Desafio das Exportações”, Rio de Janeiro, BNDES.
- Rocha, I. (2001), *Plataformas Tecnológicas: conceito e aplicações*, Brasília, MCT.
- Shapiro, C. and Varian, H. (1999). *Information Rules*. Massachusetts, Harvard Business School Press.
- Tigre, P. (2002) “O Papel da Política Tecnológica na Promoção das Exportações” in “O Desafio das Exportações”, Rio de Janeiro, BNDES.
- Tigre, P.B. (2003). E-Commerce Readiness and Diffusion: The Case of Brazil. *Globalization and Electronic Project*. Available at CRITO website: www.crito.uci.edu.
- Tornatzky, L. and Fleischer, M. (1990). *The Process of Technological Innovation*. Lexington, MA: Lexington Books.
- Villaschi, A. and Sabadini, M. (2000), “Arranjo Produtivo de Rochas Ornamentais (mármore e granito) no estado do Espírito Santo”, *REDESIST Technical Note no. 15*, Rio de Janeiro, UFRJ.
- Villaschi, A. (2004), “Interação econômica BR/UE para além de fluxos comerciais e de investimentos - reflexões neoschumpeterianas e fatos estilizados capixabas”, *Position Paper of Conference Brazil Amplified European Union*, Rio de Janeiro, UFRJ.
- World Information Technology and Services Alliance (WITSA). *Digital Planet 2002: The Global Information Economy*. WITSA, 2002.

Websites consulted:

- II. Present Situation of IT market and IT usage by SMEs
 - A. Market estimates
www.econsultingcorp.com.br
www.itu.int
 - B. Penetration of IT and e-commerce by SMEs
www.crito.uci.edu
- III. SME development in the it revolution
 - A. Overview of the relative importance of SMEs in the economy
www.ibge.gov.br
www.mdic.gov.br
www.mte.gov.br
www.bndes.gov.br
www.sebrae.com.br
 - B. Case studies on use of e-commerce and supply chain management (SCM) in selected industries
 1. – Ornamental stone cluster in the state of Espírito Santo
www.sindirochas.com.br
www.iel-ideies.com.br
www.feiradomarmore.com.br
www.prossiga.br/arranjos
www.prossiga.br/arranjos/vortais/rochas_es
www.marble.com.br/
www.pcpedras.com.br/
 2. – Aeronautics industry in SP
www.hta.com.br
www.embraer.com.br

- IV. Government policies designed for SMEs, IT, and international trade
- www.mdic.gov.br
 - www.bndes.gov.br
 - www.sebrae.com.br
 - www.bb.com.br
 - www.correios.com.br
 - www.apexbrasil.com.br
 - www.inpi.gov.br
 - www.inmetro.gov.br
 - <http://www.portaldoexportador.gov.br/>
 - <https://www.exportadoresbrasileiros.gov.br/>
 - <http://www.braziltradenet.gov.br/>
 - <http://www.telecentros.desenvolvimento.gov.br>
 - <http://www.governoeletronico.e.gov.br/governoeletronico/index.html>
 - <http://www.comprasnet.gov.br>
 - <http://www.receita.fazenda.gov.br/aduana/siscomex/siscomex.htm>
- V. Regional networks
- www.telecentros.desenvolvimento.gov.br
 - <http://www.prossiga.br/arranjos/>
 - www.bndes.gov.br
 - www.aladi.org.br
 - www.mercosul.org.br

CHILE

Yasushi Ueki

I. Introduction

Chile has a reputation as a country with an open economy and sound macroeconomic fundamentals. Over the years, its well coordinated economic policy has attracted foreign direct investment (FDI), which has encouraged the development of export sectors and facilitated the dissemination of information technologies (ITs) nationwide. Today, Chile's per-capita distribution rates for IT products and services are the highest in Latin America.

Nonetheless there are three key policy issues for Chile that arise from innovations in IT, globalization, and Chile's trade policy that seeks to benefit from free trade agreements (FTAs). The first is to seize new opportunities for traditional businesses that will benefit from using effectively IT methods such as e-commerce. The second is to improve the competitiveness of export goods and services in order to survive intensifying international competition. Key issues for firms will be to increase value-added in the existing range of products and services, to develop new ones, and to reduce costs. This will be achieved by ITs that will achieve higher quality and more effective business management, effective R&D activities and others that should improve overall business activities. The third is development of the IT sector itself.

These issues bear more heavily on SMEs than on larger firms, and ITs should also open up broader fields of business activities for SMEs. The public and academic sectors should also be required to make efforts to improve the competitiveness of Chilean firms, especially through technology transfers from universities to the corporate sector, given that R&D expenditures in 2000 were equivalent to just 0.56% of Chile's GDP. Expenditures were concentrated in the primary sectors (about 34% of the total in 2000). In the transportation and telecommunications sectors, only 1% of the total was invested in 2000, while these sectors accounted for about 2% or more during the mid-1990s.

II. The current situation in the IT market and IT use by SMEs

Chile is the most digitized economy in South America. There are indicators that support the view that Chile provides one of the best IT environments in Latin America as a market and as an IT business base. At the same time, the data reveal a gap between Chile and countries in Asia that are making progress in developing IT uses and IT-related industries.

A. MARKET ESTIMATES

Statistics on the IT market are not available from the data sources of official organizations. Estimated figures are published by private research firms such as the International Data Corporation (IDC) as well as business organizations. The exception is telecom-related data, which are produced by

the Undersecretariat for Telecommunications (SUBTEL). Most of the data are published only occasionally, and the methodologies used among the research agencies are not necessarily coordinated.

1. Overview of the digital economy

According to a survey conducted by the National Chamber of Commerce, Services and Tourism (CNC) and IDC Chile, total IT investment in Chile was estimated at US\$ 1,158 million in 2000, consisting of hardware (US\$ 644.0 million and 55.6% of the total), software packages (US\$ 118.8 million, 10.3%) and services (US\$ 395.0 million, 34.1%). This estimated value was less than the equivalent figure in Venezuela. On the other hand, per-capita expenditure in Chile was the third highest in Latin America in 2000, estimated at US\$ 76.2 and above the figure for Mexico.

TABLE 1
IT INVESTMENTS IN CHILE
(US\$ million)

	2000	2001	2002	2003	2004 (e)
Hardware	644.0	638.2	552.0	491.5	496.6
Package Software	118.8	123.8	127.7	134.2	142.9
Services	395.0	365.1	384.6	403.8	429.9
Total IT Investment	1,158.0	1,127.1	1,064.3	1,029.5	1,069.5

Source: IDC Chile and CNC (September 2004).

Information technology investments in Chile are not growing vigorously however; and, apart from package software, the figures have been trending down since 2000. IT investments in Chile represented 1.65% of GDP in 2000, which was higher than in Argentina (1.25%) and Mexico (1.00%), but lower than in Brazil (2.35%) and Colombia (1.79%) (IDC-Chile and CNC, July 2002). In 2003 the figure for Chile was 1.4%, compared to 2.7% in Hungary, 2.6% in the Czech Republic, and 2.1% in Japan.

2. Internet

According to ITU data, the number of the Internet users in Chile grew strongly in the late 1990s, rising from 250,000 in 1998, to 625,000 in 1999 and 2,537,308 by 2000. Since then, the number of users has continued to rise, reaching levels of 3,102,200 in 2001 and 3,575,000 in 2002. The recent slower expansion is shown by the indicator on Internet users per 100 people, which shot up from 4.16 in 1999 to 16.68 in 2000, before rising more slowly to 20.14 in 2001 and 23.75 in 2002.

While the growth rate of Internet subscribers is slowing down, dial-up Internet connections are being replaced by dedicated lines such as ADSL (Asymmetric Digital Subscriber Line), Cable Modem and WLL (wireless local loop, or FWA (Fixed Wireless Access)). According to Subtel, the share of dedicated connections grew from 0.5% in June 2000 to 27.8% in March 2003.

3. E-commerce

E-commerce is not well established among economic activities in Chile, although transactions are growing rapidly. CCS (2003b) estimated that the total volume of e-commerce (measurements for transactions carried out through digital media by traditional sectors such as mining, manufacturing and construction) grew from US\$ 341 million in 2000 to US\$ 1,445 million in 2001, and had reached US\$ 2,329 million by 2002.

The business to consumer (B2C) segment of e-commerce accounted for under 2% of total e-commerce transactions or US\$ 40 million in 2002, although this was double the 2000 figure. The ratio of B2C to total transactions was 0.2% and expected to remain at 0.5% in 2005.

The most promising e-commerce segment is business to business (B2B). Total B2B transaction values were estimated at US\$ 321 million in 2000, US\$ 1,415 million in 2001 and US\$ 2,288 million in 2002. The share of B2B in total transactions amounted to 2.2% in 2002 and is projected to reach 7.0% by 2005. So-called “e-marketplaces” are starting to be widely used among firms, with an estimated US\$ 2,000 million e-transactions and over 20,000 suppliers offering their products through the Internet. About 65% of the country’s e-marketplaces are vertical markets that focus on a specific industry such as supermarkets, or the construction or mining sectors. The other driving force behind B2B is ChileCompra, the government e-procurement system that is discussed below.

B. PENETRATION OF IT AND E-COMMERCE BY SMEs

Information on the computerization of Chilean firms can be gained from several sources. Among the most representative are the report on the digital economy and newsletters published by CCS, which provide readers with comprehensive data spanning several years. In a report announced by the Government, a survey conducted by the Undersecretary for Economic Affairs (Subsecretaría de Economía, 2002) provided a detailed description the situations of IT use for different firm sizes.

1. IT use by Chilean firms

According to CCS (2003b), Internet use by Chilean firms has been increasing. In 2000 and 2003, the proportion of firms with Internet connections grew from 42% to 69%, with website ownership rising from 7% to 25%. These rates are expected to increase further in 2004.

Nonetheless, in 2003 only 11% of firms used the Internet as a sales platform, and 16% for purchasing inputs and connecting with their providers, a situation likely to persist in 2004. The most widely used applications were Internet banking (58%), procedures with government agencies (53%), and tax declaration and payment (48%); less developed were sales to foreign markets (4%), videoconference (4%) and e-learning (6%).

2. IT use by SMEs

IT dissemination and use varies according to firm size; Subsecretaría de Economía (2002) provides comprehensive information on IT access and use by Chilean firms. One of the advantages of the survey conducted in March-May 2002 is that the definition of SMEs used is consistent with that applied to other SME-related statistics by government agencies under the Ministry of Economic Affairs.

The survey classified firms based on net annual sales valued in terms of the inflation-indexed currency unit *Unidad de Fomento* (UF). On 31 December 2003, one UF was worth 16,920 Chilean pesos (CH\$) or about US\$ 28 (1 UF = CH\$16,350 or US\$ 24 during the survey period). The classifications are as follows:

- Microenterprise: under 2,400 UF (US\$ 72,000)
- Small firm: from 2,401 UF to 25,000 UF (US\$ 72,000 to US\$ 750,000)
- Medium-sized firm: from 25,001 to 100,000 UF (US\$ 750,000 to US\$ 3 million)
- Large firms: over 100,000 UF (US\$ 3 million)

In this survey, medium-sized firms were further divided into small-medium (25,001-50,000 UF) and medium (50,000-100,000 UF). Survey respondents totalled 3,134 firms, including 2,584 SMEs (small: 1,136, small-medium: 805, medium: 643) but excluding microenterprises and large firms. In the same period, the population consisted of 79,089 firms including 76,337 SMEs (small: 66,295, small-medium: 6,476, medium: 3,566).

As shown in table 2, 62.7% of all SMEs are equipped with PCs and just 41.8% have Internet access from their offices. Wide disparities in IT diffusion were noted especially among small and small-medium firms. PCs are mainly used with basic software such as word processor and spreadsheet programmes, and Internet applications such as browsers and e-mail, both of which mainly help enhance personal productivity. On the other hand, ITs are not fully incorporated into the firm's organized activities. Management systems have been introduced by roughly 60% of the large firms and 26.6% of the SMEs equipped with PCs.

The main activities conducted through the Internet were e-mail, contact with banks, and contact with public services. Nonetheless, the main use of banking services by the SMEs did not involve money transfers. Contacts with suppliers and customers, or e-commerce of some type, were poorly exploited even by large firms. The main activities involved information exchange with suppliers and customers. Even when firms introduced e-commerce, they made insignificant use of it. Among the firms carrying out e-procurement, 52.5% of them purchased less than 5% of their total inputs online, with an equivalent figure of 56.5% in case of online sales.

TABLE 2
IT ACCESS AND USE BY CHILEAN FIRMS, 2002

	Small	Small-medium	Medium	SMEs	Large	Total
Penetration (% of total firms)						
Fixed telephone	92.7	99.1	99.4	93.5	99.9	93.7
Fax	69.3	91.4	96.3	72.5	97.8	73.3
Computer	58.2	90.4	97.1	62.7	98.4	64.0
Internet	37.0	67.9	84.9	41.8	92.6	43.6
Dedicated line	15.7	29.4	44.5		64.5	19.9
Website	9.8	27.8	35.6	12.6	52.6	14.0
Reason for lack of Internet access (%)						
Budget constraint	47.5	38.4	37.4	47.0	33.6	47.0
Lack of knowledge and capability	28.1	30.6	32.3	28.2	32.7	28.3
No interest	20.1	26.2	26.8	20.5	31.0	20.5
Other	4.3	4.8	3.5	4.3	2.6	4.3
Reasons for introducing the Internet (%)						
Improvement of business	56.0	56.1	49.1	55.9	57.6	55.9
Improvement of internal management and productivity	19.9	22.0	30.1	20.1	19.3	20.1
Lower costs of connection	14.5	15.1	15.8	14.6	13.5	14.5
Other	9.6	6.9	5.0	9.4	9.6	9.4
Main activities carried out through the Internet (% of firms connected to the Internet)						
Contact with banks	65.7	78.6	79.2	64.0	84.5	69.7
Contact with public services	63.9	74.0	72.6	61.6	79.7	66.9
Contact with suppliers	27.5	35.4	35.0	31.8	42.7	30.2
Contact with clients	32.8	37.6	40.8	27.3	46.0	34.9
Main e-commerce activities with suppliers (% of firms engaging in Internet transactions with their suppliers)						
Inform on prices and offers	63.1	63.2	50.2	61.7	60.7	61.7
Quotes for inputs and services	52.5	58.4	59.8	55.2	66.6	55.2
Purchase of inputs and/or services	25.7	32.5	34.3	27.8	30.5	27.8
Information on order status	12.2	14.9	15.4	13.0	14.5	13.0
Main e-commerce activities with customers (%total firms engaging in Internet transactions with their customers)						
Send/receive information	73.3	78.3	77.6	74.5	75.6	74.7
Send quotes for their products and/or services	44.1	58.2	56.9	47.7	51.8	48.1
Exhibit catalog of products	33.7	45.8	31.9	35.4	49.0	36.7
Sell products and/or services	17.7	20.0	20.3	18.4	17.9	18.3

Source: Subsecretaría de Economía (2002).

III. SME development in the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMEs IN THE ECONOMY AT LARGE

The definition of SMEs in Chile is poorly standardized even among government bodies. There are two important sources of data on SMEs, one being the Ministry of Economic Affairs and affiliated organizations such as CORFO. As mentioned above, these institutions classify Chilean firms on the basis of their net annual sales valued in UF. The other source is the National Socioeconomic Survey (CASEN) conducted by the Ministry of Planning and Cooperation (MIDEPLAN), which classifies firms by the number of people they employ.

1. The recent condition of SMEs

According to the Microenterprise and Small Business Development Committee (hereinafter the SME Committee Report, 2003), there were roughly 1,200,000 firms in existence in 2001. Of these, 652,445, or 54% were in the formal sector. Over 95% of formal firms are SMEs if they are classified by net sales. Microenterprises accounted for 82% of all formal firms while 15% were small enterprises; the shares of medium-sized and large firms were just 2.1% and 0.99% respectively.

The sectors in which SMEs have relatively greater presence are agriculture, manufacturing, commerce, and transport. About 70% of microenterprises and 60% of small firms belonged to these four sectors (SME Committee Report, 2003). CORFO (2000) provides more detailed information on SME market shares by sector. In 1997, 40% of microenterprises and small firms were operating in the commerce sector. The second largest sector was agriculture (12.2%), followed by transport (8.0%), personal and household services (7.2%), manufacturing (7.1%), and technical and professional services (5.5%).

SMEs make a major contribution to job creation. Figures published by the 2000 CASEN survey show that over 60% of employees work in firms employing under 50 people.

2. SME Exports

2.1. Current situation

According to CCS figures, the total number of exporters was 6,409 in 2003, and the number had grown by 336 firms or 5.5% by 2002. Half of all exporters were microenterprises, while 2,919 small and medium-sized exporters accounted for 46% of the total.

The total value of exports grew by 16% to reach a level of US\$ 20.14 billion. While only 240 large firms shipped abroad, they accounted for 84% of the country's total exports. Large firms benefited from the rise in the copper price. In 2003, exports by large firms grew by 18.4%, whereas the corresponding rates among microenterprises, and small and medium-sized firms were 4.8%, 5.5%, and 1.5% respectively.

Although SMEs accounted for roughly 15% of total export value in 2003, the proportion would be approximately 30% if the mining sector is excluded. This is because the mining export account for over 50% of Chile's exports and is dominated by large enterprises.

The composition of exported products differed between large firms and other smaller enterprises. Manufactured products take a larger share among smaller firms. Exports by large firms were divided into mineral products, which accounted for over half of total export value, and manufactured products. In the case of SMEs, the leading export products were manufactured goods (76% of the total), followed by agricultural products (22%). About 90% of microenterprise exports consisted of manufactured products.

The main products exported by SMEs were in sectors relating to agriculture, fruit growing, livestock, forestry, and fishing. These accounted for about 22% of total exports in 2003. In the first quarter of 2004, fresh fruits, such as grapes, along with wines were the main SME export products.

The leading markets for microenterprises and SMEs are in the Americas. Exports are more diversified among larger enterprises. The Asian market is not very important for microenterprises and SMEs, with only 5% of microenterprise and 12% of SME exports being sent to that continent in 2003.

TABLE 3
EXPORT PRODUCTS BY FIRM SIZE IN 2003

	Micro	Small	Medium	Large
Number of Exporters and Export Value				
N° of firms	3,250	2,136	783	240
(% of total)	(50.7)	(33.3)	(12.2)	(3.7)
Exports (US\$ million)	42	609	2,513	16,977
(% of total)	(0.2)	(3.0)	(12.5)	(84.3)
Export by Products				
Mining	0.8%	1.9%		51%
Agriculture, forestry and livestock	11%	22%		6%
Manufacturing	88%	76%		43%
Destination by Regions				
Latin America	58%	34%		16%
North America	19%	25%		18%
Europe	15%	23%		26%
Asia	5%	12%		36%
Rest of the World	4%	6%		4%

Source: CCS, 1 March 2004.

2.2. *The weakness of Chilean SMEs*

The export performance of SMEs will depend not only on the market conditions for their products but also on the capabilities of the SMEs themselves. The CCS study “Diagnostic study of SME Management in 2003” found that the weakest areas among Chilean SMEs were quality management, information management, and marketing and sales (CCS, 17 November 2003). In other words, SME management concentrated on supply-side aspects rather than their customers, although they also had problems that are common to SMEs throughout the world, such as financing and human resources. In the production and operations field, planning and inventory management were the areas needing most urgent solution. In the funding domain, SMEs lacked abilities in financial management and cost analysis. In short, the weaknesses identified in Chilean SMEs are closely related to financial, technological and cultural contexts, and those to which large firms apply IT tools and solutions effectively.

The recent export growth, from which large firms are benefiting more than SMEs, is revealing a physical distribution bottleneck for the Chilean export-led economy. The growth in exports from Chile causes a shortage of space on ships and containers for exporters. The consequent increase in transport costs lowered the relative burden of customs duties for exporters, although Chilean exports have been driven by FTAs. In 2003, the average tariff cost was estimated at under 3%, while transport costs were equivalent to 7.5% and expected to rise to about 9% in 2004. The consequent increase in transport costs seriously harms small-and medium-sized exporters (SMEXs), which do not export their products regularly in high volumes and therefore cannot benefit from long-term contracts with shipping companies. Although transport costs represented 8.0% of export value (US\$ 37/ton) for large firms, the equivalent figure was 11.4% (US\$ 90/ton) for SMEs and 11.1% (US\$ 150/ton) for microenterprises (CCS, 25 March 2004, 17 May 2004).

B. CASE STUDIES ON THE USE OF E-COMMERCE AND SUPPLY CHAIN MANAGEMENT (SCM) IN SELECTED INDUSTRIES

1. Background to the policy issue in Chile

Information technologies can benefit SMEs through: (i) effective use of IT applications in their businesses, including administration, product management and collaboration with other firms; and (ii) the development of new IT-related businesses such as hardware manufacture, software development, R&D and other services.

Chile recognizes a major opportunity to develop the IT sector. Its political, economic and social stability, together with an abundant, well-educated and skilled labour force, and well-established IT infrastructure compared to other Latin American countries, provide better conditions for promoting the IT-related sector. The current weakness in the IT sector makes the software development business a medium-to-long-term policy issue for Chile.

On the other hand, the existing industrial organization is based on the country's comparative advantage in natural resources and environmental conditions. The most pressing policy issue is to maintain and strengthen the international competitiveness of existing export sectors in an ever-changing economic environment and competitive conditions on the world market, and Chile's active free trade policy. Information technologies are seen as tools to increase efficiency in existing industries and to enhance the value added of products and services.

From this perspective, one of the best scenarios for IT development in Chile involves creating complementary relations between IT sector development and efforts to improve the competitiveness of existing sectors, by implementing IT applications developed by indigenous IT enterprises.

2. Case 1: Development of food safety systems

2.1. *The need for food safety management*

The food industry is Chile's leading export industry after mining. According to the statistics on products exported by Chile published by the Chilean Industry Federation (SOFOFA), copper (produced by large firms) accounted for 36% of total exports in 2003. Other representative export products include fruit and other agricultural, forestry, and livestock products, along with salmon and other fishery and processed marine food products. The non-copper export sectors are also growing strongly. The value of non-copper exports grew by 17.5% between 2000 and 2003, whereas copper exports expanded by just 2.6% during the same period.

Despite high expectations of strong export growth, these sectors have been forced to restructure their management and improve product quality, especially food-safety management, in order to develop their main markets in Europe and North America. The following changes in the market environment are encouraging Chilean firms to introduce management innovations:

- **Demands for food safety from consumers**

The outbreak of Bovine Spongiform Encephalopathy (BSE), also known as "Mad Cow Disease," has drastically affected consumer confidence in overall food safety. Increasing numbers of consumers in developed countries are demanding safer foods and detailed information on the safety of the foods they purchase, specifying items such as place of origin, producer, ingredients and so forth. In order to meet these demands, all firms participating in food supply chains have to control their production and distribution processes in line with a variety of food hygiene and environmental standards; and they are required to record and share information certifying their compliance with the required standards.

- **Regulations established in export markets**

In addition to the demand for food safety from consumers, the increasing terrorism threat resulted in exporters to the United States having to submit detailed information to the United States Government before their products could enter the country. The Bioterrorism Act of 2002 requires domestic and foreign facilities that manufacture/process, pack, or store food for human or animal consumption in the United States to register with the Food and Drug Administration (FDA) encouraging electronic registration.

In case of the European Union, food and animal feed imported for sale in the single market has to comply with the requirements of the General Food Law (CE/178/2002). This contains general provisions on “traceability,” which is defined in ISO 8402 as the “ability to trace the history, application or location of an entity by means of recorded identifications.”

- **Free Trade Agreements with the United States and the European Union**

The Chile-U.S. and Chile-EU FTAs have already entered into force. These agreements opened the world’s two largest markets to Chile, although its industries have to compete with large firms from developed countries under equal conditions. Chilean firms are being forced to prepare for competition with the firms in the developed countries.

2.2. *Food-safety management and traceability system*

In order to meet a broad range of food products requirements, well-organized control systems and monitoring by third-party organizations are essential. In practice, there are initiatives and standards to respond to consumers’ concerns on food safety, animal welfare, environmental protection and worker health, safety and welfare. Food-related standards and regulations are being harmonized at the Codex Alimentarius Commission –the international food standard-setting organization created by the United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO).

Standards prevailing in the United States and European Union influence the behaviour of exporting countries. In the United States, Good Agricultural Practice (GAP) and Good Manufacturing Practice (GMP) set voluntary minimum standards to maintain hygiene both in farming and in packing and storage processes. The former covers production practices including growing, harvesting, handling, and transportation, while GMP primarily addresses harvesting and transportation, but also includes aspects of manufacturing such as processing and packaging.

The Hazard Analysis and Critical Control Point (HACCP) established by the United States Food and Drug Administration (FDA) is a means of assuring food safety from harvest through to consumption and aims to preempt problems. In order to accomplish this goal HACCP invokes the following seven principles: (1) Hazard analysis (HA); (2) Identify critical control points (CCP); (3) Establish preventive measures with critical limits for each control point; (4) Establish procedures to monitor the critical control points; (5) Establish corrective actions to be taken when monitoring shows that a critical limit has not been met; (6) Establish procedures to verify that the system is working properly; (7) Establish effective record-keeping to document the HACCP system. The scope of HACCP is expanding to various food industries such as low-acid canned food, seafood, juice, and the meat and poultry processing industries. HACCP has been endorsed by the Codex Alimentarius Commission and is therefore accepted internationally.

In the European Union EUREPGAP was originally an initiative by retailers belonging to the Euro-Retailer Produce Working Group (EUREP). The initiative has subsequently evolved into an equal partnership of agricultural producers and their retail customers for the purpose of developing widely accepted standards and procedures for the global certification of Good Agricultural Practices (GAP). The EUREPGAP scheme principles are premised on the following: (1) the standard is based on food safety criteria derived from the application of generic HACCP principles; (2) the standard for environmental protection, which is designed to minimize negative impacts of agricultural activity; (3) occupational health, safety and welfare, and (4) animal welfare.

To uphold these principles, the system introduced the concepts of ISO standards such as ISO 9000:2000 and EN 45011/ISO Guide 65.

Both individual farmers and farmer groups can apply for EUREPGAP Certificates and EUREPGAP Benchmarked Scheme Certificates. The Scheme applicable to Benchmarking (Applicant Scheme) is assessed for equivalence by comparing content and performance criteria against EUREPGAP. The farmer/ farmer group applying for the certifications is required to perform internal self-inspection and undergo external verification by the EUREPGAP-approved Certification Body (CB).

Traceability is recognized as an indispensable system that enables the EUREPGAP certified product to be segregated from a non-certified product, and to be traced back to the farm or group of farms from which it originated, when non-compliance is detected.

2.3. *The concept of traceability and international movements*

The concept of traceability is gradually being accepted internationally. The CODEX Committee on General Principles defined traceability/product tracing as the ability to follow the movement of a food through specified stage(s) of production, processing and distribution.

The purpose of establishing the traceability system is to take suitable corrective actions in the face of non-compliance with standards, to avoid a recurrence of the non-compliance, and to minimize economic damage by segregating the smallest possible amount of the produce and derived products. It also enables producers to improve the management of production, logistics and inventory control, and to give consumers confidence in food safety. From a practical standpoint, these requirements are enabled by using information systems.

A traceability system can be divided into “tracking” and “tracing” systems according to the kind of materials and data flows. EUREPGAP uses the following definition for tracking and tracing (EUREPGAP, General Regulations Fruit and Vegetables, Version 2.1, January 2004):

Product tracking is the capability to follow the path of a specified unit of a product through the supply chain as it moves between organizations. Products are tracked routinely for obsolescence, inventory management and logistical purposes. Within the context of EUREPGAP Fresh Fruit and Vegetables, this means tracking produce from the farmer to his immediate customer.

Product tracing is the capability to identify the origin of a particular unit and/or batch of product located within the supply chain by reference to records held upstream in the supply chain. Products are traced for purposes such as product recall and investigating complaints. Within the context of EUREPGAP Fresh Fruit and Vegetables, this means tracing produce from the farmer’s immediate customer back to the farmer and certified farm.

– *From the point of view of the user, traceability may be defined as following-up products in both a qualitative and quantitative manner within space and time.*

– *From an information management point of view, implementing a traceability system within a supply chain involves systematically associating a flow of information with a physical flow. The objective is to be able to obtain predefined information concerning batches or groups of products (also predefined) at any given moment, using one or more key identifiers.*

Traceability systems can be established within a given link, firm or plant, for the purpose of its internal management (internal traceability). In this case, the coverage of the system is restricted to within one part of the product supply chain in which the firm participates. In order to extend the system beyond the boundaries of a single enterprise, firms located at different points on the product supply chain should share information to establish “external traceability” or “chain traceability.” In practice, SMEs cannot provide consumers with significant benefits without participating in a chain traceability system.

The establishment of chain traceability will be based on data standards relating to: (i) a unique identifier giving access to all available data on the history, application or location of a traced or tracked entity; (ii) definition of the data to be captured and recorded throughout the supply chain; (iii) data linkage; and (iv) data communication. EAN International is one of the representative institutions in this field.

The EUREPGAP general regulations specify the EAN Global Location Number (GLN) as additional voluntary information that farmer/farmer group may provide when applying for EUREPGAP certification. A GLN is a number that identifies any legal, functional or physical location within a business or organizational entity. It serves as a key to retrieving information from databases such as: postal address; type of location (manufacturing centre, warehouse, sales office, corporate headquarters); region; telephone, fax numbers; contact person; bank account information; delivery requirements or restrictions.

2.4. *The framework for developing food safety management systems in Chile*

The new requirements and projects for establishing traceability systems encompass Chile's main export products such as fruits, wine and fish, and are implemented in its main export markets in North America and Europe. Chilean producers and exporters are forced to meet the new challenges. Nonetheless, between 1997 and 2002 Chile issued fewer certificates than Venezuela for ISO 9000 (quality management) or Colombia for ISO 14000 (environmental management). Public-private collaboration to attain the objectives are currently underway. As a result of the quality management programme being promoted by CORFO, the number of firms obtaining certifications (ISO 9000, ISO 14000, HACCP and others) rose from 304 in 2001 to 935 in 2003 (Jorge Rodríguez, Minister of Economic Affairs, Workshop-Seminar "Inserción internacional de las PYMES," January 2004).

Activities to develop reliable systems for ensuring the safety of produce and products can be divided into three stages: establishment of health and safety standards; standardization of data format for traceability; and development of guidelines for traceability information systems. The main initiatives in Chile for improving food safety and labour conditions are: (i) the Clean Production Agreement and (ii) Good Agricultural Practice (GAP/BPA).

(i) The Clean Production Agreement (APL)

The Clean Production Agreement (APL) is an instrument administered by the National Council for Clean Production to promote activities for environmental protection, hygiene and labour safety. It is intended as a preliminary step for firms on the road to obtaining international certifications such as ISO 9000 and ISO 14000. Moreover, efforts to minimize pollution are expected to increase competitiveness of firms in Chile. Sectors making agreements with the public sector will deploy specific measures to achieve the agreed targets within the prescribed period, and CORFO will provide financial support to implement them.

Since their inception in 1999, APLs have been concluded between the public sector and representative industrial associations, and with over 1,200 private firms from 10 sectors, including construction and chemicals (as of January 2003). Among these, the APL for implementation of GAP has been signed by 884 firms in IIIrd-VIIIth and Xth Regions. The APL for pork production was signed by 42 firms in Vth-VIIIth and Metropolitan Regions. In the Xth Region, 48 firms in the salmon sector are participating in the agreement. The wine sector also participated in the programme in 2003.

The National Policy for Clean Production 2001-2005, which was approved by the Council, involves the use of information technologies as tools to develop clean production capacities. ITs are expected to promote the transfer of clean technologies by promoting information exchange, interaction and transaction among producers and clean production networks.

(ii) Good agricultural practice (GAP/BPA)

The agricultural sector launched Good Agricultural Practice (BPA), as a programme to define Chilean standards of good agricultural practices for compliance with food safety requirements in North America and Europe. GAP in Chile is coordinated by the National Commission on Good Agricultural Practice created by the Ministry of Agriculture. Both the public and private sectors are included in the programme. The commission publishes the technical specifications of ChileGAP for the following 10 sectors: pigs, bovine meat, bovine milk, sheep, goat, laying hens, chickens, maize, potatoes, vegetables, fruits, wheat, and rice. The requirements specified by ChileGAP are equivalent to those of EUREPGAP.¹

The ChileGAP technical specifications define the minimum standards to be considered when preparing GAP programmes. The specifications for livestock farming (pigs, bovine meat, bovine milk, sheep, laying hens, and chickens) encompass (i) facilities, pest control, (ii) health management, (iii) feeding and water, (iv) animal transport, (v) animal registration and identification, (vi) animal well-being, (vii) labour conditions, (viii) environmental management. In addition to these, the specification for laying hens includes an item relating to egg handling. The specifications for maize, potatoes, vegetables, wheat and rice include (i) cultivation, (ii) use of phytosanitary products, (iii) fertilizer use, (iv) water use and management, (v) animals on the estate, (vi) transport of production, (vii) control of vectors and pests, and (viii) labour conditions. Each specification clarifies the items that farmers are required to register, along with related information.

2.5. Development of a traceability system for the fresh fruit sector in Chile

Chile's food sectors are encouraged to fulfil traceability regulations and standards developed in their main export markets. Regulatory agencies and industrial associations are also collaborating to develop the necessary regulations and design and disseminate standards. For example, the Crop and Livestock Agency (SAG) has developed a system for the registration of farmers, cattle and cattle movements (<http://www.trazabilidad.sag.gob.cl/>). EAN-Chile has developed Traceability Guidelines for pig and poultry farming. This section briefly describes activities to develop Chilean traceability systems using mainly the fresh fruit and salmon sectors as examples.

2.5.1. The fresh fruit sector

The fruit sector is one of Chile's leading export sectors. Fruit growing covered an area of 211,386 hectares in 2001, with roughly 50% of the production exported as fresh fruit. The volume of processed fruit is estimated at 25% to 30% of total output. SMEs participate in the supply chain in this sector. While large-scale farmers account for 50% of the cultivated area, small and medium-scale farmers have shares of 25% and 20% respectively.²

2.5.2. ChileGAP

Traceability will become reliable only after secure quality management has been established. Chile has introduced European models for quality management of agricultural products. In order to encourage widespread use of these models, the public sector, represented by the Ministry of Economic Affairs, Health, and Agriculture, CORFO, the National Environment Commission (CONAMA), and the National Council for Clean Production, and the private sector represented by the Fruit Producers Foundation (FEDEFruta), the Exporters Association (Asociación de Exportadores, ASOEX), together with private firms, concluded an APL in which fruit exporters made a commitment to adopt ChileGAP. As of June 11, 2003, there were 1,320 programme

¹ "ChileGAP (Version 01 Nov.2003 Rev002) has been benchmarked successfully to the EurepGAP Fruit and Vegetables Normative Document (Version Sept. 2001). Until the first Certification Body has been accredited to the ChileGAP scheme itself, growers that comply with the ChileGAP Scheme will also receive a EurepGAP certificate. Ultimately, a single certificate can be issued." Source: *ChileGAP Receives EurepGAP Recognition as Benchmarked Scheme*, EUREPGAP Latest News, August 6, 2004.

² In addition to the fruit sector, there were 116,770 hectares of vineyards producing white and red wines and pisco. Here smaller-scale farmers have a larger share: roughly 40% (medium-scale farmers account for roughly 15%). There are some 120 key players producing Chilean wines; most of them are medium-sized enterprises (ODEPA, 2002).

participants in all: 52 exporters, 71 mechanized packing firms, 287 grape packing firms, and 910 fruit orchards and producers. The technical aspects of the programme are handled by the Fruit Development Foundation (FDF), an organization that has developed GAP guidelines and manuals and offers training and advisory programmes.

2.5.3. Encoding standards for identifying the units of traded goods

Traceability is developed on the basis of information, documents, and labels that are registered, submitted, or stored in accordance with GAP specifications and those of the Crop and Livestock Agency (SAG), or prepared for the purpose of business transactions and trade-related procedures. A well-coordinated standard for encoding the data collected is essential for facilitating chain traceability electronically.

Fresh Produce Traceability (FPT) guidelines were developed in conjunction with the EuroHandelsinstitut (EHI), the European Association of Fresh Produce Importers (CIMO), the Euro Retailer Produce Working Group (EUREP), the European Union of Fruit and Vegetable Wholesale, Import and Export Trade (EUCOFEL) and the Southern Hemisphere Association of Fresh Fruit Exporters (SHAFFE). These voluntary guidelines define minimum requirements for the traceability of fresh produce, thereby providing a common approach to the tracking and tracing of fresh produce through the EAN.UCC numbering and bar coding system.

In order to track and trace products, supply chain participants have to identify at least the location from which the fresh produce originates and where it is packed and stored, together with the trade and logistic unit. For this purpose EAN.UCC prepares the following encoding systems: Global Location Number (GLN); Global Trade Item Number (GTIN); Serial Shipping Container Code (SSCC). By keeping records of the serial numbers of logistic units (SSCC), identification numbers (GTIN) attributing information on traded units and location numbers of their origin (GLN), growers and packers can provide the traceability data needed by importers/exporters and distributors, and by their customers.

2.5.4. Traceability

Traceability in the fruit sector is developed on the basis of the documents, information and labels that are required to register, submit, and store in accordance with specifications issued by ChileGAP or the Crop and Livestock Agency (SAG), or for the purpose of trade-related procedures. Record sources for tracking, which is a key element in tracing, include dispatch documents, invoices, purchase orders, packing lists and so forth, most of which are basic tools for logistics and related activities. The essential elements for tracing are mainly records kept by farmers and packing houses, which are required for registration by ChileGAP, or for submission or labelling by SAG.

In the past, some firms might have maintained this data and had capabilities to respond to enquiries, but data management in the field was not easy without automated processes and an Internet connection. Nonetheless, a generic standard is essential for assuring accuracy and precision in the records, and the efficiency of data sharing and retrieval for tracking and tracing. For this reason, the Government of Chile is collaborating with agribusinesses to promote ChileGAP, and EAN-Chile encourages voluntary use of the EAN.UCC system.

Araya (2004) summarizes the practice of traceability within the Chilean fresh fruit industry. According to his report, Chilean producers can be classified as (i) growers with their own packing facilities, or (ii) growers that pack their produce in an external pack house. The phytosanitary regulations implemented by SAG require producers to label the commercial units (cases) with the names of both the grower and the packer. They can register their own codes with SAG and the U.S. Animal and Plant Health inspection Service (APHIS) under the bilateral agreement.

GAP certification and the establishment of traceability starts by identifying the individual farm and orchard in order to certificate produce origin. For this purpose, each farm or orchard obtains its identification registered with SAG. Farmers can use the GLN code provided by EAN-Chile. Farmers with BPA certification have to indicate such identification in every orchard.

Each orchard is divided into “blocks,” and each block is segmented into “plots.” Plots are planted areas normally bounded by internal roads or borders. At the farming stage, traceability is implemented by each block, which is defined as a group of plots with the same cultivar and similar handling or management. Farmers are required to register in their “field log book” all of the activities implemented in a farm such as hygiene, pesticides, fertilization, irrigation, and so forth.

A similar system to that used on farms is applied to the packing process. Each field packing and packing house needs to be registered with SAG and can use the GLN code voluntarily. The packing log book is used to record all the process controls carried out in packing facilities. In addition, the Chilean Exporters Association (ASOEX) uses standard labeling. The information labeled on cases such as variety, caliber, size, pack date, name of grower and packer, lot number and box number, facilitates logistics and traceability management. Exporters also use their own system with identification, unique numbers and bar codes for pallet management.

2.6. *Development of a platform for food traceability*

The technologies and information for traceability need to be accessible to both producers and consumers, enabling them to handle data efficiently and enhance its credibility. Nonetheless, only some of the large firms have established internal systems for this purpose. Except for industries that consist of large vertically integrated firms, one of the urgent issues is to build platforms that are available to SMEs at low cost. The development of web-based systems is one way to meet these requirements and regulations on food safety in the European Union, Japan, and the United States.

In practice, there are private Chilean firms offering IT solutions for traceability. Collective action also complements the IT service offered by private IT firms. “TrazaChile” was launched in July 2004 by the National Chamber of Commerce, Services and Tourism (CNC) and Fundación Chile, which is an autonomous, non-profit foundation that promotes innovation and technology transfer in areas such as agribusiness, forestry and fishing. These two institutions invested US\$ 5 million to form a corporation known as TrazaChile and to develop and operate the site. The system is developed on the basis of ORACLE technology in cooperation with EAN-Chile. It allows for online access to historical information on exported products. The site targets producers, exporters and input suppliers, mainly in the wine, fruit, marine product and meat sectors. Following trials with three firms, the website will be fully operational as from the final quarter of 2004.

3. **Case 2: Development of the software and IT service sectors**

The IT industry in Chile is new and still small. Development of the IT industry is one of Chile’s policy priorities with the advent of the information society and use of IT applications for social and economic development.

3.1. *Recent conditions of the software and IT service sectors in Chile*

3.1.1. **Characteristics of the IT sector in Chile**

Indicators on the IT industry in Chile are scarce. The Chilean IT Companies Association (ACTI) provides time-series data on sales and the number of employees since 1989, while more detailed information on the characteristics of the sector are obtained from surveys such as Chile Innova (2003) implemented by Ministry of Economic Affairs, along with governmental institutions (CORFO, INTEC) and the Santiago Chamber of Commerce (CCS); and two surveys by the Chilean Software Firm Group (GECHS) in 2002 and 2003 that only covered its affiliate enterprises.

The survey conducted by Chile Innova includes the largest sample in 2002, comprising 500 IT enterprises drawn from a universe of 1,871 firms in the Vth, VIIIth and Metropolitan Regions. In that year, 2,084 IT firms were identified. The largest IT cluster exists in Metropolitan Region, consisting of 1,634 firms, followed by a 149-firm cluster in the Vth Region.

Most participants in the IT sector are domestic microenterprises (1-9 employees) and small firms (10-49 employees); 88% of them were either microenterprises (44%) or small firms (44%). Roughly 4.6% of their capital originated in foreign countries. About 40% of firms started up between 1995 and 1999, and 22.4% in the early 1990s. Business promotion has slowed down in the twenty-first century, and 18.3% of existing firms were participating in the market in 2000-2002.

The main activities of Chilean IT firms relate to services and software, which account for 56% and 24% of the total respectively. Using more detailed categories, 22.4% of the sample firms claimed to be involved in software and applications development and engineering. Other key activities include hardware imports and sales (16.7%), website design (13.8%), consulting on computerization and data processing (10.6%), support, maintenance, and repair of equipment (6.9%), and electric and electronic engineering (6.6%).

The number of workers employed by the sample firms permanently exceeded 50,000, with 68% working in medium-sized and large firms, 26% in small firms and 7% in microenterprises. A further 8,400 workers were employed by the sector on a temporary basis. These figures mean that each firm employs an average of 27 permanent workers. The average number of workers was four for microenterprises, 16 for small firms and 153 for medium-sized and large enterprises.

The main customer segments for software firms affiliated to GECHS were medium-sized and large firms in the service and public sectors. A smaller percentage of software firms targeted export markets, such as the agriculture, fishery, forestry and mining sectors.

3.2.2. Exports of software and services

The IT firms surveyed by Chile Innova (2003) were mainly serving the domestic market, and just 17% of them declared exports. In the software sector, 12.3% of firms were exporting, particularly in the commercial software area (28.7%). In the service sector, 11.2% of firms exported services such as automation (25.7%). In the hardware segment, only 4.0% of firms registered exports, while firms selling peripherals, printing, and security equipment did not operate in the foreign market.

Apart from the low percentage of firms selling to foreign markets, export earnings accounted for just 3.6% of total sales. Exports were most important among small firms (5.1%), while microenterprises and medium-sized and large firms made 2.0% and 3.7% of their sales abroad, respectively.

A similar situation was noted by GECHS (2003). Total annual sales by software firms in 2003 amounted to US\$ 19,670,000 in the domestic market and US\$ 895,000 internationally (4.4% of the total). The main export destination was Peru, where 12% of the firms achieved 21-40% of their international sales. Central America and other South American countries apart from Brazil were also important markets. Apart from the South American region, some of the firms succeeded in penetrating the European market.

3.2. Comparative advantages and disadvantages

According to Chile Innova (2003), the key advantages that Chile requires in order to develop its IT industry include economic stability, access to the international market, and communications infrastructure. Human resources and geographic location were recognized as disadvantages.

The AT Kearney 2004 Offshore Location Attractiveness Index demonstrates comparative advantage/disadvantage for the IT sector in Chile. The 25 countries selected were evaluated from the three major standpoints: financial structure, people skills and availability, and business environment. Although Chile can offer one of the best business environments in Asia and Latin America, its people's skill and availability is the worst in the two regions. The low valuation of the labour force is caused by less business process outsourcing (BPO) experience, small size and less availability of labour, compounded by inferior education (lower scores on standardized

education and language tests). High remuneration costs, including average wages, also detracted from the assessment of the financial environment.

The barriers perceived by software firms entering the foreign market relate to marketing, product quality and internal management. In order to improve competitiveness in international markets, firms have recognized the need to strengthen capacities in terms of marketing, financing, management and infrastructure availability. Efforts to obtaining quality certifications are in an early phase; only 4% of respondents obtained the Capability Maturity Model for Software (CMM or SW-CMM) and ISO, but about 30% of them were endeavouring to achieve them (GECHS, 2003).

Based on the observations made above, the advantages and disadvantages of the IT sector and barriers to foreign market entry be summarized as follows:

- Advantages: Good macroeconomic conditions; Free trade agreements; Secure and widespread telecommunications and IT infrastructure; and Labour force quality.
- Disadvantages: Weak foundation of skilled IT engineers and the IT sector; Geographic location; High labour cost; and Poor R&D personnel and budget.
- Barriers: Financing; Marketing; and Product quality / quality certifications

3.3. *Agenda Digital: National vision and strategy for developing the software sector*

Agenda Digital 2004-2006 (Grupo de Acción Digital, 2004) is the latest medium-term plan for developing the digital economy presented in February 2004 by the Digital Action Group (GAD), an organization set up by government institutions, private firms, and the academic sector. The result of this effort is a national strategy broadly agreed upon by the public-private sector, which includes initiatives to achieve IT industry take-off for 2004-2006 (Initiative 25-30, table 5).

These proposed initiatives are being implemented with strong support. The Chilean Economic Development Agency (CORFO) has established programmes such as the High Technology Investment Programme, and it grants varied financial support to promote FDI, R&D and venture businesses. The Internal Revenue Service (SII) provides tax incentives, the details of which are described in other sections of this report.

In order to facilitate the acquisition of certification, CORFO has launched a programme to support IT firms in cooperation with industrial associations and technology transfer entities such as ACTI, the Electric and Electronic Industry Association (AIE), Fundación Chile, GECHS, and SPIN-Chile. CORFO will finance 50-60% of the costs of consulting and other measures needed for IT firms to satisfy the certification criteria. As of 21 July 2004, CORFO had already provided support to 23 firms that began work to achieve ISO 9000 and CMM Level 2. The Government will support 60-80 local IT firms through the programme during 2005 (CORFO and Business News Americas, 20 July 2004).

3.4. *Development of the software cluster in Valparaíso*

Regional development is an important issue for developing countries. In Chile, CORFO promotes the TodoChile programme which aims to attract investment to Chilean regions and to encourage decentralization, taking into account existing industrial bases and comparative advantages in each region. In Chile, Valparaíso is designated as a policy priority area to develop an IT cluster with comparative advantages against over competitors. Initiatives are encouraged from local universities, national and regional governments and the private sector.

3.4.1. Bases for development of the IT cluster

Construction of the software sector is seen as a key area at this time for industrial development at the national and regional levels. As noted above, companies in the IT sector are concentrated in Santiago, while the Vth Region has the second largest IT sector accommodating less than 10% of the firms. Moreover, the academic base in Valparaíso is expected to enable

businesses to accept and create new technologies and firms. A number of academic institutions are also located in the area, such as Universidad Tecnica Federico Santa María (UTFSM), Pontificia Universidad Católica de Valparaíso (UCV), Universidad de Playa Ancha (UPLA), and Universidad de Valparaíso (UV).

Valparaíso and its surrounding area have been identified by the Government as a potential location for IT development outside the Metropolitan Region. When a team from Intel Corporation, a semi-conductor manufacturer, visited Chile in 1996 to select a site for its new plant in Latin America, “CORFO was authorized to offer incentives if the investment were to be located in an especially poor region of the country in need of economic development. CORFO officials went so far as to suggest a location for the Intel plant that would meet such criteria, a poor region of Chile not far from Valparaíso” (Nelson, 1999).

Nonetheless, the educational environment and human resources in Valparaíso are not necessarily satisfactory for establishing an IT cluster. In the Vth Region, there are only two doctoral programmes in science and the number of doctoral students is under 6% of the national total. The Vth Region’s share of PhD scholarships is less than those of the VIIIth and Xth Regions (Neely, 2003). Postgraduate education in information and electrical engineering is concentrated mainly in UTFSM. The weakness of the R&D sector will be a bottleneck for IT sector development.

Efforts to form an IT cluster in Valparaíso have been boosted by R&D and business promotion activities in universities such as 3IE of UTFSM, and by taking the opportunities afforded by a policy suggestion by the Japan International Cooperation Agency (JICA, 2001) and Plan Valparaíso.

3.4.2. A policy suggestion by JICA (2001)

The JICA study team judged that most IT enterprises in Chile are categorized not as “Pure IT firms,” which are knowledge-intensive, develop core software technology and export their products and services; but as “IT Solution Providers,” which develop solution services from core technologies. The limited human resources and weakness in the field of IT and R&D will force the Chilean IT sector to remain in the category of “IT Solution Providers” for the next five years, as preliminary path towards the development of indigenous “Pure IT Companies.”

The outlook for the IT industry in Valparaíso is similar to the present situation at the national level. The focus for IT firms in Valparaíso will be as IT solution-providers for other industries and other countries. In order to maintain and improve their competitiveness as IT solution providers, they need to maintain constant R&D for the purpose of commercialization and establishing export-oriented businesses. The JICA study team also suggested a strategy and action plans for developing the IT sector in Valparaíso, including the establishment of the IT Development Centre, the IT Special Zone, and the Science and Technology Park for R&D (table 4).

The IT Development Centre could be a self-financed non-profit organization with partners from the public and private sectors and universities. It will aim to: (i) promote collaboration between market players; (ii) strengthen R&D by integrating CONYCIT and CORFO schemes and allocating resources from government support programmes in accordance with the R&D priorities decided by the Centre; and (iii) provide infrastructure and services for IT business, such as data centre, business support for SMEs, and other commercial services such as Internet Service Provider (ISP) and IT training.

TABLE 4
STRATEGIES AND ACTIONS FOR DEVELOPING THE IT INDUSTRY IN VALPARAÍSO,
AS PROPOSED BY THE JICA STUDY TEAM

Strategy		Action plans
Vision for the future	Clarification of vision of Valparaíso as an IT city	Establish and IT Charter (declaration aimed at becoming a world-level IT city) with participation from all stakeholders
Strengthen R&D	Improve public support	Valparaíso Investor Relations (IR) New incentives for R&D expenditure Restructure public support programme: autonomy, localization and direction and priority under the IT Development Centre National Innovation System
	Good IT environment	Establishment of Science & Technology Park Improve infrastructure
	Attract MNCs (especially R&D department)	Establishment of a Science & Technology Park New incentives for multinational corporations (MNCs)
Foster export-oriented business	Stimulate IT companies' motivation and support	New incentives for export business
	Support IT companies' activities	Establishment of IT Development Centre
	Promotion of IT industry to overseas	Valparaíso Investor Relations (IR) Strategic Sister Cities
Improve IT environment and its competitiveness	Good IT environment	Establishment of Science & Technology Park, IT Special Zone Improve infrastructure Increase human resources supply Establishment of a specialist court for IT issues Improve living conditions Financial incentives and support
	Good human resources	Increase human resources supply
	Give support to entrepreneurs	Establishment of incubation centres
Increase in business opportunities	Demand-side approach	IT training by IT Development Centre E-government at provincial and municipal levels Close the digital divide
	Improve infrastructure	Good connection between Valparaíso and Santiago Develop broadband infrastructure

Source: JICA, 2001.

3.4.3. ICT Centre Valparaíso (ICT2) Project

There were difficulties in the process of formulating a project to attain the goals of the IT Development Centre mentioned by the JICA study team (2001) and the high-tech hub in Plan Valparaíso. Recently the concept has been implemented as the ICT2 project, while the original project to develop an IT Centre in Valparaíso has been renamed CITIC.

(1) CITIC

Following the JICA study (2001), the ICT Research and Application Centre (CITIC) project was planned to establish a national and international reference centre for R&D in IT products and services.

According to the CITIC project plan, its mission is to be a high technology centre in the ICT field specializing in the following: research, development and customization of products; human resources training; knowledge transfer; coordination of university-governmental initiatives aimed

at transforming innovation into commercial value; and technology transfer to Latin America. The Centre is also expected to strengthen and develop the ICT sector in the Valparaíso Region, turning it into a national reference centre in the short-term and a reference centre for Latin America in the ICT field in the medium-term.

The project was expected to be financed by the Vth Region and CONICYT (National Scientific and Technological Research Commission). A contribution from the Government of Japan through JICA was also expected for the following activities: participation of long-term and short-term Japanese experts in the planned R&D activities; human resource training including internships for young CITIC researchers' in Japanese universities.

(2) ICT2

Although the concept of the CITIC is being developed through intensive collaboration by the Government, universities, and JICA, the first project proposal failed to be endorsed in 2002. Attempts to revise the proposal were continued.

During the process of revising the project, two major changes were made to the original framework. Firstly, CONICYT took over responsibility for the project, although CORFO and its relevant body, the Technological Research Corporation (INTEC), had played a leading role in developing the initial proposal. Secondly, efforts were made to find the priority area for R&D at the Centre. In order to develop the project, in 2003 CONICYT issued a public call for proposals for an “Advanced Centre in Information and Communication Technology in Valparaíso”. Universities mainly from the Vth Region organized a joint venture to submit a second proposal entitled “ICT2.” This process was approved in 2004 following a few revisions.

As of 2004, the status of the ICT2 project can be summarized as follows:

- Financial contribution: Regional Government in the Vth Region CONICYT/ FONDEF (Fund for Scientific and Technological Development)
- International assistance: JICA
- Universities: UTFSM, Universidad de Chile, Universidad de Católica de Valparaíso, Universidad de Valparaíso, Universidad de Playa Ancha, Universidad de Viña del Mar, and Universidad de Mar.

The project will be financed by the national and regional governments of Chile and the private and academic sectors in the region. The Government of the Valparaíso Region and CONICYT will provide CH\$ 200 million in funding over a 5-year span (up to CH\$ 400 million in total during the five years following the project's launch). As CONICYT required the applicants to prepare budget plans, to which the private sector would contribute at least 20% of the total project budget, the universities and associations are expected to make investments of about CH\$ 266 million.

In addition, JICA is planning to provide the required inputs, mainly by sending experts and training Chilean experts in Japan, intensively during the first two phases of the project. If the project is unable to achieve the expected result, JICA will not provide further assistance to the Centre.

As a result of the revisions to the proposal, traceability was identified as an area in which Chile may potentially have a comparative advantage, the beneficiaries being mainly SMEs. For the first two years after its launch, the center will focus on R&D and products development in the field of traceability, involving such projects as embedded systems and Radio Frequency Identification (RFID). However, it is expected that the subject of R&D will be more focused after recruiting a director of the center. In order to facilitate the project, JICA will request support from Auto-ID Labs Japan. It is JICA's plan to hold the first training session at Auto-ID Labs Japan and dispatch short-term specialists from the Labs within the fiscal year 2005.

The centre will consist of 20-30 researchers. The ICT2 project will be operated at 3IE of UTFSM at first, before relocating to the Technological Building in Valparaíso after mid-2005. This building is being constructed by CORFO in the Curauma Industrial Park located 12 km from Valparaíso along Route 68. Construction will be completed in April 2005. CORFO appears to see the building as a base for encouraging IT businesses, and to meet the prospective increase in demand for spaces by high-tech companies that will be attracted to the Vth Region by CORFO's High Technology Investment Programme.

IV. Government policies designed for SMEs, IT, and international trade

A. IT POLICIES IN THE COUNTRY'S OVERALL DEVELOPMENT STRATEGY

Agenda Digital 2004-2006 (Grupo de Acción Digital, 2004) is the latest medium-term plan for developing the digital economy. Drafting began in April 2003 and it was presented in February 2004 by the Digital Action Group (GAD), which was organized by government institutions, private firms, the academic sector and other governmental institutions. The result of this endeavour is a national strategy enjoying broad consensus among the public-private sector, with a view to the bicentenary celebration in 2010.

Agenda Digital proposes that Chile will be a digitally developed country, ranked at the level of OECD member States, by the time of the bicentenary. This means that:

- it will be equipped with solid and secure broadband infrastructure, available nationwide and accessible to all people from their homes, work places, or a network of infocentres and cyber cafés.
- it will have digitally literate population and a workforce with skills for better IT usage.
- it will provide online services for the citizen, with Government, congress, the judiciary, and both regional and municipal authorities all contributing to digital development from their different perspectives.
- it will expand enterprise connectivity to the network, or intensify advanced use of the Internet in businesses, including highly developed electronic commerce.
- it will attain a critical mass of IT firms capable of competing internationally.
- It will be equipped with a modern legal-regulatory framework that facilitates development of the information society, assuring freedom of expression, democracy, transparency, and access to knowledge and culture, such as protection of the rights of creators, innovators, entrepreneurs, employees and consumers.

In order to accomplish the six objectives for 2010, an action plan was developed. *Agenda Digital 2004-2006* includes 34 initiatives, which can be grouped into six action areas: (i) access; (ii) education and training; (iii) e-government; (iv) computerization of firms; and (v) IT industry; and (vi) legal-regulatory framework.

TABLE 5
INITIATIVES IN 2004-2006

WIDELY AVAILABLE ACCESS

- 1 Consolidation of the means to facilitate individual and community broadband access for all Chileans.
- 2 Promotion of Infocentres as service centres.
- 3 900,000 households and 150,000 businesses connected to the Internet by 2006.

EDUCATION AND TRAINING

- 4 Digital literacy for half a million Chileans.
 - 5 Launching of IT skills certification.
 - 6 Promotion of connected and equipped schools.
 - 7 Integration of IT into curricula.
-
- 8 Fostering technical/professional IT training.
 - 9 Promotion of world-class content.
 - 10 Command of basic and instrumental English for all schools.

ONLINE GOVERNMENT

- 11 Integrated electronic services platform.
- 12 Broadband digital network for the public sector (Ruta 5D).
- 13 Electronic platform for *Chile Solidario* and social policies.
- 14 Development of digital technologies in the health sector.
- 15 Digital development of regional governments and municipalities.
- 16 Increase in the measurement and efficiency of government information technology spending.
- 17 Improvement of the security of essential information structures for the public sector.

DIGITAL DEVELOPMENT FOR BUSINESSES

- 18 Widespread use of electronic invoicing.
- 19 Consolidation and expansion of the use of ChileCompra.
- 20 Simplification and online installation of business transactions.
- 21 Electronic billing for fees and online initiation of activities.
- 22 Development of payment means for e-commerce and consolidation of the Government's payment portal.
- 23 Single window and marketplace for international trade.
- 24 Increased adoption of development instruments.

IT INDUSTRY TAKE-OFF

- 25 Identification of opportunities and focusing of efforts for the development of the IT industry.
- 26 Quality assurance through company certification.
- 27 Intensification of the High-tech Foreign Investment Attraction Programme.
- 28 Heightened promotion of IT Research and Development.
- 29 Facilitation of the IT industry export process.
- 30 Financing for enterprise creation and start-up.

LEGAL FRAMEWORK

- 31 Removal of obstacles and promotion of electronic document and electronic signature.
 - 32 Right of execution of e-invoicing.
 - 33 E-commerce consumer rights.
 - 34 Upgrading of legislation to protect intellectual property.
-

Source: Agenda Digital 2004-2006.

B. POLICIES TO SUPPORT SMEs

At least six ministries with their agencies (Agriculture, Economy, Education, Finance, Foreign Affairs, Labor) are involved in SME policy in conjunction with the private sector. As over 100 instruments have been introduced for SME development, according to Berry (2002), it is therefore redundant to explain the entire framework of SME development policy.

This report focuses on IT policies, export promotion, and business development. Two government institutions play key roles in this field. PROCHILE contributes to diversifying exports

of Chilean products and services, provides export sectors with information, and supports Chilean firms in their contacts with potential purchasers abroad. CORFO is in charge of financial instruments for economic development.

1. Export promotion

PROCHILE has a policy package to expand and enforce the Chilean exporter base. The institution provides various support services to firms with potential and existing exports according to their development stages. This kind of support includes information service, capacity building, consultancy, and marketing service.

The Government of Chile also provides export incentives. One of the policy instruments consists of tax incentives that can be applied by exporters regardless of business size. The other consists of credit instruments.

The export promotion policy and instruments referred to here do not necessarily target IT products and services alone. The promotion of IT exports forms part of the policy for FDI promotion and high-tech industry development, which will be discussed below.

2. Trade facilitation

The concept of trade facilitation is not always well defined but generally encompasses a broad range of attempts to make trade easier. From the trader's perspective, trade facilitation relates to the entire trade chain encompassing order/preparation, transport, customs and payment handled by both the private and the public sectors (National Board of Trade of Sweden, 2003). Trade facilitation requires reform of the institutional framework for simplification, standardization and uniformity of procedures throughout the trade chain. Implementation of the reform will be made feasible or more efficient by effective use of standardized technologies.

From the Chilean standpoint, the country has the most sophisticated physical infrastructures in Latin America. For example, Santiago has won high marks for its airport service, in addition to low cost of living and security. In the case of tariff negotiation, Chile has promoted both Economic Complementarity Agreements (ECAs) and Free Trade Agreements (FTAs). As a result, Chile's tariff schedule is not necessarily uniform and easily comprehensible. Customs duties faced by importers of Chilean products depend on the provisions of the tariff reduction schedule in each agreement.

For the purpose of trade facilitation, the public and private sectors in Chile have introduced IT systems for each sector under the Public-Private Partnership framework.

- **Tariffs:** CCS and PROCHILE are building a website entitled *Aranceles* [Tariffs], which contains a database of trade agreements. Users can search for information such as tariff codes, tariff reduction schedules, rules of origin and the chapters of each agreement, which are associated with tariff codes.
- **Certification of origin:** The Federation of Chilean Industry (SOFOFA), the main private certifying agency, has streamlined the certification process to the point where it is now fully computerized (Izam, 2003). It also offers procedures for certification of origin via the Internet.
- **Customs:** The National Customs Service is implementing a project to integrate Internet systems for the development of customs operations and regulations (ISIDORA). This will introduce XML and web technologies to modernize customs information systems.
- **Port logistics:** The Port of Valparaíso, for example, has introduced online services for logistics and shipping planning. Its logistics service is provided by Valparaíso Logistic Trade (VLT), which is a strategic partnership between the Port Valparaíso, the Association of Fresh Fruit Exporters (ASOEX), Rutacert (a logistics information service provider), and

TPS (Terminal Pacifico Sur Valparaíso). The VLT website serves as a portal for port logistics in Valparaíso. Users can monitor movements of vehicles through the Rutacert system. They can also trace cargos in the port and make plans to dispatch trucks to the port.

- **Online service (CCS):** the Santiago Chamber of Commerce (CCS) has developed online services that represent information infrastructure for international trade:
 - Comexonline: Database on international trade.
 - E-certchile: Digital Certificate Authority.
 - Movimiento Marítimo Aéreo: Publication of the itinerary of maritime and air cargos operated by the leading firms in Chile, to assist shipment planning.
 - Rutacert: Vehicle monitoring system that enables users to access positional information certified by CCS and to improve fleet dispatch control (rutacert.cl).
- **Portal Comex Online CCS:** This CCS portal site mainly provides its subscribers and members with information and services relating to the foreign trade library; database access services; support services; and international business (<http://www.portalcomexccs.cl/>).

3. FDI promotion

FDI promotion is handled by the Foreign Investment Committee, while the Internal Revenue Service (SII) has jurisdiction over the tax incentives and the main policy instruments, and CORFO promotes the development of SMEs and the high-tech industry.

The *TodoChile* programme

TodoChile is a CORFO programme to attract investments to Chile's regions and encourage decentralization. The programme provides a number of additional incentives for investment outside Santiago, depending on the project stage: feasibility study; financing; operation; export; and expansion.

High Technology Investment Programme

In 2000 CORFO introduced a programme of special incentives for investments in high-technology projects, targeting those in which foreign companies act either individually or in a consortium. Projects have to comply with two basic requirements: (a) they develop new projects in high technology; and (b) they must involve investments of at least US\$ 1 million.

The program targets sectors that support the development of or use new technologies, such as: (i) software production; (ii) production of equipment and components for information processing and transmission; (iii) IT enabled services; (iv) production and dissemination of multimedia content; (v) biotechnology and pharmaceutical products; and (vi) production of new materials.

Regional Investment Platform

This initiative aims to make Chile the main regional business centre for multinational companies operating in Latin America, by encouraging foreign investors who are attracted by Chile's stability and business environment to use the country as a base from which to export or provide services to other Latin American markets.

For this purpose, a law was passed in November 2002 to create a special tax system (Article 41D Law No. 19840). Under this tax system, Chile-based companies in which foreign investors have a stake are exempt from tax on the earnings generated by their subsidiaries in third countries.

4. Business promotion

4.1. *Basic framework for the business promotion policy*

Policies to promote new businesses encompass a wide range of issues including R&D promotion, promotion of new business, development of the high-tech industry, upgrading of existing sectors, formation and expansion of industrial clusters, finance, and so forth. Policy implementation therefore involves a variety of entities such as Ministries and other governmental agencies, business organizations, universities, and NGOs.

In the government sector, one of the missions of the Ministry of Education is human resource development with advanced academic degrees. The National Scientific and Technological Research Commission (CONICYT) is the representative institution in charge of the national R&D policy, and instruments such as Fund for Scientific and Technological Development (FONDEF) and the National Fund for Scientific and Technological Development (FONDECYT).

CORFO is responsible for financial instruments to promote business development. The Technical Cooperation Service (SERCOTEC) is a State institution, whose mission is to support initiatives to improve SME competitiveness and strengthen their management capacities. The other organization that makes an important contribution to technology transfer and human resource development is Fundación Chile, which is an autonomous, non-profit foundation aimed at promoting innovation and technology transfer in areas such as agribusiness, forestry and fishing.

4.2. *Incubation business policy*

As the universities are responsible for more than 40% of total R&D expenditures, with a further 40% contributed by the Government and just 15% by the private sector, new businesses are expected to emerge as a result of technology transfers mainly from the universities. – Incubation businesses play key roles as an interface between these sectors and entrepreneurs. The Government of Chile and other public and private institutions provide incubation and venture businesses with support tools that include access to various funding sources depending on their development stages.

Incubation businesses are relatively new to Chile. The Physics and Mathematics Faculty of the University of Chile established EmpresaNet (now known as Access Nova), and the first incubation for high-tech businesses were created in 1996 with financial assistance from CORFO's FDI. Incubations now are established mainly by universities (Universidad del Bío-Bío, Universidad Católica de la Santísima Concepción, Universidad de Concepción, Universidad de Chile, Universidad Técnica Federico Santa María, Pontificia Universidad Católica de Chile, Universidad de Talca, Universidad de la Frontera, Universidad Adolfo Ibáñez) and municipalities (Santiago, Rancagua). CORFO provided these incubations with financial assistances.

C. SPECIAL MEASURES TO CORRECT THE DIGITAL DIVIDE BETWEEN FIRMS

Policy tools for closing digital divide between firms have focused on various issues, including the introduction of computer and other equipment, software, Internet connection, and capacity building. For this reason, in addition to educational institutions such as universities, technical schools, and training centres, private firms and nonprofit organizations, a number of Ministries and other government institutions are involved in policy implementation. Individuals are also sometimes included as targets of corrective actions for digital divides between smaller firms, along with their entrepreneurs and employees.

1. Human resources

SENCE

SENCE runs a tax incentive scheme for company-based training, i.e. for firms that directly provide or contract registered providers to develop training programmes for their workers (World Bank, 2004). The training system has two components. Tax exemption is the main legal instrument for promoting labour training programmes in firms. The system allows companies to deduct the costs incurred in training their workforce from their annual taxable income, up to a maximum of 1% of their total payroll, or more in case of small firms. The National Training Fund (FONCAP) finances actions to train workers, managers, and entrepreneurs in small firms.

The SENCE incentive scheme is widely used by SMEs, which account for more than 70% of the total number of firms using SENCE but less than 25% of the total expenditure on capacity building (Román, 2003). The training of workers in IT is a strategically important area for SENCE. The Service has been developing e-learning courses since 2003, and also supports implementation of the Digital Literacy campaign.

Digital Literacy

In 2003, the Ministry of Education launched the Digital Literacy Campaign. This aims to provide 500,000 people over 15 years of age and not studying in the education system (especially workers, entrepreneurs of microenterprises, and housewives) with practical training in IT through the National Infocentre network and other training centres operated by ENLACES (the Chilean school network), BiblioRedes (Library network), SENCE, etc. The curriculum includes basic computer use, word processor, e-mail, and the Internet. According to Agenda Digital 2004-2006, the Ministry of Education intends to train 121,000 people in 2003, 203,700 in 2004, and 175,300 in 2005.

2. Technical aspects

Technical Cooperation Service (Sercotec)

The Chilean Technical Cooperation Service (SERCOTEC) is a State institute whose mission is to support and fund initiatives to improve the competitiveness of microenterprises and small firms and to strengthen the management capacities of their entrepreneurs. The service works primarily in the development of tourism, small-scale fishing, wood and furniture production, retail trade and crafts. For this purpose, SERCOTEC runs a variety of programmes to increase entrepreneurial association, improve conditions in the business environment, increase their share of sales and take advantage of new business opportunities.

In the IT field, SERCOTEC established infocentre networks for microenterprises and small firms nationwide, in alliance with the Solidarity and Social Investment Fund (FOSIS) in order to reduce the digital divide between firms. The Service operates 95 infocentres mainly in the Vth Region (14 centres), the VIII Region (19) and the Metropolitan Region (17), where workers in small firms are concentrated; and it provides IT training courses in the Digital Literacy Programme (Programa Nacional de Infocentros, 2004). In addition, SERCOTEC is creating a portal entitled “Redsercotec,” through which the centre provides supports for improving the competitiveness of microenterprises and small businesses. Registered users can consult with professionals from SERCOTEC and other institutions through the portal.

National productivity and quality centre (ChileCalidad)

ChileCalidad was established in 1994 to provide firms and organizations with technical assistance and training for management innovation. The challenge facing the centre is to enhance SME competitiveness by introducing international standards for management systems. Demand is increasing after the negotiation of FTAs with Europe and the United States.

To this end, in the field of quality management standards, ChileCalidad has been providing technical assistance to SME projects that are partly subsidized by CORFO since 2002, aiming to

implement quality management standards. The programme beneficiaries are SMEs working for certification under ISO 9000, ISO 14000, HACCP, GAP and other standards.

3. Infocentres

Universal access to telecommunications services and IT is a major policy issue in developing countries. One of the most important actions to counter this situation involves building a network of public infocentres, equipped with computer, printer, scanner, photocopy machine, and fax in order to provide services including Internet connection and training in computer use.

The number of infocentres in Chile has grown rapidly over the last few years: in October 2001, there were 160 infocentres; and the number rose from about 190 in July 2002 to over 1,100. As of June 2004, there were 764 infocentres across the country. These were established by government institutions, NGOs, and others. The main infocentre networks are operated by public institutions such as ENLACES, the Libraries, Archives and Museums Office (DIBAM), National Youth Institute (INJUV), and SERCOTEC.

The Chilean Government has implemented a well-coordinated policy to enable rural and low-income urban residents to access the basic public telephone service by providing subsidies through the Telecommunications Development Fund (FDT I). The Government published a new law for FDT II (Law No. 19,724 of 2001) in order to promote an increase in the coverage of the telecommunications service in low-income areas. The fund subsidizes projects to provide telecommunications services such as public phones and community infocentres (Wellenius, 2002 and World Bank, 2004).

D. E-GOVERNMENT TARGETING SMEs AND TRADE PROMOTION

1. Overall strategy/structure of e-government

The Electronic Government Agenda 2002-2005 includes plans, programmes, and activities that are achievable during the current administration led by President Ricardo Lagos. The activities involved in the Agenda are included in the project for Government Reform and Modernization. From this standpoint, the comprehensive incorporation of IT in the government administration system has various objectives, including quality of service; efficiency; transparency; participation; leadership in IT usage; and international competitiveness.

2. E-government applications for corporate service

Chilean Ministries and other governmental institutions have already set up IT systems to provide people and firms with information on this public service, together with the necessary procedures, document formats, and online procedures. According to Agenda Digital 2004-2006, there were 239 portals of ministries and public services in operation, and more than 170 procedures and online services were available. In order to encourage use of these IT-based services and facilitate access to necessary information and services, the Government of Chile established the *Trámite Fácil* Portal. In the business-related area, the Ministry of Economic Affairs designed a single window entitled “Sitioempresa,” which provides public information and procedures relevant to business activities.

From such online public services, several projects that are used relatively often by firms and individuals, or were launched recently, are mentioned below:

a. E-procurement (*ChileCompra*)

The public procurement project “ChileCompra” aims to put all public procurement by public agencies online. Annual business is worth about US\$ 2.5 billion, involving 200,000 central government transactions.

In 2003, ChileCompra handled 50% of all tenders for public procurement and investment, worth US\$ 1.3 billion. The number of transactions channeled through the portal rose to 108,000 to account for 54% of the total. The Government achieved a 7% cost saving.

As of March 2004, 64,000 suppliers were registered with the system, most of which are SMEs (microenterprises: 73%, small: 19%, medium: 6%, large: 2%). Registered suppliers represent 21% of all firms in Chile: by firm size, 27% of large firms, 20% of medium, and 12% of small firms are listed as suppliers.

ChileCompra is expected to result in explosive spread of e-commerce among SMEs. The Santiago Chamber of Commerce (CCS) estimates that B2B transactions in Chile will grow from US\$ 3.32 billion in 2003 to US\$ 5.757 billion in 2004. ChileCompra will handle 23% of total B2B, compared to 5% in 2003. As a result, the online sales penetration rate among Chilean firms will rise from 11% to 27%.

b. *Single window for External Trade*

The Single Window for External Trade initiative began with the aim of enabling participants in trade value chains to complete all trade-related procedures electronically through the Internet. The single window system allows traders to submit information to just one organization, or with “one click”, through the Internet in order to fulfill all regulatory requirements for exports and imports.

The Ministry of Economic Affairs, which is in charge of the single window system for firms, and the National Customs Service promote coordination for development and implementation of the initiative among 18 public institutions with different roles, in a series of actions relating to authorization and control of exports and imports. Among these, eight institutions³ involved in the initiative reflect private-sector demands for simplification of trade procedures covering 96% of all operations. Some projects to establish interconnection and data interchange between information systems among customs and other public institutions are also underway in 2004, and further progress is expected in 2005.

c. *Tax Declaration*

The tax declaration service, which is run by SII, is one of the most widely used e-government services. During the 2004 declaration period (April-May), 1,663,720 income-tax declarations, equivalent to 83% of the total, were submitted via the Internet. The proportion of declarations submitted in this has grown from 5% in 1999, to 55% in 2002 and 70% in 2003. The SII target is to receive 100% of declarations online.

d. *Electronic Invoice*

The Electronic Invoice was trialed during the second half of 2002 by the eight large firms that had already completed the pilot phase. The system enables taxpayers authorized by the SII to issue electronic invoices, which can be used for credit and debit notes. Users assume obligations, such as having to store purchase and sales ledger information in the electronic format specified by SII. The digitization of invoices simplifies tax payment procedures and reduces errors. The Santiago Chamber of Commerce has estimated annual cost savings of US\$ 300 million, equivalent to 0.5% of GDP (CCS, 2003a).

³ National Customs Service; Agriculture and Livestock Service (SAG); National Fisheries Service (Sernapesca); Institute of Public Health (ISP); Metropolitan Region Environmental Health Service (SESMA); Civil Registration and Identification Service (SCRel); Undersecretariat for Transport; General Treasury of the Republic (TGR).

V. Conclusion and recommendation

Few SMEs have succeeded in participating directly in the foreign market. The main export markets for Chilean SMEs are in Latin America. This is true not only of manufactured products but also software and IT services. Chilean SMEs have not cultivated the growing Asian market, although Asia is the most important market for large firms.

The main weakness of SMEs include quality management, information management, and marketing and sales. Scant use of IT makes it harder for SMEs to implement well-coordinated management systems for customer-oriented service, planning and inventory control, and financial management. Fewer Chilean firms obtain international certifications than those from developing countries in Asia. Such weaknesses originate from a lack of human and financial resources. Higher shipping and other transaction costs prevent SMEs from exporting their products, or do not allow them to export to distant markets.

The barriers facing SMEs in participating in online transactions mainly consist of difficulties in accessing the Internet and problems applying it to their businesses. Important factors that cannot be overlooked include a lack of Internet knowledge, capability, confidence and interest. Lack of understanding can cause disinterest in the Internet and its applications.

As policies for using the Internet to promote international trade, it is necessary to enhance credibility among the buyers and sellers who participate in online networks, the products offered on websites, IT literacy and capacity for e-commerce among SMEs, and to establish e-business platforms. Policy issues can be classified in three groups, which are closely related to each other.

(1) *Measures against barriers to foreign market participation*

Management and quality control in accordance with international standards. Clients feel safer doing business with SMEs that can provide products and services, or manage processes under international standards such as ISO 9000, 14000 and CMM. Standardized management also make it easier to introduce IT in a firm and to share information between firms by using IT.

Branding strategy at the state, regional and firm levels; protection of intellectual property rights and trademarks. It is important for SMEs to make their products and services more visible, in order to cultivate markets in foreign countries and in cyberspace. One of the strategies for SMEs to achieve this is to raise brand awareness and to sustain the credibility of their labels. The protection of trademarks and other intellectual property rights is therefore an important policy for developing countries.

Grouping and clustering (sector and regional levels). The grouping of firms and development of an industrial cluster create positive effects that encourage the development of industries and regions by, for example:

- Making it possible to exceed a critical mass for introducing IT-related infrastructure, utilities and facilities.
- Facilitating information exchange and technical and knowledge transfer through face-to-face and Internet communications among firms in a given sector.
- Facilitating information exchange and technical and knowledge transfers from universities and research institutions to industrial sectors, and between different industrial sectors.

Cooperation with importing countries. Free trade agreements and dialogues with importing countries give Chile additional opportunities to gain information on regulatory requirements and market demands in those countries.

(2) *Trade facilitation measures*

Even if firms have the products, services, and administration capabilities to participate in foreign markets or if they have already succeeded in making contact with promising customers, some of them will face difficulties in starting and maintaining transactions, arising from costly international trade procedures.

Provision of market information through websites/establishment of a marketplace for making bids. Information exchange is the simplest and most common use of the Internet to promote international trade. SMEs can access websites established by the Chilean Government, NGOs and international organizations in order to obtain necessary information. They can also submit bids to start businesses and publish advertisement at zero or low cost.

Provision of online and offline consultation services /arrangement of business meetings. Consultancy and other online and offline services will complement information provision via websites.

Trade facilitation. Transport costs also weigh heavily on SMEs. Heightened security concerns add to the complexities of managing trade chains. Efficient trade chains are a key factor for SMEs facing high transportation costs with fewer capabilities for managing trade procedures.

(3) *IT policy and measures for promoting e-commerce and other IT applications*

Capacity building. Even though SMEs with Internet connection can gain access free of charge or at low prices, they do not necessarily have the capabilities needed to make full use of them.

Confidence-building among suppliers and purchasers. Firms are required to undertake careful research before entering into business relationships with trading partners. They need to gather a huge variety and large quantities of information such as macroeconomic statistics, company profile, credit information, regulations and so forth. Parts of such information can be shared at low cost by using the Internet and a platform accessible by registered users.

Confidence-building for secure online transactions. At minimum it is necessary to establish ground rules for managing online transactions, relevant laws and regulations, and technical standards such as electronic signature and encryption.

Building affordable IT platforms for SMEs. The establishment of infocentres is a common policy for overcoming difficulties in access to the Internet. Nonetheless, problems remain for SMEs to use IT applications for business management on shared computers. The Government, NGOs and business associations should work together to establish IT platforms for databases of trade-related information, traceability and other information management systems, to which SMEs can gain access through the Internet even from public spaces at affordable cost.

E-government. E-government becomes a demonstration facility enabling users to experience online transactions and realize their immense value. As the public sector is the most credible trading partner, SMEs can offer their products and participate in bidding with a sense of security. IT is also a key tool for achieving efficient trade facilitation systems.

Individual countries and international organizations establish frameworks for facilitating international trade, which include technical standards, working rules and relevant laws for EDI and e-commerce, health guidelines, together with other regulations and conformity assessment systems. Intergovernmental cooperation can complement efforts made by them. A system needs to be established to transfer best practices in new business promotion, and in SME capacity building and IT use. This will be implemented efficiently through south-south cooperation.

References

- Alarcón C. and Stumpo, G. (2000), “Pequeña y medianas empresas industriales en Chile,” Serie desarrollo productivo No.78, CEPAL, Santiago, July.
- _____ (2001), “Policies for small and medium-sized enterprises in Chile,” CEPAL Review No.74, pp.167-182, CEPAL, Santiago, August.
- Araya E. (2003), “Traceability within the Chilean Fresh Fruit Export Industry,” presentation material prepared for IDtrack-FoodTrace European Conference on Food Traceability 2003.
- _____ (2004), “Traceability within the Chilean Fresh Fruit Export Industry,” GFT Forum, May 20, 2004, <http://www.itfnet.org>.
- Berry, A. (2002), “Valoración de políticas de apoyo a la pequeña empresa: Primera aproximación a una metodología regional,” Inter-American Development Bank, May.
- Bianchi, P. and Parrilli, M. D. (eds.) (2002), “Obstáculos y oportunidades de inversión para el desarrollo de las pequeñas y medianas empresas en Chile,” Project for the Ministry of Economic Affairs and Energy, the Government of Chile, financed by the Inter-American Development Bank, March.
- Cámara de Comercio de Santiago (CCS) (2003a), “Perspectivas de la factura electrónica en Chile,” Santiago, January.
- _____ (2003b), “La economía digital en Chile 2003,” Santiago, September.
- Chile Innova (2003), “Diagnóstico de la Industria de las tecnologías de la información en Chile 2003,” Santiago.
- Comite de Fomento de la Micro y Pequeña Empresa (2003), “La situación de la micro y pequeña empresa en Chile,” the Government of Chile, Santiago, March.
- Corporación de fomento de la Producción (CORFO) (2000), “La Pyme en Chile: Presencia de la pyme en el universo empresarial chileno 1994 - 1997,” Santiago, July.
- Dirección General de Relaciones Económicas Internacionales, Ministerio de Relaciones Exteriores de Chile (DIRECON) (2003), “Chile piensa su inserción internacional desde las regiones,” December.
- _____ (2004), “Comercio Exterior de Chile Cuarto Trimestre 2003,” February.
- Foreign Investment Committee (2004), “Chile APEC 2004,” the Government of Chile, Santiago, January.
- Fernandez, Gaston (2004), “Chile’s Dynamic Business Environment & Trade Facilitation Measures,” PowerPoint presented for APEC Seminar on WTO Trade Facilitation on November 8 and 9, 2004, Bangkok, Thailand.
- GECHS (2003), “Diagnóstico 2003 de la Industria de Software y Servicios,” Presentation by César Cornejo, President of GECHS, Santiago.
- Grupo de Acción Digital (2004), “Agenda Digital Chile 2004-2006,” February.
- Iglesias, A. and Stevenson, R. (2003), “The Software Industry in Chile 2003,” Japan External Trade Organization (JETRO), Santiago, April.

- Izam M. (2003), “Rules of Origin and Trade Facilitation in Preferential Trade Agreements in Latin America,” Serie comercio internacional No31, CEPAL, Santiago, August.
- Japan International Cooperation Agency (JICA) (2001), “The Study for Promotion of Investments and Exports for the Balanced Economic Development in the Republic of Chile Draft Final Report,” August.
- Katz, J. and Hilbert, M. (2003), Road maps towards an information society in Latin America and the Caribbean, CEPAL, Santiago, July.
- Kommerskollegium (Swedish National Board of Trade) (2003), “Trade Facilitation from a Developing Country Perspective,” Stockholm, April.
- Kuwayama, M. (2003) “The Comprehensiveness of Chilean Free Trade Agreements,” in Okamoto, J. (ed) Whither Free Trade Agreement?, Institute of Developing Economies (IDE/JETRO), Tokyo.
- Ministerio Secretaría General de la Presidencia de Chile (Modernización) (2002), “Agenda Gobierno Electrónico 2002 - 2005,” Proyecto de Reforma y Modernización del Estado (PRYME), October.
- _____ (2004), “Agenda de Gobierno Electrónico 2002-2005: Avances”, PRYME, November.
- Neely, Alan (2003), “Resumen diagnóstico del desarrollo del postgrado en la V región,” Valparaíso, August.
- Nelson, Roy (1999) “Intel’s Site Selection Decision in Latin America,” Thunderbird, The Garvin School of International Management.
- Oficina de Estudios y Políticas Agrarias (ODEPA) (2002), “Panorama de la Agricultura Chilena,” December.
- Peres, W. and Stumpo, G. (eds.) (2002), Pequeña y medianas empresas industriales en América Latina y el Caribe, CEPAL, Santiago.
- Presidential Commission on the New Information and Communication Technologies (1999), “Chile: Moving towards the Information Society,” January.
- Programa Nacional de Infocentros (2004), “Informe de Monitoreo Primer Semestre/2004.”
- Román, Enrique (2003), “El fomento productivo en una economía de mercado: lecciones del caso chileno,” in Muñoz, Oscar (ed.) (2003), Hacia un Chile competitivo: Instituciones y Políticas, FLACSO-Chile, Editorial Universitaria, Santiago, October.
- Rusten, E., Contreras-Budge, E and Tolentino D. (1999), “Enlaces: Building a National Learning Network,” LearnLink Project, AED, Washington, D.C., January.
- Staples, B. R. (1998), “Trade Facilitation,” World Bank, October.
- Servicio Nacional de Aduanas (2001), “Balance de Gestión Integral Año 2001,” Santiago.
- _____ (2003), “Balance de Gestión Integral Año 2003,” Valparaíso.
- Subsecretaría de Economía (2002), “Acceso y uso de tecnologías de información en las empresas chilenas” Santiago, August.
- Ueki, Y (2003), “Industrial Agglomeration and Regional Growth in Korea: Focusing on the Software and ICT Service Sector,” in Kagami, M. and Tsuji, M. (eds.) Industrial Agglomeration: Facts and Lessons for Developing Countries, Institute of Developing Economies (IDE/JETRO), Tokyo, March.
- Vergara, Ester (2003), “Coordinación Intersectorial Ley 18164 Aduana – ISP” presentations prepared for Seminario “Proyecto de Modernización de los Procesos de Control Nacional,” organized by Instituto de Salud Pública de Chile (ISP), 13 de November 2003.
- Wellenius, B. (2002), “Closing the Gap in Access to Rural Communications: Chile 1995-2002,” World Bank Discussion Paper 430, Washington, D.C, February.
- World Bank (2004), “Chile New Economy Study,” Report No. 25666-CL, February.

COLOMBIA

André Kublik Walther

I. Introduction

With the advent of globalization and possible free trade agreements with the United States and the European Union, as well as other agreements at the regional and hemispheric levels, such as MERCOSUR and the Free Trade Area of the Americas (FTAA), small and medium-sized enterprises (SMEs), which represent more than 90% of Colombian companies, need to adapt to a new type of competition. They must incorporate information and communication technologies (ICTs) in order to promote the country's export capabilities and prepare for the new challenges that lie ahead.

In a very short period of time, ICTs have become one of the priorities of the Colombian Government and business community. They have made significant inroads in both the public and private sectors of Colombian society, which have begun to incorporate the new technologies into their activities.

In the International Institute for Management Development (IMD) World Competitiveness Yearbook of 2004, Colombia is ranked at number 41 among 60 countries, and in the Global Competitiveness Report of 2003 of the World Economic Forum, it is ranked at number 51 among 102 countries. Colombia thus occupies an intermediate position in competitiveness rankings, indicating that progress has been made in the last few years. Significant improvements have been made in ICT-related legislation, Internet access and ICT promotion on the part of the Government and private actors.

Government initiatives have been decisive in bringing about this process. Colombia has a programme known as the Connectivity Agenda (2000), which has progressed well beyond theory to a concrete plan of action. Different stages of the programme have been implemented in both the public and private sectors, though its focus hitherto on the public sector means that SMEs have yet to see clear benefits.

Within Latin America, Colombia is a latecomer in the area of ICTs, and unfortunately has not made up much ground in recent years. Colombia has the second largest population in South America, but accounts for only 4.5%¹ of its Internet users.² This can be attributed to economic, social and cultural causes, such as language barriers and lack of training programmes.

¹ www.Emarketer.com.

² Note that most of the data and information presented in this paper were compiled before July 2004.

II. Current ICT market situation and ICT use by SMEs

A. MARKET ESTIMATES OF ICT INVESTMENT LEVELS

Colombia is at the lower end of the scale in terms of per capita investment in computing technology. In 2003, this figure was US\$ 39, whereas Argentina invested US\$ 98 per capita even in 2001 (the worst year of its recent crisis), Venezuela invested US\$ 72, Mexico US\$ 77 and Brazil US\$ 108.³

1. Telephony

Local telephony in Colombia has expanded strongly in the last decade, registering an annual growth rate of 10.4% in installed lines, which doubled the country's capacity in nine years. The number of fixed lines in Colombia increased from 2.8 million in 1991 to 8.7 million in 2003.⁴ Colombia has a density of 20.03 telephone lines in service for every 100 inhabitants.

TABLE 1
TELEPHONE LINES

Country	Main telephone lines (thousands) 1998	Main telephone lines (thousands) 2003	Per 100 inhabitants 2003
Argentina	7,323	8,009	21.88
Brazil	19,986	38,810	22.32
Chile	3,046	3,467	23.04
Colombia	6,366	8,768	20.03
Mexico	9,926	14,941	14.67
Peru	1,555	1,839	6.71

Source: International Telecommunications Union (ITU), "Telephone lines" [online] 2004 <<http://www.itu.com>> .

Mobile telephony has become one of the most important services in the telecommunications sector because of growth in subscribers and billing. Revenues of mobile telephone providers add 22% to the sector. From June 2002 to June 2003, the number of subscribers increased by 35%, from 3.8 million to 5.8 million. This growth continued into the second semester of 2003, with the entrance of a new service provider. As well, average rates dropped 13% in 2003, which increased the number of minutes per call.⁵

TABLE 2
CELLULAR MOBILE SUBSCRIBERS

Country	Subscribers (thousands) 1998	Subscribers(thousands) 2003	Per 100 inhabitants 2003
Argentina	2,530	6,500	17.76
Brazil	7,368	46,373	26.36
Chile	964	6,445	42.83
Colombia	1,800	6,186	14.13
Mexico	3,349	25,928	24.45
Peru	742	2,908	10.61

Source: International Telecommunications Union (ITU), "Mobile subscribers" [online] 2004 <<http://www.itu.com>> .

³ Colombian Chamber of Information Technology and Telecommunications (CCIT).

⁴ Superintendence of Public Services, International Telecommunication Union (ITU).

⁵ Telecommunications Regulation Commission (CRT).

2. Internet

There are an estimated 2.7 million Internet users in Colombia, well above the projections of previous years. Despite this rapid growth, the number of users remains below the figure recorded in the most Internet-intensive countries in Latin America. The number of computers per 1,000 inhabitants is 34, compared to an average of 50 in the rest of Latin America.⁶

TABLE 3
INTERNET USERS IN COLOMBIA

Date	Dial-up	Dedicated lines	Total users
December 2000	692,076	180,894	872,970
June 2002	1,105,803	490,749	1,596,552
December 2002	1,329,495	670,718	2,000,213
June 2003	1,992,642	739, 559	2,732,201

Source: On the basis of information provided by the Telecommunications Regulation Commission (CRT), Bogotá, D.C., 2003.

3. Hardware and software

The hardware and software markets have grown in step with needs for information, and they are an important factor in the country's ICT development.

Hardware use in Colombia has increased in recent years, but has been affected by the adverse economic situation. The number of PCs per 1,000 inhabitants rose from 18 to 34 between 1995 and 1997, dipped to 28 in 1998 and increased again to 31 in 1999. Microsoft-Colombia estimated the total number of computers in Colombia at between 1.25 million and 1.3 million in 1999.⁷

The production of local software is one of the most promising areas of Colombia's ICT sector. A growing number of local companies have consolidated and developed a capacity to respond to the demand for software within the country, and they have even begun exporting. Although trade in this segment is still in deficit, the industry's development strategy is likely to bring it towards a balance in coming years. Colombia now exports approximately US\$ 25 million in software and is seeking to increase this to US\$ 2.4 billion within five years, though this goal is still distant.

4. E-commerce

The Government has taken a number of steps to support the development of e-commerce in Colombia. One is the enactment of Law 529, also known as the Law on Electronic Commerce, which allows data messages to be recognized under the law. It also regulates e-commerce, creates certification agencies and allows digital signatures. The law confers the same contractual and legal validity on electronic data transfer as to hard copies. For a digital signature to be valid, it must be verifiable, controlled solely by the person using it and linked to the information or message being transferred. Certifying agencies (local or foreign) must be authorized by the Superintendence of Trade and Industry. These legal steps have been accompanied by a flat rate for Internet connection and the creation of an official body (CERTICAMARA) to certify the security of digital transactions.

B. ICT AND E-COMMERCE PENETRATION BY SMEs

The Government defines an SME as a company with between 11 and 200 employees and assets of less than 5.3 billion pesos (US\$ 1.9 million).⁸ Table 5 gives the definitions of micro-, small

⁶ Colombian Chamber of Information Technology and Telecommunication (CCIT).

⁷ World Bank; Microsoft-Colombia.

⁸ Law 590 of 10 July 2000, which defines small and medium-sized companies in Colombia.

and medium-sized enterprises by assets and number of employees. Colombia's definition does not necessarily coincide with that of other countries in the region: a company defined as a microenterprise in one economy could be considered as a small or medium-sized company in another.

TABLE 4
CLASSIFICATION OF MICRO-, SMALL AND MEDIUM-SIZED
ENTERPRISES UNDER LAW 590

Size	Assets (US\$)	Number of employees
Micro	< 66,000	< 10
Small	66,000 – 662,000	11 – 50
Medium	662,000 – 1,900,000	51 – 200

Source: On the basis of Colombia, *Law 590*, Bogotá, D.C., 10 July 2000.

Few data exist on the use of ICTs by SMEs in Colombia, notwithstanding serious data collection efforts in recent years. The National Statistics Administrative Department (DANE) takes periodic surveys of microenterprises and SMEs by sector (services, manufacturing and commerce). These surveys show that Internet use is increasing and that 90% of companies will soon be connected by dial-up or other types of access. Many SMEs do not yet have their own website, however. B2B commerce is increasing, although the use of online payment platforms is still being consolidated. Interestingly, the surveys also show that the manufacturing sector is the largest user of the Internet.

III. SMEs in the ICT Revolution

A. SMEs WITHIN THE ECONOMY

Different studies show that the bulk of SMEs belong to the services and manufacturing sectors. Important segments within manufacturing are the clothing industry, leather working, metal mechanics and auto parts.

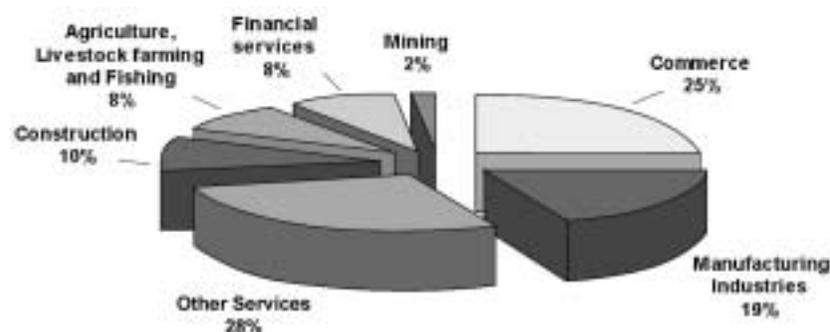
SMEs do not yet command a large share of total exports. This is especially true for SMEs in Latin American countries, as these firms have ventured onto the international markets relatively recently. Colombia's market liberalization began in the late 1980s and early 1990s. Many companies went bankrupt or closed down around this time, but those that were more flexible adapted to the new circumstances. In general, SMEs have been relatively dynamic, especially since 1999.

TABLE 5
SHARE OF SMES IN NATIONAL PRODUCTION, BY SECTOR, 2001
(Percentages)

Sector	Medium companies	Small companies	Total production by SMEs
Furniture and accessories	44.06	45.30	89.36
Leather industry and products	49.60	37.67	87.27
Food	52.76	21.48	74.24
Footwear and their parts	29.75	37.72	67.47
Plastic products	50.43	14.69	65.12
Wood industry and products	41.35	21.26	62.61
Metallic products	37.08	25.11	62.19
Garments dressing	32.42	27.59	60.01

Source: National Statistics Administrative Department (DANE), *Encuesta Anual Manufacturera (EAM)* 2001, Bogotá, D.C.

FIGURE 1
SECTORAL PARTICIPATION OF SMES, 2001



Source: On the basis of information provided by National Statistics Administrative Department (DANE), Bogotá, D.C., Central Bank, 2001.

Diversifying and penetrating external markets are the two main goals for the creation and development of SMEs in Colombia. However, foreign trade remains quite difficult for SMEs. Only 13% of SMEs have experience in exporting their products. Studies (e.g. FEDESARROLLO, 2003) indicate that the main obstacles for exporting companies are overly complicated export procedures, high costs of domestic transport, lack of information on external markets and the high cost of domestic and imported raw materials.

B. CASE STUDIES FOR E-COMMERCE AND SUPPLY CHAIN MANAGEMENT IN SMEs

Three companies –Zebra Electrónica, Itansuca Ltda. and Sistema Integrado de Información para la Artesanía, or SIART– were selected as case studies. The selection criteria were that the firms must: (i) be SMEs; (ii) have made some headway in implementing ICTs; (iii) be exporting or have the potential to do so (identified by their EXPOPyme programme share); and (iv) be willing to participate in the study. The study focused on ICT and web page development and export orientation.

1. Zebra Electrónica

Zebra Electrónica, a Colombian manufacturer of electronic security products, was established in 1991 by four partners.⁹ Currently, it has 20 employees. Its product lines include systems to control the access of persons or vehicles to offices, plants and other locations, using proximity cards or biometric equipment, such as digital fingerprinting devices; software; electromagnets; interlock controls; power supplies; and other accessories. The company also provides technical support, installation and maintenance.

Zebra's exports increased in the last four years from almost zero to 11% of total sales, and are likely to continue growing. Export destinations include Ecuador, Costa Rica, Guatemala, the United States (Miami), Dominican Republic and Bolivarian Republic of Venezuela. Zebra imports a variety of components and original equipment manufacturer (OEM) products for assembly from the United States, Taiwan Province of China and the Hong Kong Special Administrative Region of China, mainly due to their low prices. These contracts are reported to be concluded over the Internet.

⁹ Sales are mainly to distributors (approximately 80%). There are approximately 450 distributors selling products to enterprises and consumers. Thirty such distributors account for 80% of Zebra's sales.

(a) *ICT use in the company*

The company's internal ICTs have been upgraded in step with its growth and development. They still fall short of an optimal level due to financial constraints, but the computers, software packages and applications have grown in number to reflect the needs of the company. Tools have been developed in Excel or Access for sales orders, budgeting, technical service, client records and other functions.

Zebra's size and production volume are not large enough to use automation processes. Also, the lack of economies of scale in production would prevent the company from making large investments in such processes.

The technology used for the products is based on different brands of microcontrollers. Technological development is focused mainly in two fields: electromechanical products and electronic products. The former (e.g. electromagnets for locks) is of a relatively low technological level; it is a simple mechanical and electrical process, using software such as AutoCAD and OrCAD (development software for printing circuits and simulating electronic functions). These are produced by third parties.

Electronic products (e.g. design of integrated circuits) are developed using OrCAD and other tools for microcontroller programming that form the basis for these products. Several parts are manufactured by third parties, but Zebra assembles the final product.

The software incorporated into the products is designed by external programmers, systems engineers or electronic engineers who have experience in similar work. Zebra uses the following:

- Software: Access Control, which permits administration of the entire access control system. It can be used to programme access schedules, and it keeps and files work.
- Hardware: Access Control ZC500 and ZA200; keyboard Z100; locks; and a power supply. This is produced internally by the development department.

(b) *Outsourcing*

Zebra uses outsourcing in the manufacturing process of several products. The company designs its own products and components, then the production of some parts is contracted out to third parties before the final product is assembled within the company. Zebra produces metallic pieces for the electromagnets in numeric controls, metallic boxes, injected plastic boxes, integrated circuits and other parts.

Procurement is the responsibility of a committee comprising of a general manager and finance, procurement and production managers. This committee is in constant contact with the commercial department for order upgrades. Zebra uses an Excel application to programme and control its budget. It tracks sales by vendor and by product, as well as costs, expenditures and cash flow. It also maintains a detailed sales budget.

Every year, the company invests between 5% and 7% of gross profits in technology. It has short- and long-term investment plans. Recently, it acquired Firmware tools for its microcontrollers.

Its technology portfolio is relatively broad, as every area of the company uses both specific and generic software. All the departments use Microsoft Office tools such as Word, Excel, PowerPoint and Access. In some situations, standard applications are used for specific functions. In the commercial department, for example, cost estimates, invoicing and client tracking are managed with Office tools. A program called Centaur is used for accounting purposes. The development department has the most extensive technology portfolio, and uses more specific tools. Specially designed tools in Excel or Access are used to control accounts receivable, client records, purchases and stocks of raw material. Other applications have been developed by third parties. The control of procurement and production inventories was developed in Delphi, a program used

to develop databases and other applications. Zebra is not aware of any software that they would like to use but do not. If any such existed, it would probably be too far removed from their needs or capacity to acquire it.

(c) *Internet use*

Initially Zebra installed an ISDN line, but it did not perform well and the company decided to use a conventional phone line instead. Recently, after analysing the alternatives of cable and ADSL, Zebra switched to an optical fibre connection with Cablenet. The sales, development, quality, human resources and management departments are interconnected via this system.

In 2001, Zebra developed its website (www.zebraelectronica.com) as part of its export plan. Funding came from EXPOPYME, a Government export promotion programme for SMEs with a budget earmarked for website development in participating companies. Zebra hired Estudio Net Ltda. to design, develop and host the site. It has a contractual relationship with this company. The first website was designed and developed entirely by Estudio Net, but the second and third were made by Zebra itself. It has been upgraded almost every year, but too slowly to keep up with clients' needs. Zebra will try to improve this situation and make the website a genuinely useful business tool.

Currently, the website is still confined to information and support for clients. It has an e-mail link for customers to contact the company, and also provides technical information on the products, such as technical specifications, installation manuals, operating instructions and updated versions of software.

Clients have responded favourably to the website, generating interest and business, but the company is aware of the need to upgrade it to improve its control and operation. Zebra recognizes that the website has not been instrumental in closing business deals because it has not been updated and is not as attractive as it should be. It has served more as a reference and technical support tool.

(d) *Exports*

Zebra joined EXPOPYME two and a half years ago, seeking to improve its training and export abilities. Although EXPOPYME has been important in financing several activities (including the website), the work within the company itself has been recognized as the driving force behind the export surge.

Through the electronics union (Asesel),¹⁰ Zebra receives support for presenting its projects to different entities for financing. Two of these projects merit further attention. Zebra submitted a project to the Andean Development Corporation, which was approved in the amount of almost US\$ 70,000. This will help several companies in the electronics sector to seek business opportunities in foreign markets, particularly Peru and Chile. Another project was presented to the Colombian Fund for Modernization and Technological Development of SMEs (FOMIPYME). This was approved in the amount of almost US\$ 120,000 and will allow participant companies to seek new markets and certify their products. Zebra does not currently have partnerships with foreign companies.

(e) *Marketing and publicity*

Zebra has sought and found new clients nationwide and worldwide through phone directories, Internet databases and embassies, among other means. The company has worked in competition analysis, market options and prices. It is registered in PROEXPORT as a national

¹⁰ More than a year ago, Asesel created a Centre of Technological Development for the electronic and computer science sectors and acquired updated tools for the development of new products. Unfortunately, it has not been easy for Zebra to use these applications in its product development, mainly because the tools that the company already has are more specific to their needs. However, Zebra used the centre for a continuous upgrading project with SENA sponsorship to change its electromagnet manufacturing process.

manufacturer and its products bear a certificate of origin. It has also participated in fairs and conducted private training events and product presentations. With regard to publicity, Zebra has made printed and electronic catalogues, banners and other promotional items at fairs or events; it has also received press publicity and given interviews in specialized publications.

(f) *Summary of ICT use in Zebra Electrónica*

Although ICTs have not been the most important factor in the recent development and evolution of the company, there is no denying their contribution to enhanced agility and flexibility, cost reduction and better communication and relationships with clients and suppliers. Despite Zebra's leading position in the domestic market (it has no local competitor), it is always looking for ways to improve its products and prices. ICTs will be a great support for the growth of the enterprise.

Zebra Electrónica has developed a product portfolio with a high technological content, which has helped to set it apart from competitors and expand its business into foreign markets. The increase in IT use has led to concrete and quantifiable results that are not necessarily unique to Zebra, but may be applied to other SMEs. These include, among others: identification of new suppliers, mainly in Asian markets; improvement of customer services, thanks to technical support through the website; increases in the number of potential client contacts both nationally and internationally, also through the website; improvements in communication with potential clients overseas; improvements in internal administrative and management processes; and control of accounts receivable, clients, production and procurement.

Reducing the Flash content of the website is recommended; it makes navigation very slow, especially when many users still have dial-up connections. The company also realizes that despite its export focus, the English version is very limited and should offer the same content as the Spanish version.

Zebra's experience with EXPOPYME has been quite positive, but the results were not what the company initially expected. EXPOPYME provided important training and valuable support for preparing and developing exports, but its follow-up was rather weak. Positive results so far may be attributed to Zebra's own initiatives and management.

2. Itansuca Ltda.

Itansuca Ltda. was founded in 1989 and is well known in Colombia as a leading innovator in consulting, design, auditing and procurement management for the energy sector as well as for general purpose industry, basic environmental care, construction, transport and communications. It employs 15 people with permanent contracts (in plants) and 70 people with contracts for technical and professional services.

Itansuca has developed processes according to international standards and exported to Saudi Arabia, Guatemala, Nigeria, Peru, Ecuador and the Republic of Korea. The company does not import. Itansuca is certified under NTC-ISO 9001:2000, and has completed more than 500 projects.

(a) *ICT use*

Itansuca acquired computing and printing equipment in the early years of its existence, though it did not have an internal network or organization, much less a systems department. Over time, Itansuca's need to transfer information grew, and in 1996, the company installed its first wired infrastructure, server and plotter.¹¹ It also hired systems staff. This enabled the company to transfer information and run internal e-mail. By 1999, Itansuca had Internet access (through Cablenet)

¹¹ A Hewlett Packard Netserver LC II was acquired with Windows NT 4.0. Itansuca also purchased its first plotter (a Hewlett Packard DesignJet 600).

throughout the company, and it acquired another plotter (a Hewlett Packard DesignJet 750C Plus). At that time, the company had about 20 computers and 15 printers, but additional printers and computers were rented when projects required.

The main problem in the early years of operation was the lack of a magnetic file handling policy. Employees saved both personal and working files to the hard disks of the computers that they were working on. When projects were finished, files were left there. This was a very sensitive situation for a company whose services included information management.

There were neither hardware inventories nor procedures to manage information resources. Also, the company was lax about storing software licenses that it had bought over the years, and some were lost. With high diskette rotation inside and outside the organization, viruses invaded its network. In 2000, databases were developed to help manage the computers and magnetic information. The company also pooled and classified the information stored in the computers as best as it could, although some project information was lost irretrievably as a result.

In 2001, Itansuca implemented quality assurance procedures for its hardware, software and NetWare management. An official project portfolio template was created, with a single information storage site for each project. Procedures were put in place for handling magnetic files, including backup requirements and maintenance of computing equipment. This was in fact part of the process of quality assurance certification that Itansuca obtained that year. As a result, Itansuca stopped using floppy disks for all of its computers except management and systems department machines and instituted a virus screening schedule. Thanks to this measure, no files have been lost to viruses in the last four years. In 2002, Itansuca changed its ISP temporarily to Super Cable, but on finding the service below expectations and the system unreliable, it switched back to Cablenet.

In late 2002, Itansuca acquired its own headquarters (its current location) and installed a certified wired network. Itansuca also acquired an additional switch; it currently has two switches and three hubs, both from 3Com. In 2003, Itansuca bought a Compaq Proliant ML350G3 server with a SCSI hard disk and tape backup unit. The company now owns 40 computers, but continues to rent others when the project load requires.

To manage its hardware and software, Itansuca has developed eight user profiles that define each employee's hardware and software needs. For instance, Profile 1 reflects the needs of Itansuca's designers and, besides the operating system, their machines have only AutoCad. Not all the profiles have direct Internet access, nor does everyone have a company email account.

Since not all users have all of the software installed on their computers, the systems department has a service room with three computers containing the software required for specific tasks, as well as a scanner. The profile system considerably reduces the number of times a given piece of software is installed in the organization's network, and due to network stability, it is working perfectly.

Printing, plotting and photocopying services and library management have been centralized at the new headquarters, in what is called the Documentation Centre. There are two plotters connected through Jet Direct, a Hewlett Packard LaserJet 2200DN printer connected directly to the network and a multi-functional Hewlett Packard OfficeJet G85 printer connected to a computer.

(b) *E-mail problems*

E-mail problems began in July 2003 when a firewall installed in the external mail server blocked all of Itansuca's communications for a time. Itansuca finally installed Outlook 2000 and used Cablenet's outgoing mail server to authenticate accounts. This solved the initial problem—the mail could be used—but it created new ones: an Outlook 2000 license was required for every computer with external mail; Itansuca could not control the hosting status of the mail accounts; and the outgoing mail through Cablenet slowed the delivery of messages and created dependence on that server.

To solve these problems, the systems committee accepted a proposal from Quijano y Consultores, which was chosen over others mainly for financial reasons. The proposal anticipated using Linux to configure the internal mail and, since Itansuca already had a server, the investment was definitely smaller. However, the process hit a number of difficulties. Only one of the three problems (the need for Outlook 2000 licenses for every computer) was solved. Furthermore, technical problems arose with the installation of Windows NT and Proxy, due to the contractor's inexperience. Lastly, the system manager lacked control over the contract, and he did not raise the alarm when he saw irregularities in the execution of the process, which led to delays.

Quijano y Consultores correctly configured Itansuca's internal mail in February 2004. However, it did not advise Itansuca that the network configuration of each computer would have to be changed before the accounts could be used. Also, the systems manager prefers to obtain another opinion before configuring them himself.

It is necessary to hire an expert to solve the specific problem of internal mail accounts before configuring them in the computers. Once they are configured, there will be no need to have Outlook licensed on all the company's computers. However, the problem of depending on Cablenet to host the external accounts and outgoing mail will only be solved when the mail server is housed within Itansuca itself, giving it absolute control over the accounts. There are several ways to do this. The main proposal presented involves the purchase of 20 new computers and a simple server to host Itansuca's mail accounts and website. The value of this server is equivalent to the value of the computers that are being acquired; it would be a replacement, not an addition.

(c) *Software*

The company works on a Windows platform with an NT server and operating systems that range from Windows 95 to 2000 in the offices. It uses laptops with Windows XP to work outside headquarters. Itansuca uses Microsoft Office according to its user profiles, which basically use Word, Excel and Outlook. The company also developed databases in Access for handling inventory, software and magnetic or optical information, documents and data, curricula, staff time keeping and other administrative tasks, such as managing employees and subcontractors, systematizing certain accounting processes and controlling inventory for the Documentation Centre.

Engineering design uses AutoCAD 2000. Adobe Acrobat 5.0 is also used to save documents in PDF format and sometimes to protect them. Projects are carried out with Microsoft Project and Primavera Project Planner. Itansuca's accounting software and application suite were developed by MECOSOF, a Colombian firm. The company also has specific programs for engineering.

(d) *Procurement and investment plans*

Procurement decisions and investment plans are executed according to Itansuca's strategic systems plan, which was implemented in 2002 and planned investments from 2003 to 2006.

In 2003, Itansuca planned a headquarters move, a computer upgrade, development of a costs subsystem and an update of its commercial subsystem and timing sheets. Of these activities, the first two and part of the third have been completed.

From 2004 to 2005, Itansuca plans to acquire a 48-point switch, a telephone plant and a new server; purchase 20 computers; complete the costs subsystem; and install a virtual answering machine.

At present, Itansuca uses Cablenet for Internet access at a monthly rate of approximately US\$ 250. Access is provided only through the service room and for personnel who have external mail accounts. The connection uses proxy software.

(e) *Website*

Itansuca's first official website, set up in 2000, was designed and maintained by Estudio Net. Site hosting and external mail accounts were also contracted to this company. The site was used as a general company presentation, outlining its services and showcasing some of its completed projects. At the beginning of 2004, a new website was designed and developed by Inés Gecko and implemented in the framework of Itansuca's corporate image project. Estudio Net continued to host the site. The systems strategic plan projects this as interactive site for project information and consultation.

(f) *Exports*

The earlier projects were mainly consultancy work on pipeline design, mechanics, instrumentation and control for the gas and petroleum sectors. Until now, projects have followed on from business relations developed in Colombia. Itansuca has exported designs, but the company has no specific strategic export programme.

Like Zebra, Itansuca participated in EXPOPYME for a year. An export plan was developed in this framework, but it did not produce the expected results and was discontinued. The designated consultant did not have the experience or knowledge to meet Itansuca's needs. Although Itansuca withdrew from EXPOPYME, PROEXPORT has provided support for business agendas and scheduled meetings with prospective clients. The results have been positive for Itansuca's expansion into Ecuador and Venezuela, where it has subsidiaries.

Itansuca has not participated in business fairs or meetings because they are focused on tangible services or products. The company's business is more intangible and most of it is not classified by customs duty schedules.

(g) *Summary of the impact of ICT use in Itansuca*

In Itansuca, in common with other SMEs, ICT development has been significant and directly linked to company growth. For this company, whose principal product is information, good management using a tool such as an official project file is vital.

Itansuca's systems department has developed a strategic plan to optimize information resources, software and hardware. This has generated important savings that have been channelled into upgrading systems equipment. The user profile concept was an adroit step, since it directly influences ICT resource optimization and efficiency. It has also helped to reduce the cost of acquiring software licenses, which represents one of the main obstacles to ICT development in SMEs.

In more general terms, ICT use by Itansuca has led to internal and external communications improvement; improved client relations and communications; better project follow-up; improvement of project file handling and storage; export growth through e-mail use; lower communication costs; optimization of information resources and software purchases; improvement of data security; and better internal administrative and management processes. These benefits are by no means specific to Itansuca, however.

Itansuca's ICT experience has not been problem-free, however. Website use has been limited; it has been a general "goodwill" presentation device but not a marketing or communication tool. It has provided a general support locally and worldwide but has had little direct effect on sales.

Similarly to the first case study, in this case Itansuca's new web page has proved too heavy and slow due to the tendency of Colombian web designers to employ high Flash content. The company might have done better to consult the website supplier to update the site.

One of Itansuca's main ICT problems has been creating and maintaining a functional internal network and mail service. This problem clearly does commercial damage to the company,

since communications and file transmission are centralized through e-mail. It is crucial to solve this problem, as many projects are conducted abroad. Moreover, the problem has arisen as a result of poor advice from the companies Itansuca consulted. At this point, communications between Itansuca and current software and hardware suppliers have failed. The systems department did not carry out thorough enough research or a cost-benefit analysis. It simply chose the cheapest proposal, which proved not to be as good an option as it should have been.

3. Artesanías de Colombia and SIART

Colombia's geographical diversity is massive. It is located between the Caribbean Sea and the Pacific Ocean, and crossed by the Andes Mountains. In the east of the country are the Amazon and the plains region, called *llanos*. Its territorial and climatic diversity have influenced its population, which comprises many different groups that generate a wide variety of cultural and artistic expression, reflected in their crafts.

The crafts sector consists mainly of microenterprises and small companies, located in zones or populations with little access to ICTs. This, together with an increasing need for and interest in new markets and ways to create business, makes ICTs an important tool for these small entities.

(a) *SIART: an information system for crafts*

(i) Introduction

SIART, which translates as the Integrated System of Craft Information and Advice on the Internet, is the new portal of Artesanías de Colombia. It aims to be a point of contact between traders and artisans, providing information on the craft sector, supporting its development and improving the sector's competitiveness and position in international markets. It also aims to advise artisans and traders, improve productivity and quality and broaden the market for handicrafts.

SIART activities were built up around training staff in the companies involved, and especially the artisans themselves, to use computers and related technology. The intention was to create synergies between production and design. Information was gathered for the system, while equipment, accessories and services for the technical operation of the project were acquired.

(iii) Design and improving competitiveness

The design of SIART opens up a virtual space to help artisans to produce better crafts, offering advertising, information and other services with programmes and innovative strategies through the Internet. A team of SIART designers also advises on product development, image, packaging and exhibition; evaluates products; and informs potential consumers about production techniques, trends and events.

SIART offers artisans the following services: design advice, for which artisans can be in constant and easy communication with designers; product assessment (available to artisans anywhere in Colombia over the Internet) for participation in fairs and catalogues and the preparation of goods for export; classified advertisements, a contacts directory, and a virtual library; and specialized information about requirements for the artisanal sector, researched and organized to allow users to find real answers to their questions. Active SIART users are registered and affiliated with the system in order to be able to use all the tools and services it has to offer. Also through SIART, artisans, traders, dealers and organizations related to the sector can receive advice and assessments, participate in forums and workshops and access specialized information. By aiding the optimization of the processes, production, design and commercialization of Colombian artisans, SIART extends the artisans' abilities to sell their crafts throughout the world.

The fundamental product of SIART is its specialized and updated information. It contains directories of artisans, traders, public and private organizations and other active users of the system; specialized content about commercialization, development, environment, business opportunities, production and raw materials, as well as information about the Centre of Design for the Crafts in

Bogotá and Craft Design Laboratories in Pasto and Armenia; interactive tools for SIART users, such as forums, a glossary and a virtual library; information for the public about SIART, Artesanías de Colombia, hiring processes, purchases and presentation of projects, procedures for accessing international markets, an economic census of the sector, financial services available to the sector and information about the competitiveness of Colombian artisanal production; and information about artisan events and fairs, craft design contests, projects and programmes for the development of the sector, news, and trends.

SIART also offers design advice, packing, exhibition, portfolio and image development and commercial services; classified advertisements, a product catalogue and online sales; product assessment to participate in fairs, be part of the commercial catalogue or prepare for export; and training programmes through workshops and chats about navigating the Internet as well as using SIART and its technical programmes for product development, image editing, computer design and commercialization. The workshops are sponsored by the chambers of commerce and SENA. These services are provided in SIART offices, located in the Plaza de Artesanos, the Craft Design Centre and SMEs in Bogotá and the Craft Design Laboratories and SMEs in the cities of Pasto and Armenia.

(iv) Access to SIART

Apart from the Craft Design Centre and SMEs in the city of Bogotá and the Craft Design Laboratories and SMEs in Armenia and Pasto, SIART can be accessed through its website (www.artesantiasdecolombia.com). As most artisans live in small populations far from the main cities, Internet access is provided in community Internet centres. These are part of the COMPARTEL programme, which is conducted in the framework of the Connectivity Agenda. COMPARTEL is present in 670 Colombian municipalities with less than 8,000 inhabitants and is focusing its efforts on artisan localities.

(v) E-commerce

One of the objectives of SIART is to offer a platform for sales and e-commerce through its website. Such a franchise already exists in the United States, but in Colombia it has not yet been implemented.

Crafts are not easy to sell through the Internet, because consumers like to touch or try on products before buying them. SIART takes this and other important factors for e-commerce success with crafts into account. In each case, it has established the following considerations:

1. *To limit the number of products.* Before attempting to sell a product, factors such as availability, price and presentation must be considered. A number between 20 and 30 available products might be appropriate to begin sales.
2. *To improve logistics.* One of the main problems of e-commerce in Colombia is shipping, because high prices and slow delivery make e-commerce less competitive than traditional sales. The delivery price often exceeds the value of the product. Also long delivery times may not justify an online purchase.
3. *Packaging.* Packaging must be adapted to the product and in many cases protect it. There is little experience in this field and it is necessary to research packaging that is both good quality and economical.
4. *Organization of artisans.* Chains of artisans must be organized enough to supply orders made through the Internet.

It is hoped to that SIART will be able improve these factors and begin Internet sales in the medium term.

(vii) Website description

Artesanías de Colombia's new website was implemented in October 2003. It has a full Spanish version and a smaller English version. As mentioned above, its main users are artisans, suppliers, craft trade companies and foreign buyers. One of its most important components is its

commercial catalogue, which has product information classified by categories (e.g. ceramics, fibres, wood, indigenous goods, textiles) and suggested locations for use or display (e.g. bedroom, garden, living room). The ultimate aim of the catalogue is to be a virtual store for the products on offer. It is a dynamic site, with updates on news related to the sector and surveys. An internal search engine allows a registered user to obtain specific data on artisans, traders and suppliers.

In the website's gallery, artisans can publish photographs and descriptions of their products. In this way, artisans engage with ICTs and promote their crafts. To get into the gallery, the artisans must send reviews and photos of their products. If they are approved by SIART, they are published in the gallery. Commercial contacts outside Colombia have already been made through this section. Products are also promoted in the classified section, where users can publish offers of or requests for products. In addition to these interactive sections, the site has general information on SIART, Artesanías de Colombia, fairs and events, related organizations and other projects. There is also a space for chat and forums, which is not in operation yet. The website is still being developed; it is expected to be complete by 2005.

SIART has pursued a number of different strategies to promote the site. One is mailings. SIART publishes two types of electronic bulletins: internal, aimed at employees of SIART and Artesanías de Colombia, and external, for the artisan sector and general public. The external bulletins are La Gaceta Artesanal, Expoartesanías and Plaza de Los Artesanos; these are sent periodically to registered users and other interested parties. Considering that the users are mainly artisans, promotion cannot be through electronic means alone. Workshops, events and fairs are essential to bring artisans into the system.

(b) *Recommendations and considerations*

SIART is still in a phase of development and consolidation, and the portal has not yet been completed.

The implementation of e-commerce is essential, as users expect it when they browse the website. Online sales can generate income to continue the project after 2005, when IDB financing ends. Site administration and content updates should also improve. It would be better to centralize these processes and end the dependence on staff not tied directly to SIART. Contents updating is necessary to expand the system and position it commercially.

SIART has several competitive advantages that it should build on. One is the fact that it is the only information and advice system for the craft sector in Colombia on the Internet. Furthermore, it has institutional and Government support, as well as short-term IDB support.

It may be advisable to change the organization's name, as SIART is a frequently used abbreviation and could be easily confused with other organizations and websites. It would be also better to register a shorter domain name that is easier to remember. The present domain, artesantiasdecolombia.com, is very long, especially considering that many users do not speak Spanish. Replacing Oracle databases with simpler and more economical ones should be studied as well. SIART does not need such a robust database.

Considering the system's main beneficiary users group –artisans with less formal education and access to technology– training in ICTs and exporting is a high priority. To increase use of the system, SIART should set up a strategy to provide advanced training courses in the use of computers and the Internet, as well as training in international marketing and technical standards. Support from EXPOPYME, chambers of commerce, universities and private companies will be crucial. In addition, workshops or training sessions should be held in the towns or communities where the artisans live, rather than requiring them to undertake long, expensive journeys. Approaching private companies and searching for sponsorship agreements is important to reduce the dependence on the resources of governments and international organizations.

C. SUMMARY OF ICT USE IN SMEs

In summarizing the three cases studied in this paper and others published recently, the following conclusions may be reached.

Though they have helped businesses form agendas and participate in international fairs, the existing government policies for promoting exports in the SME sector, such as EXPOPYME, have not had much impact on exports. This has been due partly to problems with consultants with insufficient knowledge of ICTs and who develop export plans that are difficult to implement or unrealistic for their companies or their markets.

Export programmes have not focused on the use of ICTs for export sectors, although this should change with the implementation of the Prymeros programme, which focuses on precisely this objective. Good results are expected for 2004. Although companies clearly realize the importance and benefits of ICTs, programmes are still directed at administrative and production processes rather than national or international sales, marketing and distribution. Websites remain informative only and lack e-commerce tools.

The companies do not have systems to measure the impact of ICT use in administrative, production or commercial processes. This either results in underinvestment in ICTs or is used as a justification for not investing at all.

The Government should therefore afford greater emphasis to the technological aspect of its export promotion programmes. Also, participating companies and universities should pay more attention to this subject and produce better-trained consultants.

IV. Government policies for SMEs, ICTs, and international trade

A. E-GOVERNMENT, SMEs AND TRADE PROMOTION

1. Connectivity Agenda

The Connectivity Agenda is a Ministry of Communications programme for increasing and broadening ICT use as a dynamic tool for domestic, social and economic development.

The priorities of the Connectivity Agenda action plan for 2004 are:¹²

Government online. at www.gobiernoenlinea.gov.co. ICTs should improve the efficiency and transparency of public administration, helping public entities to simplify, integrate and create useful documents for public administrators, citizens and enterprise managers.

Online payments. The public sector should develop and implement an online system to receive payments from individuals and companies for any documents or services that the Government provides. The regulations for such a system were to be defined in 2004.

Online Government nationwide. Territorial agencies were to gain access to technology to improve their administrative capacity and document management.

Integral System of Electronic Procurement. In the initial phase, efforts focused on a single procurement portal (www.contratos.gov.co) for upgraded information, execution indicators for public agencies, response to complaints and corruption accusations and, in general, good service to citizens.

Government intranet. An intranet was planned to allow the flow and exchange of information (data, voice and images) among state agencies and between the State and citizens

¹² <http://www.agenda.gov.co>.

seeking to access government services online. The development and implementation of the components of this project should begin in 2004 and continue through the first semester of 2005.

National University Network. The network should connect several cities in a broadband network that allows the efficient exchange of information among universities and investigation centres and gives Colombia access to high-speed international academic networks.

Congress is discussing a bill to unify all the relevant agencies under the same online government system. All these projects are expected to be on stream by June 2005.

2. Rationalization and Automatization Proceedings Programme (PRAT)

A study by the Public Functions Department concluded that citizens and businesses have to conduct 2,676 different types of transaction to work with the Government. The worst affected sectors are social protection and health, education, foreign trade and housing. A decree, which is waiting to be signed by ministers, will adopt a single form and allow investment certifications to be consulted electronically. It also creates a virtual commercial window for foreign trade, with a single inspection at ports and airports.

This single foreign trade form will be implemented beginning 1 January 2005, consolidating 35 export and import documents into one form and reducing processing time from 20 days to just two. Twelve organizations related to foreign trade will be integrated online: the Ministries of Commerce, Industry and Tourism, Transport, Environment, Social Protection, Agriculture and Defence, as well as the Colombian Agricultural Institute (ICA), the National Institute for Food and Pharmaceutical Control (INVIMA), the Colombian Rural Development Institute (INCODER), the Colombian Institute of Geology and Mining (INGEOMINAS), the Superintendence of Trade and Industry and the Superintendence of Oversight and Security.

B. PROMOTING ICT USE IN SMEs

With 40% of GDP, SMEs are a fundamental part of the local economy, and both Government and private trade entities have begun to develop strategies to foment the use of ICTs in the SME sector.

(a) Prymeros

Prymeros is an initiative of the Colombian Confederation of Chambers of Commerce (CONFECÁMARAS), IDB (Technical Cooperation No. 7978-CO) and Connectivity Agenda, operating jointly nationwide with the Chambers of Commerce of Barranquilla, Bogotá, Bucaramanga, Cali, Cartagena, Manizales and Medellín. Connectivity Agenda funds 25% of the programme, while the IDB contributes 50%. The remaining 25% is financed by CONFECÁMARAS and the seven Chambers of Commerce. It is the Government's largest ICT initiative and practically the only one aimed at the SME sector in Colombia.

The Prymeros programme aims to help improve the competitiveness of Colombian SMEs through services and technological solutions for e-commerce. By September 2004, 2,559 companies entered Prymeros, of which 750 have been analysed - that is, they are assigned an expert consultant in e-commerce as well as traditional management consultancy, who assists in implementing e-commerce technology by assessing the needs of managers and outlining a proposal that then serves as an input for the last phase: action plan implementation.¹³ Prymeros hopes to make 2,100 companies aware of the benefits of ICT use and e-commerce, assign an analytical consultant to more than 20 business communities and implement e-commerce action plans in at least 15 businesses by the end of 2004.

¹³ Analyses are taking place in Medellín with the business communities of underwear, construction, fruits, dairy, tourism and forestry; in Cartagena, with the metal working communities, navy and auto parts; in Cali, with health, leather and clothing; in Manizales, with the tourist industry; in Bucaramanga, with the poultry, clothing and supplying sectors; and in Bogotá, the clothing and pharmaceutical clusters.

C. POLICIES TO SUPPORT SMEs

1. Export promotion

Foreign trade policy is based on supporting the internationalization of Colombian companies through subregional hemispheric integration - that is, by strengthening the Andean Community and negotiating other free trade agreements. Recently the Council on Foreign Trade presented a new programme that promotes trade with the European Union, Canada, Panama, Japan, India, CARICOM, the Central American Common Market, China, Republic of Korea, the Russian Federation, Thailand, Singapore and Malaysia.

*PROEXPORT*¹⁴

PROEXPORT is a government agency responsible for the commercial promotion of Colombia's non-traditional exports. It offers international marketing support and advice to Colombian businesses through services to help design and implement export strategies.

It promotes the effective incorporation of Colombian companies into international markets through identification of market opportunities; design of strategies for market penetration; internationalization of firms; help to design action plans; and specialized services for foreign companies interested in acquiring Colombian goods and services.¹⁵

Since its creation, one of the main objectives of PROEXPORT has been to maintain a portal with updated trade information for both Colombian exporters and foreign importers. It is one of the most complete information sites and has contributed to creating a better-informed Colombian business sector. Its portal, www.proexport.com.co, contains data on trade opportunities, a directory of Colombian exporters and a section called INTELEXPORT with information about foreign trade, aimed at helping identify market niches for Colombian products in other countries. INTELEXPORT also monitors trends in international markets, Colombian exports and the identification of potentially exportable products, as well as the latest foreign trade news.

EXPOPYME

EXPOPYME is a programme offering SMEs tools and advice to create an export culture and boost their own exports. The programme has assisted 2,107 SMEs in the last five years nationwide in training, development of export plans and, in some cases, tutoring in exporting to target markets.¹⁶ EXPOPYME deals with companies in all sectors of the economy and all kinds of companies in the craft sector. It also runs a diploma course on managing change, to help businesses learn to devise export plans.

Exports undertaken within EXPOPYME increased from US\$ 67 million in 2000 to US\$ 117 million in 2003.¹⁷ The United States was the main market, with a 32% increase in exports in 2003. Other important destinations were Ecuador, Mexico, Panama and Costa Rica. In the first two months of 2004, companies in EXPOPYME exported goods and services worth US\$ 17 million, the main origins being Bogotá, Medellín, Cali and Bucaramanga.

The programme has a budget for developing websites for participating companies. However, the amount is very small for the tasks of developing e-commerce applications and dynamic pages.

¹⁴ <http://www.proexport.com.countries>.

¹⁵ Its general objectives are: to strengthen, in the short and medium terms, Colombian sales, goods and services in the international markets, offering firms a portfolio of high-quality services; to maximize efficiency in the uses of PROEXPORT national and international network offices; to build partnerships with private and public national and international agencies that work to increase the availability of resources to support business initiatives.

¹⁶ The programme seeks to promote new product development, productive processes and management methods for export, through methodologies and supporting instruments designed by the programme. Companies in the programme receive training for export and make an exporter plan and chart to define where they will send exports and how to access State support.

¹⁷ PROEXPORT, EXPOPYME programme.

ICT use in the companies is very limited and it has not been one of the main focuses of EXPOPYME, partly due to consultants' and universities' inexperience in this field.

2. Facilitating trade

Some aspects of trade facilitation in Colombia have been discussed, such as the Connectivity Agenda projects, that make export and import procedures easier.

The accession of Colombia into free trade agreements such as FTAA and the Andean Trade Preference Act are also facilitating ICT use in ways that boost trade.

Colombia has recently stepped up investment in transport infrastructure, by means of an aggressive concession scheme. These investments will facilitate future service and logistics development.

3. Foreign investment

Investment climate improvements have focused on the elimination of legislative barriers and the creation of incentives to attract larger investment flows. With inflows of US\$ 2.03 billion, Colombia is the second-largest foreign direct investment destination in South America after Brazil.¹⁸

In 2003, foreign investment grew by 68% compared to the same period in 2002, from US\$ 1.1 billion to US\$ 1.85 billion, mainly due to the good performance of foreign portfolio investment (FPI), which grew 109%, moving from an outflow of US\$ 1.01 billion to US\$ 87 million. On the other hand, foreign direct investment (FDI) decreased from just under US\$ 2.12 billion to US\$ 1.76 billion, a drop of 17%.

D. SPECIAL MEASURES TO BRIDGE THE DIGITAL DIVIDE

1. COMPARTEL

To equip remote communities of limited resources with adequate telecoms infrastructure, the Ministry of Communications has designed COMPARTEL programmes for rural community telephony, social internet, and broadband connectivity for public institutions. Before COMPARTEL, only the major cities in Colombia had Internet access, and ICT rates are still prohibitively high for low-income users.

2. Telecentros

Inhabitants of Colombian municipalities have Internet access through Telecentros, thanks to the social internet COMPARTEL programme, which is overseen by the Ministry of Communications and the National Development Fund (FONADE). Telecentros have been in operation since 2000.

Social internet COMPARTEL was developed in three independent stages. In the first, 670 Telecentros were set up in municipalities with an urban population of under 8,000. In the second, 270 Telecentros were set up in municipalities of over 10,000 inhabitants. In the third stage, which is still underway, 500 Telecentros are planned for municipalities not covered in the previous phases. Plans also exist to extend the service to centres with over 1,700 inhabitants. When the project is complete, all the regions of the country should have Telecentros equipped with modern communications technology, to be used by communities as virtual libraries and as a driver for new employment and trade opportunities.

¹⁸ World Investment Report 2003.

V. Conclusion

SMEs in Colombia, like those in most of Latin American countries, are the driving force of the economy. They generate more than 60% of employment nationwide and represent 92% of commercial establishments and 40% of the country's total GDP. However, their exports do not exceed 20% of the national total. This shows their importance and great potential for future growth.

The Government has been developing plans and export programmes such as PEE and EXPOPME, both of which are coordinated by Proexport. Fortunately, these strategies continue despite changes in governments.

Although, as explained in this document, results have been positive and the level of exports has been rising, Colombia still accounts for only 0.2% of world exports. According to WTO, Colombia ranks 54th in the world in export levels.

However, opportunities for new business, employment generation and wealth creation are being generated by integration agreements such as FTAA, free trade agreements with the United States and the European Union, and regional preference systems such as the Andean Community (CAN) and MERCOSUR.

SMEs should adopt new strategies to face these emerging challenges and competition, not only in the sphere of trade and production, but also in the use of technology. On this depend their success and survival.

Recent studies on SME exports and ICT use agree that current use of ICT is limited by access difficulties. This means a lack of information on business opportunities and regulations to adapt products to international requirements, as well as lack of skills in export processes. All this is a challenge to the competitiveness of Colombian companies.

In general, though, government investment and the expansion of ICT services on offer from both the public and private sector create a favourable context for computer science, technology and communications programmes.

There are two main fields in which the use of ICTs is most prevalent. First is the government sector and Connectivity Agenda, which is described at length in this report. This initiative, among other things, promotes ICT use among government agencies and facilitates public access to official information, transactions and proceedings. Second, the Ministry of Education is introducing new technologies and e-learning that will increase the number of people with knowledge of ICTs. Government policies aimed at the private sector must be oriented to stimulating technological innovations and export promotion, which are the basis for business development in the country.

Internet and other ICT use is still very limited, usually confined to e-mail and basic website use of little added value; their most significant benefits are contacts generated by e-mail and limited information available on products and services. E-commerce is still being consolidated. Entrepreneurs do not usually see it as a short-term goal, or as a marketing or commercialization tool. B2B use is becoming common, but not B2C. Entrepreneurs do see technology as an investment, but more as a way to reduce costs than to generate business opportunities with greater added value. The impact of ICTs within companies is difficult to quantify, mainly because they do not measure their own levels of technology use.

Another factor in limited proliferation of new technology has been the lack of information and professional advisory capacity in implementing ICTs within companies.

Technology is usually appreciated and recognized only in production, plant operations, automation and manufacturing processes, where it is easier to measure its impact. In administrative and especially commercial fields, it is not easy to find studies and results that demonstrate to managers the importance of making technological improvements.

Therefore, quantifying ICT impact, offering the advice and support of experts and introducing methodologies applicable to SMEs will be decisive in helping entrepreneurs choose among the technological alternatives available. It will also allow them to understand more clearly the subsequent value and benefits of ICT for their businesses.

To sum up, good initiatives have been put in place to improve ICT use and increase SME exports, but lack of access to financing, qualifications and human resources still results in conservative and limited application. Added to this is the slow development of public infrastructure, which has also played a role in delaying the introduction of ICT in SMEs.

Recommendations

1. Coordinate and unify policies and support services for SMEs

Despite the emergence of many organizations –private, public and mixed– that support SMEs in Colombia, in some cases an oversupply of business services has been generated. Disorganization and lack of coordination among these organizations confuse businesses, who often do not know where to go for advice or support. CAF has already noticed this problem, pointing out that lack of knowledge about which programmes they are eligible for “is an obstacle to the businessperson and ...to competitiveness”.

The internal disorganization of trade and business organizations is also an obstacle, and they are tending to become more political organizations than real support institutions.

Government and business associations and organizations should organize and standardize criteria for the formation of common policies on SMEs. The creation of a single agency to unite and coordinate all these efforts would be a very important step.

2. Internationalization

The common policies of the Government and SME organizations should aim to turn SMEs into SMEXs, that is, exporting companies. It is fundamental to promote the internationalization of SMEs through wider coverage and improvement of programmes like EXPOPYME. In this respect, it is important to facilitate and improve access to information on business opportunities and to create new networks and intra- and interregional information systems. Making export processes and documents easier and more flexible through PACOS and the unification of trade organizations is another vital area of public policy. Use of ICTs in Colombian companies will permit the generation of competitive advantages and points of differentiation for international negotiations.

3. Provide credit

SMEs find that one of the main obstacles to growth is their limited access to long-term credit to upgrade infrastructure and productive capacity. The financial sector releases resources only for immediate cash flow or short-term credit; it must be paid back within a year, reducing the possibility of buying technology. A properly structured business loan plan needs longer terms to amortize the acquisition of long-term assets. Also, evaluation criteria and financing documents and processes should be standardized to unify credit lines for SMEs.

4. Provide training

It is important to promote training and academic programmes in Internet use, not only as work and consultation tools, but also as a study subject for high school degrees.

The workshops that are being held to help SMEs internationalize should include the implementation of ISO 9002 and ISO 14000 standards to make companies stronger and more competitive in international markets.

Training and qualification workshops offered by universities, SENA and related agencies must also be made financially accessible for SMEs through credit lines. At present, different entities offer loans at higher costs than SMEs can afford. Additionally, these activities should be tax-deductible, or SMEs should qualify for other types of fiscal benefits that would make these initiatives more attractive and frequent.

It is crucial to promote bilingualism through compulsory education in English in high school courses. Bilingual education has become more common in private schools, but it must be a priority of the Ministry of Education to introduce it in public schools as well. International trade and internet transactions are conducted in English.

4. Reorient ICT use

It would be beneficial to shift the focus of ICT use within companies. At present, ICT use is focused on production and administration. More emphasis should be placed on the use of new technology in commercial areas: sales, customer care and marketing.

Fiscal incentives should be put in place to encourage the use of e-commerce in exports and other commercial activities and to facilitate access to e-payment systems and transportation services. In this way, service companies could offer more competitive rates, making their use more attractive.

5. Build partnerships

It is vital to promote the creation of business networks to reduce production and commercial costs. This will make SMEs more competitive. Internet use to improve supply chains between SMEs and large companies is also an area for policy discussion.

6. Create interregional networks

In addition to negotiating free trade agreements, it is also essential to create regional networks (e.g. within the Americas or Andean zone) and interregional associations (e.g. between Latin America and Asia) that improve access to information about business opportunities, technological interchange, export processes, tariffs or costs of transportation and e-learning.

Portals should be informative as well as interactive; they should be marketplaces that allow participating companies to conduct commercial transactions directly with each other, avoiding third-party mediation. Also, the different government information systems should be interconnected to simplify e-procurement and bidding.

Lastly, a technological infrastructure should provide business support in the form of offices and experts in international trade and ICTs for all the participating countries, in this case in Latin America and Asia.

The creation of such a network could be facilitated by tapping into the know-how and infrastructure of existing networks, such as TIPS, which has more than ten years of experience in Latin America and Asia. This is worth consideration by the Forum for East Asia-Latin America Cooperation (FEALAC) and its constituent governments, should they decide to go ahead with such a venture.

References

- Arbeláez María Angélica and Luis Alberto Zuleta, (2003), “La MIPYMES en Colombia: diagnóstico general y acceso a los servicios financieros” [online] Bogotá, D.C. < <http://www.sic.com.co/>>
- BNP PARIBAS (2004), *Emerging Markets Weekly Spotlight*, Paris.
- CCIT (Cámara Colombiana de Informática y Telecomunicaciones) (2004), “Impacto del IVA en los PCs”, Bogotá, D.C., unpublished.
- Coinvertir (Invest in Colombia Corporation) (2004), Official site [online] <<http://www.coinvertir.org>> (2003), *Foreign Investment Report*, Bogotá, D.C.
- Colombia (2003), “Ley 2010”, *Diario Oficial*, Bogotá, D.C.
- (2000), “Ley 590 de 2000”, *Diario Oficial*, No. 44.078, Bogotá, D.C., 12 July.
- Consejo Superior de Comercio Exterior (1998), *Lineamientos de la política de comercio exterior de Colombia y funciones del Consejo Superior de Comercio Exterior*, Bogotá, D.C.
- DANE (Departamento Administrativo Nacional de Estadística) (2004) *Estrategia antitrámites 2004*, Bogotá, D.C.
- _____ (2003a), *Tecnologías de la información y las comunicaciones, TICs*, Bogotá, D.C.
- _____ (2003b), “Política nacional de ciencia y tecnología 2000-2002”, *documento Conpes*, No. 308, Bogotá, D.C.
- FUNDES (Foundation for Economic and Social Development) (2003a), *Small and Medium-Sized Enterprises SMEs indicators in the Fundes Region*, Bogotá, D.C.
- (2003b), *La realidad de la pyme colombiana*, Bogotá, D.C.
- Gutiérrez, María Clara (2003), *Legislación de comercio electrónico*, Barranquilla, Oficina de asuntos legales internacionales, Ministerio de Comercio.
- Hilbert, Martin, Sebastian Bustos and João Carlos Ferraz (2003), *Estrategias nacionales para la sociedad de la información en América Latina y el Caribe* (LC/R.2109), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), November.
- Kuwayama, Mikio (2001), “E-commerce and export promotion policies for small-and medium-sized enterprises: East Asian and Latin American experiences”, *Comercio internacional series*, No 13 (LC/L.1619-P/I), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), October. United Nations publication, Sales No. E.01.II.G.159.
- Ministerio de Comunicaciones (2004), “Plan de acción 2004-2005”, *Connectivity Agenda*, Bogotá, D.C.
- _____ (2003), “Como se encuentra el país en tecnologías de la información”, *Connectivity Agenda*, Bogotá, D.C.
- _____ (2000), “Cambio para construir la Paz”, *documento Conpes*, N° 3072, Bogotá, D.C.
- Ministerio de Comercio Industria y Turismo, (2003), *Las MIPYMES en Colombia, evolución, desarrollo y fomento (1999-2003)*, Bogotá, D.C.
- NAP Colombia, (2004), Official site [online] <<http://www.nap.com.co>>
- Pallares Villegas, Zoilo (2002), *La asociatividad empresarial. Una respuesta de los pequeños productores a la internacionalización de las economías*, Bogotá, D.C., Programa de Desarrollo Empresarial Sectorial (PRODES).

- Pinto, Martha Elena (2003), “Lineamientos de política para el sector de comunicaciones”, Cartagena, unpublished.
- Puyana, David Guillermo (2004), “La problemática de las pymes en Colombia: internacionalizarse o morir” [online], Bogotá, D.C., Centro de Investigaciones Escuela De Finanzas y Comercio Exterior <<http://www.usergioarboleda.edu.co/pymes/noticia1.htm>>.
- SENA (Servicio Nacional de Aprendizaje) (2004), Official site [online] <<http://www.sena.gov.co>>. (2002), *Plan estratégico 2002-2006*, Bogotá, D.C.
- Ueki, Yasushi (2003), “E-commerce environment and trade promotion for Latin America: policy implications from East Asian and advanced economies experiences”, *Comercio internacional series*, No 29 (LC/L.1918-P/I), Santiago, Chile, Economic Commission for Latin America and the Caribbean (ECLAC), July. United Nations publication, Sales No. E.03.II.G.80.
- Universidad de los Andes (2004), “Proyecto de estudio de casos colombianos y un país de similares características en cuatro sectores productivos que permitan identificar casos de éxito y/o fracaso en la implementación de tecnologías de información y comunicación en las PYMES”, Santiago, Chile, Facultad de Administración, unpublished.

EL SALVADOR

Merlin Alejandrina Barrera López

I. Introduction

Though there is, today, an abundance of information, most individuals and companies have little knowledge of how to use tools that would allow them to fully exploit this information to enhance the efficiency and operation of their businesses.

This vast informational resource is generally overlooked by companies, due to their inability to use it, thus losing the potential advantage it could provide in improving the productivity and efficiency of their operations.

Rapid developments in information technology (IT) have had a dramatic impact on all operational aspects of organizations, as well as in the specific area of technology. For various economic sectors, particularly those with limited resources and small-scale operations, accessing tools that promote competitive development has been one of the most serious constraints. Thus, it is imperative that companies gain knowledge of these new information technologies, which can be used by small and medium-sized enterprises (SMEs) and can become a tool for development, providing major changes in efficiency and productivity, while creating sustainable growth for the countries involved.

II. Present status of information technology in the Salvadoran market, and IT use by SMEs

A. MARKET ASSESSMENT

After undergoing a widely publicized privatisation process in the telecommunications area at an international level, El Salvador has made significant advances in developing communication and information infrastructure. According to World Bank figures, El Salvador had 93 lines per 1,000 people in 2001, compared to 163 per 1,000, the average figure for Latin America and the Caribbean. A local 3-minute call in the United States costs US\$ 0.07, compared to US\$ 0.09 in Latin America and the Caribbean. The statistic for outbound traffic in international telecommunications was 264 minutes per subscriber for the United States, compared to 87 for Latin America and the Caribbean during the same year, while the United States had 125 cellular phones per 1,000 people, compared to 160 per 1,000 in Latin America and the Caribbean. These figures show the significant advances the country has made in this area in the wake of greater openness within the sector through the privatisation of services.

In a similar vein, use of the Internet, as well as use of computers generally, has seen a remarkable increase (table 1).

As can be seen, in 2001 the number of computers per 1,000 people was 21.9, a figure that increased to 25.5 in 2002. According to the most recent Economic Survey taken in 2002 in El Salvador, 5.6% of Salvadoran families had at least one computer, compared to 0.8% in 1995, with 2.3% of families having Internet access. This shows that despite the major progress in communications, developments in information technology and advances in the privatisation process, access to these tools is still limited largely to the capital city and other cities in the vicinity (table 2).

TABLE 1
ICTs IN EL SALVADOR

	El Salvador			Latin America & Caribbean
	1995	2001	2002	2001
<i>ICT Infrastructure & Access</i>				
Telephone mainlines per 1,000 people	50	93	109.1	163
In largest city (per 1,000 people)	171	198		175
Waiting list (thousands)	200	38		4,403
Revenue per line (\$)	702	985		827
Cost of local call (\$ per 3 minutes)	0.01	0.07		0.09
Mobile phones per 1,000 people	2	125	139.7	160
<i>International telecommunications</i>				
Outgoing traffic (minutes per subscriber)	225	264		87
Cost of call to U.S. (\$ per 3 minutes)	—	1.23		3.20
<i>Computers & Internet</i>				
Personal computers per 1,000 people	—	21.9	25.5	59.3
Users (thousands)	—	15.0	24,515	25,666.9
<i>Monthly off-peak access charges</i>				
Service provider charge (\$)	—	26.0		—
Telephone usage charge (\$)	—	0.62		—
<i>ICT business & government environment</i>				
(Rating from 1 to 7, with 7 the highest/best)				
Broadband Internet access availability	—	4.5		4.0
Local specialized IT services availability	—	4.4		4.5
Competition in ISPs	—	4.8		4.0
Government online services availability	—	3.3		3.3
Laws relating to ICT use	—	3.4		3.3
Government prioritisation of ICTs	—	3.4		3.4
Secure servers	—	7		2,769

Source: World Bank, Data by Country Statistics 2003 and Economic Survey, Digestyc 2002.

TABLE 2
PCS AND INTERNET ACCESS IN EL SALVADOR

	1995	2001	2002
Houses with PCs (%)	0.8	4.6	5.6
Houses with Internet (%)	—	1.7	2.3

Source: Economic Survey, DIGESTYC, 2002

In November 2003, CID Gallup El Salvador conducted a market study on the IT services market in El Salvador. The results were as follows:

There are approximately 100 companies including website-design services, software suppliers, systems analysts, customer service applications, systems consulting services, business consulting, and post-sale services and consulting. Forty-six percent of these relatively new companies started operations between 1992 and 1997, a period in which the process of privatising telecommunications services began.

For 2003, 44% of the business came from commercial firms (B2B), while 35% of business came from government (B2G); 34% of B2B businesses were in the telecommunications sector in 2003, with 30% in services, out of which 25% were financial institutions and 27% were in manufacturing for export.

Among companies that provide IT services, 50% have exported their products, primarily to markets in the United States, Mexico, Guatemala, Honduras and other Central American countries.

B. PENETRATION OF IT AND E-COMMERCE AMONG SMEs

According to a study conducted by CID Gallup El Salvador in 2003, among a sample of 100 companies, 25% were government and 75% were private, with SMEs accounting for a third of the private firms; 56% stated that they had contracted local firms for application development services.

Salvadoran companies make extensive use of IT: based on the enterprises surveyed, 14% had 1-25 computers, 18% had 26-50, 24% had 51-100, 19% had 101-200 and 26% had 200 computers or more.

Additionally, 50% of these companies had Internet access, as follows: 21% when the number of computers is 26 to 50, 13% when the number of computers is 51 to 100.

Firms' use of local IT is mainly for sales applications (72%), human resources (71%), application integration (68%), portals (62%), financial applications (60%), marketing and customer service applications (50%), distribution applications (38%), business to consumer applications (33%) and manufacturing applications (29%).

III. Development of SMEs within the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMEs IN THE OVERALL ECONOMY

SMEs are classified according to the number of employees, being those businesses with up to 100 employees (microenterprises have up to four employees; small enterprises have from five to forty-nine employees; and medium-sized enterprises have from fifty to ninety-nine employees).

In terms of job creation, SMEs utilize a high percentage of the economically active population, thus making them vital to the development of the national economy.

According to the Ministry of Economy's economic survey for 2002, there were approximately 465,969 registered establishments including micro, small and mid-sized businesses, employing a total of more than 700,000 persons. In addition, one sees evidence of the importance of SMEs when the economic sector is analysed by categories: In industry, trade and services, microenterprises contribute most to job creation (table 3).

According to the 2002 economic survey, SMEs in El Salvador account for 45.3% of GDP. The data takes on greater significance when comparing the different economic sector: services account for 52% of GDP, with the commercial sector accounting for 44% and the industrial sector accounting for 39.6% (table 4).

TABLE 3
IMPORTANCE OF SMALL AND MEDIUM ENTERPRISES IN EL SALVADOR,
BY NUMBER AND EMPLOYMENT SOURCE 2002

Size of company by number of employees	Number of companies	%	Number of Employees	%	Average Employment
Less than 10	141,887	91.7	468,567	51.1	1.9
10 – 49	10, 541	6.8	308,619	33.6	6.5
50 – 99	1,402	0.9	21,850	2.4	26
Above 100	941	0.6	118,352	12.9	531.2
Total	154,771	100.00	917,388	100.00	

Source: Economic Survey 2002, DYGESTIC.

TABLE 4
GROSS NATIONAL PRODUCT, BY SIZE OF COMPANY AND NUMBER OF EMPLOYEES

SECTOR	Under 4	SMEs				Above 100	Total
		5 to 9	10 to 49	50 to 99			
Industry	569,561.48	85,832.11	355,148.68	175,147.65	368,233.48	1,553,923	
Trade	748,989.48	245,000.45	341,333.71	81,679.77	96,188.34	1,513,191.75	
Services	520,908.22	116,651.77	553,982.97	92,789.26	170,130.05	1,454,462.27	
Total	1,839,459.20	447,484.34	1,250,465.30	349,616.68	634,551.88	4,521,577.40	
Percentage	40.70%	9.90%	27.70%	7.70%	14.00%	100.00%	

Source: Economic Survey 2002, DYGESTIC.

Despite this major contribution to the economy, SMEs face serious obstacles. These include shortcomings within the firms, which make it extremely difficult to take advantage of opportunities arising from free trade agreements, with these becoming a liability rather than an advantage. Limitations in the ability to purchase goods represent another major constraint. The generally poor negotiating capacity of SMEs presents a further problem, exerting a negative effect on their prices and, hence, on their market competitiveness.

The lack of trained technicians is another serious problem for SMEs, since this, too, affects competitiveness within their sector. Other factors include debt, the cost of maintaining public relations with customers and lack of access to bank loans. These elements in combination contribute to stifling their prospects in the new millennium. In light of these challenges, the private sector is negotiating to persuade the government to provide concrete assistance for the SME sector.

No statistics are available to show SMEs' contribution to exports of goods, which for December 2003 reached US\$ 3 billion, of which approximately 90% comes from large businesses.

B. CASE STUDIES ON THE USE OF E-COMMERCE AND SUPPLY CHAIN MANAGEMENT (SCM) IN SELECTED INDUSTRIES

Beginning in 1996, El Salvador began a major National Competitiveness Programme aimed at improving the productivity and competitiveness of Salvadoran companies. This programme identified as strategic economic sectors: textiles and clothing, coffee, apiculture, metal/mechanical, ornamental plants and flowers, handicrafts, tourism, the immigrant community, electronics and information technology (IT).

These productive sectors began by carrying out sectoral analyses to identify their main features, strengths and weaknesses, so as to be able to design a strategy to increase their competitiveness.

The identification of principal features of the apiculture sector allowed the company VAPE S.A., a cluster member, to design a strategy to provide value added to honeybee products, through the acquisition of new technology, improvement of current processes, and development of new products. Examples include:

- a) Production and export of honeybees, in light of the decrease in Salvadoran exports during the civil war that occurred between 1979 and 1982. There was a 9.5% increase in honeybee production between 1961 and 1987, with exports growing 8.8%. However, from 1987 to 1996, its production and exports dropped by 4.8%.¹ Despite the fact that honeybee production and exports decreased, the value of exports showed a growth trend.
- b) Overall, the country's share of the international market remained unchanged, with new competitors coming onto the international market.
- c) While Salvadoran honeybee exports were increasing, they were also being concentrated in the European market, with 85% of such exports going to Germany.
- d) There was also a concentration in the buyers' market.
- e) Cost analysis showed that production costs were lower than those in competing countries; that advantage, however, had been counterbalanced by transportation and freight charges, making the per-kilogram cost of the product higher.

In the distribution supply chain, it was found that marketing and import costs accounted for the largest percentage of the final price.

Since the time the industry analysis was conducted, the company VAPE S.A., which produces honeybees, undertook a major restructuring, forming a new firm that made use of new technology, adding value to the product. The new company was called HealthCo Products.

1. CASE STUDY: HealthCo Products Company

HealthCo was established in Central America as a business committed to improving consumers' quality of life by means of natural alternatives and use of the highest-quality ingredients, processed exclusively for HealthCo, with the assistance of outside scientific consultants specialising in the field of preventive health care.

The company believed that the solution to consumers' health problems could be found in the curative power of plants, herbs and a well-balanced diet. The firm offers these solutions through products processed under the strictest quality control and endorsed by certifications granted by the High Council of Health.

The company relies on modern facilities of the highest quality, innovative technology and highly skilled personnel for the production of nutritional supplements.

As this introduction is being written, the company's team of researchers are studying and developing new formulas to improve human health.

The goal is to construct a route to a healthier lifestyle, through 100% natural solutions that the company believes to have curative powers.

¹ Source: United Nations Food and Agriculture Organization (FAO), FAOSTAT Database; Comments of the Apiculture Cluster Working Group; Analysis of the Monitor Company.

Company facilities

- **Headquarters**

The company's headquarters are located in the future industrial and commercial heart of El Salvador.

- **Honeybee Processing Plant**

The facilities meet all requirements of the Salvadoran Ministry of Health. It is in these facilities that the company processes gourmet-quality honey, prepared daily for export to countries in the European Union, such as Germany and Spain.

- **Laboratory**

The laboratory operates under the strictest quality control. The company verifies and monitors each process involved in production. The operation is backed by advanced European technology and by raw materials of the highest quality, making it possible to produce a highly reliable product. Certified by the High Council of Public Health, with facilities that exceed the required standards, the company engages in good manufacturing practices (GMP).

Product distribution

HealthCo sells its products in three ways:

- **Multilevel**

People can select among three business alternatives for the marketing of the products, the first being multilevel marketing.

Product distributors are provided with all of the necessary physical and intellectual materials. They also receive a formal explanation of the multilevel system to provide them with a better understanding of the various steps involved in the process, thus allowing them to gain the necessary clarity and confidence in the products, which in turn will be conveyed to the clients.

- **Retail**

All products are carefully adapted to the retail market. HealthCo provide clients with the necessary promotional materials and marketing logistics, based on the market.

- **Private Label**

The extensive production capacity allows HealthCo to supply local and international markets simultaneously, while successfully meeting the high quality standards demanded by the market. There is also an excellent in-house graphic-design department. Their product label designs have helped HealthCo attract new clients at fairs, differentiate the product on store shelves, and adapt products to foreign markets and languages.

Information technology (IT) usage by Healthco

- **Production Process**

HealthCo Products has invested in sophisticated, modern equipment, allowing the company to enhance the value added of their products.

In addition, the company has made efforts to install and use IT equipment and facilities that will enhance efficiency, product development, access to new foreign markets, and income from exports.

The laboratory operates under strict quality control standards. HealthCo verifies and controls each process involved in production, and is supported by advanced European technology and by raw materials of the highest quality, making it possible to produce a reliable product for consumers.

As mentioned earlier, certified by the High Council of Public Health, the company observes good manufacturing practices with facilities that exceed required standards (GMP). The facilities meet all the requirements of the Salvadoran Ministry of Health.

These facilities also process the honey used in producing homogenized honeys. The large storage area makes it possible to maintain high levels of inventory to supply the ongoing demand.

The value added incorporated in the primary product, honey, makes it possible to produce a range of sophisticated new products.

- **Marketing and Sales**

HealthCo's multilevel system includes a worldwide network of 5,000 distributors and salespersons who promote and market the product, maintaining contact with the company through the Internet. HealthCo provides support, training, marketing kits and all materials required to promote and sell the products. Eighty-five percent of sales revenue is derived from this multilevel distribution system.

- **Supply Chain Management (SCM)**

All products and services that HealthCo requires for its production process are available through a network of services, which provides the honey—supplied by VAPE S.A., the firm that first initiated honey production—and assists in packaging, logistics and transportation.

- **Services (Electronic Data Interchange [EDI])**

HealthCo draws on a network of different e-services, which utilize information and communications technologies (ICTs) to enhance efficiency. These provide services related to banking, taxes and customs, while at the same time offering a directory of distributors, a catalogue of products, and a website (www.healthcoproducts.com).

2. CASE STUDY: Software Alliance Company

Company data

Software alliance S.A. de C.V. is a small Salvadoran enterprise dedicated to the manufacturing of software with administrative applications and specializing in scientific research and development for the software industry. Created April 11, 2003, it offers an innovative product to the international, as well as the Salvadoran market.

Software Alliance S.A. de C.V. is part of the EQUIBANK group, which includes:

- EQUIBANK
- C. S. EQUIBANK
- NETWORK ALLIANCE S.A. de C.V.
- SOFTWARE ALLIANCE S.A. de C.V.

EQUIBANK was established eleven years ago as a business dealing with security. Currently, C. S. EQUIBANK S.A. de C.V., part of the group overseeing this market, provides services such as maintenance of ATMs, which it carries out for the majority of the banks operating in the country; and manufacturing of theft-proof products for the industrial and commercial sectors. The other members of the group –Network Alliance S.A. de C.V. and Software Alliance S.A. de C.V.– specialize in the information technology area (software and hardware).

Software Alliance manufactures programs for integral solutions. Its distributors, which are in charge of marketing the products, oversee sales and post-sales customer service. They also coordinate training for their customers, designed to provide information about operation and optimal use of the software. The staff includes eight administrative personnel and four programmers. The

company has strategic ties with the Israeli firm, Magic Inc., which also manufactures software on a global scale. The linkage is designed to achieve two objectives: first, it allows Alliance Software to obtain technical assistance from this prestigious firm, which also grants the company licensing rights to “Magic International”; second, it allows Alliance Software to market Magic’s products in El Salvador.

The company also has a commercial agreement with the Chilean-based company, e-Commerce Solutions, aimed at furthering its goal of expanding in the Latin America market, particularly in Chile and Mexico. In light of its desire to move into additional markets, Software Alliance has highlighted several points regarding exports, including the following:

- They are members of the “information technology” cluster, as designated by the Ministry of Economy of El Salvador.
- They are in the process of becoming CMM (Capability Maturity Model) certified.
- They are associated with Microsoft in technical and commercial matters.
- They are registered on EXPRO (Export Program for Micro, Small and Medium Enterprises) in El Salvador.
- They have a very detailed export study, carried out by CONAMYPE (National Commission for Micro and Small Enterprise), through which they gained a recognition of the high export potential of their product.
- They have received assistance from CENTROMYPE (Foundation to Promote the Competitiveness of Micro and Small Enterprise) for their export project.
- They are members of EXPORTA EL SALVADOR (National Export Promotion Agency).

The product they offer

The innovative product offered by Alliance Software is called GERENT-E, a program that provides SMEs with administrative solutions. The product has multiple uses and can be accessed simultaneously by different personnel within the same company. It displays multiple times and multiple currencies.

GERENT- E is made up of three modules: financial; human resources; and administrative. Each module is independent and is marketed separately. The financial and human resources modules have garnered the highest volume of sales, due to the importance of these areas to SMEs. The company believes that the product offers several advantages, which have allowed GERENT-E to be competitive in the Salvadoran software market alongside other internationally known brands.

As mentioned earlier, GERENT-E is an innovative product that can be installed and become operative in five minutes. It has an animated tutorial that not only answers Frequently Asked Questions (FAQs), but also provides a complete guide to use of the program. Additionally, the product offers interactive assistance via e-mail, drawing on a specialized team of engineers and technicians employed by Alliance Software to ensure that the program performs as it should to meet the customer’s needs.

Other features of the product are as follows:

- It offers intelligent updating of balances.
- It provides graphic reports for the user that give comparisons between the user and the competition.
- It catalogues account charts, based on international standards.

C. PROBLEMS SMEs FACE IN PARTICIPATING IN THE TRADE-ORIENTED VALUE CHAIN

The internationalisation of the companies, the opening of new markets resulting from the signing of trade agreements, and the economic development they engender, along with the use of ICTs, have allowed the integration of ever-expanding and more complex value chains, ranging from the providers of raw materials to the logistics management involved in distributing to end consumers. Despite this fact, in El Salvador SMEs have a low level of participation in these value chains, due to both internal and external factors. The internal factors are the following:

- ***Low level of technification in the productive and administrative processes within SMEs***

One of the major features of Salvadoran SMEs is the relatively intensive use of labour compared to reliance on capital and technology, which would allow them to enhance efficiency in the production process. The lack of technology in production, as well as in management, increases production costs for these companies, while reducing their productivity and competitiveness. Thus, the possibilities of becoming part of the value chain with highly technological companies are very limited, especially considering the intense competition among companies to establish a presence in new markets.

- **Problems in accessing financing**

Though there is a wide range of credit lines oriented to providing financing for SMEs in El Salvador, the stringent requirements and low-risk culture within the financial system act as constraints. The debt accumulated over past years, on the part of certain subsidized sectors, further limits efforts to modernize production plants and enhance competitiveness.

- **Limited management capacity**

The great majority of Salvadoran SMEs are family owned businesses and are passed from generation to generation, leading to a certain “imprinting” in management style. The centralized decision making, as well as style of supervision and production, makes them less competitive.

- **Deficiencies in creating businesses and in entrepreneurial culture**

In El Salvador, the economy’s dependency -on commodities exports, the high degree of protectionism in the form of tax barriers, affecting certain sectors in the past, and the tendency to form family owned businesses, limited the training of an entire generation of managers capable of anticipating the changes demanded by new conditions in the global economic environment and of modernizing the business so as to be able to rapidly become part of large-scale value chains.

- **Poor development of aid services**

El Salvador has no network of services providing comprehensive assistance to help SMEs become part of the value chain through: standardization in the production of goods and services; certification and accreditation of labs; design and adaptation of new products and packaging; technological research and development oriented to the productive sector; marketing strategies; and focus on sectors of strategic importance.

IV. Government policies designed for SMEs, IT, and international trade

A. IT POLICIES IN THE COUNTRY'S OVERALL DEVELOPMENT STRATEGY

El Salvador has already outlined a path to allow for the formulation of an IT policy. Many variables need to be taken into account in the final formulation of this policy. Defining the route that best guarantees success in implementing such policy is a complex task. To be successful, it must address the country's immediate demands for development. El Salvador has launched initiatives aimed at achieving the national objective of bringing well-being to the country's population, and an effective IT policy will play an important role in the development process.

The need to define a computer science policy has been linked with various factors and motivations related, in part, to the nature of technology itself, how it is disseminated, the economic opportunities it represents, and its impact on other areas.

Computer science policies are based on criteria relating to the environment, more general policy approaches, the role of the State, the specificity with which the policy is defined, its scope, and the instruments used to implement it. Moreover, it should incorporate strategic policy guidelines that have been debated in the society, along with effective measures to help implement and define a scheme for creating a set of concrete projects.

The effort to create a national computer science policy in El Salvador is based on major achievements in the field. First, the country has accumulated an important physical inventory of technology capable of supporting IT efforts. At the same time, advances in establishing an information system that can provide the society with access, via IT, to databases of national interest, are currently under development. This includes access to information on the Central Reserve Bank and the Superintendency of Values. Work is also underway to provide access to information on the Ministries of Treasury, Economy and Customs. In the cultural realm, the country's major universities have been involved in this system, providing information ranging from library content to databases detailing national research efforts. Thus, the infrastructure of the Salvadoran Internet Network is, in principle, facilitating the creation of an eventual National Information System. Implementation of this system will constitute a major advance for computer science development in El Salvador and, combined with a suitable national policy, will move the country toward achieving its objectives: modernization, greater competitiveness, and economically, socially and culturally sustainable development.

In summary, El Salvador's strength is based on: the development and implementation of competitiveness policies; interest, on the part of the productive, academic and State sectors, in developing the computer culture; efforts aimed at improving and automating technical-administrative processes in public and private areas; improving the telecommunications system; developing the Salvadoran Internet Network, SVNet; making the National Council of Science and Technology (NCST) an effective operating entity; and strengthening the National Computer Science Committee (CSNC).

B. POLICIES TO SUPPORT SMEs

1. Export promotion

El Salvador is currently moving toward developing international markets in commercial areas, since this is seen as a potential source of economic growth. SMEs are also attempting to gain a share of this international market, giving rise to numerous institutions and programs to support these firms. The most important of these are:

- EXPORTA EL SALVADOR (National Export Promotion Agency).
- EXPRO (Export Program for Micro, Small and Medium Enterprises).
- CONAMYPE (National Commission for Micro and Small Enterprise).
- CENTROMYPE (Foundation to Promote the Competitiveness of Micro and Small Enterprise).

Financial instruments are:

- Fund for Technical Assistance on Exports (FAT).
- Export Promotion Fund (FOEX).
- EXPRO-CENTROMYPE Fund.
- Multisectoral Investment Bank (BMI) Credit Program.
- Credit Program for micro and small businesspersons.
- Export Credit Program.
- Mutual Guarantee Fund.
- Other tax incentives.

2. Trade facilitation

The Government of El Salvador, through the Ministry of Economy, has been working to create a business environment conducive to increasing the competitiveness of the productive sector, in order to promote its success in a changing and globalised world, and to assure investors fair and equal treatment for their investments, through legal norms and transparent institutional mechanisms.

The Ministry of Economy, through the Trade and Investment Office, has introduced reforms to the legal and institutional framework to facilitate the establishment and operation of domestic and foreign investment in the country.

The National Office of Investments (ONI)

The Law of Investments standardized regulations regarding the establishment and operation of domestic and foreign investments, and created the National Office of Investments (ONI). The National Office of Investments has established a single window to process, at one location, all investor-related formalities. Through this system, local and foreign investors are able to complete all requirements and be ready to begin operations within 7 working days.

The Export Electronic System (SIEX)

- An electronic clearinghouse for export permits.
- Automatic export authorization by electronic means.
- Export permits issued in 45 minutes.
- Subscription free of charge.
- 24 hours a day, 365 days a year.
- Provides relevant trade information.

El Salvador has already signed various trade treaties with different countries, which further enhance the climate for investment.

3. FDI promotion

The government promotes investment, with a particularly favourable policy with regard to foreign investment. For this purpose, PROESA (Promoting El Salvador) was created as a government office to oversee the promotion of investment and to facilitate the execution of procedures required by the laws.

4. Business promotion

El Salvador has created an atmosphere favourable to the development of new businesses, both local and international. There are also agencies which, in coordination with other foreign institutions, have created programs to provide incentives to different productive sectors for the creation of new enterprises. The prime example of this is the program, “Launch Your Idea” (ETI).

This platform for competitiveness was designed to train young people who wanted to establish an enterprise, teaching them to formulate their own plans and rewarding three of the best efforts with seed capital. This program also provides participants with the opportunity to expose their business ideas to investors interested in financing promising enterprises.

C. SPECIAL MEASURES TO CORRECT THE “DIGITAL DIVIDE” BETWEEN COMPANIES

1. Human resources

Escuela 10 Program

This program is designed to offer opportunities for educational excellence to children and youth at public educational centres throughout the country. The program consists of support, dissemination and accreditation of the educational quality of public educational centres in El Salvador.

Ciberolimpiadas

The Cyberolympic initiative consists of a contest in which students with basic and average education within the Salvadorian educational system employ information and communication technologies to develop websites. Through the Cyberolympics, learning dynamics are developed, contributing to active participation on the part of the school community, while motivating the training of students and teachers in the use of the new information and communication technologies for school activities.

2. Technical aspect

One of the most important instruments for promoting the use of IT in SMEs is the electronic commerce guide, titled “The Secret of Electronic Commerce.” Preparation of this guide was an initiative supported by the International Trade Centre (ICC), the Central Reserve Bank of El Salvador and the Corporation of Exporters of El Salvador.

The objective of the guide is to encourage a culture of electronic commerce in El Salvador among SMEs and to promote the advantages that the system offers for doing business.

3. Financial aspects

Technology Development Fund

In order to promote the use of technology as an engine of sustainable growth, the Department of Economy and the Multisectoral Investment Bank (a second-tier bank) has supported

the development of a Technological Extension System and of a Technology Development Financing System for El Salvador.

The Financing System includes the development of three funds for small and medium enterprises, offering nonreimbursable resources to support the process of innovation and the marketing of products.

4. Infocentres

In attempting to move the country toward the future, an initiative was created by the Government of El Salvador, with the support of the World Bank, to define a development strategy based on creating and making productive use of information and knowledge. Infocentres are being created on the basis of identified demand for information and services.

Infocentres in El Salvador operate as a franchise, offered to private businesspersons who invest in the localities and in the support infrastructure. The content is developed for the Infocentres Foundation, which has the technology necessary to provide technical backup and maintenance, and to design and host websites of other companies, as well as the ability to conduct teleconferences, online forums and online training.

5. Others

Red del Desarrollo (Development Network)

Since 2003, El Salvador has been creating the Development Network Programme, an executive network, located in 41 infocentres throughout the country. These telecentres support SMEs seeking information about loans, providing direct contact with executives in banks and financial institutions based on the needs of the client. Nonfinancial services, such as technical assistance programs (FAT), matching grants for exports, and toolboxes for SMEs are also provided, in addition to contact with guarantee programs and trade organizations for SMEs.

D. E-GOVERNMENT TARGETED TO SMEs AND TRADE PROMOTION

1. Overall strategy/structure of e-government

The Government that assumed power in June 2004 has included, in its strategic lines of action, the “Connectivity Agenda,” designed to incorporate the use and large-scale application of ICTs, as tools for the country’s economic revitalization and social development. To this end, there must be coordinated activities within the government, the productive sector, the academic sector and civil society, to formulate a national policy on information technology use.

The specific areas of action will include, among others, the following:

- Access to infrastructure.
- Creation of content.
- Education and training.
- Online Companies.
- Online Government.
- Online Academy.
- Online Municipalities.
- Development of the Information Technologies Industry.

In tandem with this, the Connectivity Agenda, established by the current Salvadoran Government, coincides with the IT Master Plan for Central America, formulated in the framework of the Plan Puebla Panama (PPP) integration project, an initiative representing a common regional development approach among the countries of Central America and Mexico, encompassing 8 areas of development. El Salvador heads the committee related to communications.

2. Some applications

a) E-procurement

FOVIAL

The Road Conservation Fund (FOVIAL) is a government organization that draws on private participation. It was created by the government to provide services for conservation and maintenance of roads, encompassing all of the country's paved and unpaved roads.

This entity (www.fovial.com) has created a portal that publishes, on a daily basis, all of its projects, bids, awards, bid records and online opening of offers, along with online publication of all legal norms, documents, projects and other necessary information so that companies dedicated to these areas can offer their services to the State.

The Law of Procurement and Awards mandates that the exact time at which bids for a given project are opened must be recorded. Participating enterprises may also monitor this process from their offices, through the "Online Opening of Offers."

b) Customs and other trade-related procedures

TELEDESPACHO (TELEDELIVERY)

As part of the effort to modernize the General Office of Customs (DGRA), the Teledelivery system was implemented. Since February 14, 2004, the use of TELEDESPACHO is mandatory for all importers when declaring their goods to the Office of Customs. The service is available 24 hours a day, 365 days a year.

This change was designed to establish a system of virtual declaration, by which importers and exporters could make declarations from their homes and/or from anywhere in the world using digital signatures.

Integrated Foreign Trade System (SIEX)

This is a system that connects, through the Internet, exporters, State institutions, organizations concerned with foreign trade, and the Centre for Export Procedures (CENTREX), which is part of the Central Reserve Bank of El Salvador.

The fundamental objective of the Integrated Foreign Trade System (SICEX) is to facilitate, simplify, and authorize export documents, and to contribute institutionally to the competitiveness of El Salvador in world trade.

c) Online taxes

The handling of online tax payments is carried out through the portal of the Ministry of Treasury. It is anticipated that, increasingly, other government procedures, such as visa applications, passports, birth registrations, etc., will be incorporated in the system.

d) Other

The new government, which assumed power in June 2004, has made considerable progress in promoting e-government, providing an excellent website with various procedures and services for citizens and businesses.

E. INSTITUTIONAL ISSUES

Compared to the advances in IT use within the government sector, use of IT in the private sector is relatively low. Government IT investments and procurements account for the vast bulk of the total for the country. The present government has established a Puebla Panama master plan. This has defined a vision for the future, in which Salvadoran companies utilise information technologies based on the following:

1. Legal and institutional framework

The government authorized the National Enterprise Commission on Information as the primary entity responsible for all matters related to IT. Under this central entity, various subcommittees will be formed to discuss specific topics relating to the promotion, use and regulation of IT. Budgetary support and allocation of personnel to the central entity will be necessary in order to successfully implement the master plan's Action Plans.

A Vice Ministry of Technology was recently created, setting in motion two pilot projects for digital literacy instruction, which is being used to introduce the basic concepts of computers and the Internet to 400 children in rural areas.

Establishing laws to promote IT is a priority concern, covering the development of the IT sector, e-government, security, a legal database, and building capacities, as well as funds to finance promotion of the sector and the use of IT in other sectors.

2. E - government

In order to effectively implement e-government, the functions should be centralized under the proposed structure referenced earlier. It is also important to erect a building to house the Centre for Electronic Government, so as to serve as a symbol of the country's intention to be a major player in IT. Among the priority projects are those related to centralizing the functions of electronic government. These include a centre for electronic government, coordination centre, technology bank, training centre, government relations system, government entry, government WAN, standardization, etc.

3. Industry and commerce

The programs proposed require substantial proficiency in IT, and even the lower-level programs require some knowledge of IT. Thus, some projects cannot be carried out efficiently under current conditions. However, once set in motion, the projects will have a positive impact, demonstrating that the government is intent on providing an enhanced business environment. Proposed initiatives include the creation of a business database, with an inventory of IT businesses and experts; statistics on IT-related commercial and industrial activities; assigning high-priority business to the national IT industry; establishing incubation centres; providing a network environment; and creating an electronic-learning package, etc.

4. Development of human resources

According to an evaluation of the list of projects, the most effective human resources development projects are: "Improving Knowledge of IT in Enterprises" and "IT Training in Schools." The latter includes purchase of PCs, programs to train teachers and community leaders, networks linking the country's schools, development of educational content, etc.

5. ICT infrastructure

The status of ICT infrastructure in El Salvador is relatively good compared to that in other countries of Central America. Thus, the priority projects in this sector relate mainly to improving access to the Internet. Establishment of the Neutral Access Points (NAP) is considered a high priority, since the present condition of the system will have trouble accommodating the increasing

traffic of data projected for the near future. Other priority areas include: introduction of a G3 cell phone system to promote electronic commerce and improve Internet access in rural areas; and improvement of statistical data and strengthening of the Superintendency of Energy and Telecommunications, which is the principal entity regulating access to the Internet—an important element in future broadband traffic.

V. Regional networks

There is no cooperative network in El Salvador to promote trade by SMEs, trade facilitation, or coordination with others trade systems. There are, however, numerous private and public websites oriented to providing trade information to Salvadoran SMEs, promoting exports, fostering foreign investment, and promoting catalogues listing Salvadoran products and companies.

The most-visited websites in El Salvador, due to their ability to provide useful and effective information, are:

<http://www.coexport.com>

- Objective: to promote exports and to provide relevant information for the members of organizations and other interested entrepreneurs.

www.centromype.com.sv

- Objective: to promote business for SMEs and provide trade information and business opportunities.

www.camarasal.com

- Objective: to provide trade information and promote business for members of the Salvadoran Chamber of Commerce.

www.agronegocios.gob.sv

- Objective: to provide trade information and promote agribusiness.

www.tradepoint.gob.sv

- Objective: to support a worldwide trade point network and provide trade.

www.infocentros.org.sv

- Objective: to promote connectivity in numerous points around the country and provide relevant information to the Salvadoran population.

www.exporta.gob.sv

- Objective: to promote Salvadoran exports of products and services around the world.

VI. Conclusions and recommendations

A. CONCLUSIONS

SME development

SMEs' contributions to the Salvadoran economy, as well as to GDP and to job creation, are beyond question. However, despite the extensive efforts carried out by public and private organizations to develop the skills needed by SMEs and supply important resources and services,

this process is still in its early stages, with SMEs still finding it difficult to become part of the supply chain.

Export promotion policies

El Salvador has various initiatives aimed at promoting exports of goods and services to foreign markets, taking advantage of the benefits provided by several free trade agreements that have been signed with a number of countries.

These initiatives are oriented to providing technical assistance, financial and non-financial services, trade information, trade intelligence, etc. However, all of these efforts are offered to entrepreneurs in a non-integrated manner, rather than as an integrated set of services. The result is that the services reach some businesses, while others lack access to them.

Information and communication technologies (ICTs)

The level of ICT development in El Salvador is moderate. The country has developed one of the best physical communications infrastructures in Central America, as a result of its efforts to implement the Telecommunications Privatisation Law, which has been judged to be one of the best in the world.

The private sector, particularly large enterprises—represented by the banking and commercial sectors—has introduced improvements in the use of IT, in regard to management processes, human resources management, marketing and consumer services, as well as in relation to design of EDI and customer relationship management (CRM) systems. However, among SMEs, the use of ICTs is limited almost entirely to designing promotional websites and use of e-mail.

Networks

Although there are many initiatives to foster the use of ICTs for purposes of trade promotion and development of SMEs, there are no initiatives geared to creating a cooperative network to improve the efficiency of trade promotion and to use the ICT sector to enhance the operations of development institutions and organizations.

B. RECOMMENDATIONS

1. Export and development policies for SMEs should take into account the need to create government support services designed to increase the productivity and competitiveness of Salvadorian companies.
2. ICTs should be used to encourage export promotion policies for SMEs, through fully integrated programs that include a set of multidisciplinary institutions, working to improve assistance to SMEs, stimulate use of these resources, and raise the efficiency of the productive sectors.
3. Based on the recommendations of the Pilot Study for the Formulation of the El Salvadoran Master Plan for Information Technology, promoting ICT usage and connectivity should take place after the introduction of e-government applications and improvements in infrastructure to facilitate access. At the same time, this process should be used by the ICT industry for marketing efforts within the country.
4. Cooperative networks should be designed, drawing on various commercial and trade promotion institutions in El Salvador. The Puebla Panama Plan (PPP) should be used to integrate these networks in larger, complementary regional initiatives, taking advantage of joint efforts with other Central American countries to promote the development of SMS and ITC industries in the Central American region.

References

- Agencia de Promoción de Inversiones de El Salvador – PROESA (<http://www.proesa.com.sv>), San Salvador, September 2004.
- Asociación Infocentros de El Salvador – INFOCENTROS (<http://infocentros.org.sv>), San Salvador, October 2004.
- Central Reserve Bank of El Salvador (<http://www.bcr.gob.sv>) San Salvador, September 2004.
- Central Reserve Bank of El Salvador, Corporación de Exportadores de El Salvador y Centro de Comercio Internacional, “Secretos del Comercio Electrónico. Una guía para pequeños y medianos exportadores.” San Salvador, El Salvador, 2001.
- Multisectoral Investment Bank – BMI (<http://www.bmi.gob.sv>), San Salvador, October 2004.
- Chamber of Commerce and Industry of El Salvador (<http://www.camarasal.com>) San Salvador, September 2004.
- Centro de Trámites de Exportación – CENTRES, Sistema Electrónico de Comercio Exterior – SICEX (<http://www.centrex.gob.sv>), San Salvador, October 2004.
- CIBERESCUELA, “Cyberolimpiadas 2004,” San Salvador, 2004.
- Comisión Nacional para la Micro y Pequeña Empresa de El Salvador- CONAMYPE (<http://www.conamype.gob.sv>), San Salvador, September 2004.
- Consejo Nacional de Ciencia y Tecnología – CONACYT (<http://conacyt.gob.sv>), San Salvador, September 2004.
- Consultoría Interdisciplinaria en Desarrollo S. A – CID Gallup El Salvador, “Desarrolladores de Software,” San Salvador, November 2003.
- Corporación de Exportadores de El Salvador (<http://www.coexport.com>), San Salvador, September 2004.
- Dirección General de Estadística y Censo – DIGESTYC, “Encuesta Económica 2002,” San Salvador, El Salvador, 2002.
- Dirección General de Aduanas de El Salvador (<http://aduana.gob.sv>), San Salvador, October 2004.
- Fondo de Fomento de Exportaciones (<http://www.foex.gob.sv>) San Salvador, September 2004.
- Fundación Promotora de la Competitividad de la Micro y Pequeña Empresa – CENTROMYPE (<http://centromype.com.sv>), San Salvador, October 2004 .
- Fundación Salvadoreña para el Desarrollo Económico y Social – FUSADES (<http://fusades.com>), San Salvador, October 2004.
- Gobierno de El Salvador, “Plan de Gobierno País Seguro,” San Salvador, El Salvador, 2004.
- Japan Bank for International Cooperation, “Estudio Piloto para la Elaboración del Plan Maestro en Tecnologías de Información para El Salvador con Estudio Básico en el campo de las Tecnologías de Información para la región del PPP,” March 2004.
- Ministerio de Agricultura y Ganadería de El Salvador – MAG (<http://www.mag.gob.sv>), (<http://www.agronegocios.gob.sv>), San Salvador, October 2004.

Ministerio de Economía de El Salvador (<http://www.minec.gob.sv>), San Salvador, September 2004.
Ministry of Education of El Salvador (<http://www.mined.gob.sv>), San Salvador, October 2004.
Ministry of Treasury of El Salvador (<http://mh.gob.sv>), San Salvador, October 2004.
Monitor Company and Ministry of Economy, Construyendo las Ventajas Competitivas de El Salvador – Fase III, November 1997 – January 1998, San Salvador, El Salvador, 1998.
Oficina Nacional de Inversiones – ONI (<http://minec.gob.sv/oni/index/html>), San Salvador, October 2004.
World Bank, “Data by Country Statistics 2003 and Economic Survey,” Washington DC., 2003.
USAID, NATHAN ASSOCIATES, INC, “Programa de Exportaciones para las Micro, Pequeñas y Medianas Empresas,” (www.expro.org), San Salvador, October 2004.

MEXICO

Juan Antonio Ramírez Bustos

I. Introduction

Although small and medium-sized enterprises (SMEs) in Mexico are gradually adopting information technology (IT), many are still far from fully leveraging the potential operational advantages of that technology. This is especially true of SMEs whose interaction with large clients or whose role in supply chains depends on their ability to share various types of information, such as inventories, factoring, production control and logistics and to connect to their clients' headquarters. The lack of a more fully developed IT culture partly explains Mexico's lagging international competitiveness.

A new IT culture has begun to emerge within many large companies, and a small number are implementing enterprise resource planning (ERP) systems; however, only a few are improving their competitiveness by using second-generation customer relationship management (CRM) systems.

Although ERP-based solutions appear to be gaining acceptance among Mexican SMEs, in many cases such solutions are inadequate, because of the many obstacles preventing ERP from being implemented according to the needs of individual companies. Foremost among these difficulties is the fact that most Mexican companies lack information on management and operational procedures.

II. The current IT market and IT use by SMEs

A. MARKET ESTIMATES

The 2,095 companies in Mexico's IT industry employ 110,000 professionals. Annual output is more than US\$ 600 million.¹ Yet IT-related expenditures in Mexico account for only 1.4% of gross domestic product (GDP).

Mexico's fledgling software-development industry is characterized by slow growth and a high degree of dispersion. Many companies have family-management structures, are new to the industry, are unable to obtain financing and lack market credibility. The failure rate is high: fewer than 50% of these companies remain in business for two years.

In addition to the lack of financing, including loans and leasing plans, SMEs are saddled by the lack of a stock exchange for the SME sector, which makes it difficult for their employees to participate as investors in business ventures. This obstacle to employee participation in company ownership and in earnings on share valuations harms companies in the short term by preventing them from retaining highly qualified human resources.

¹ Currency equivalents. Currency unit: Mexican peso (MXN). Exchange rate effective 15 September 2004: MXN 1 = US\$ 0.086; US\$ 1 = MXN 11.5. Fiscal year: January 1 - December 31.

In this business sector, talented employees are frequently lured away by competitors, making it more difficult for new SMEs to survive. To prevent United States companies from losing competitiveness due to managerial talent being lured to other countries, the United States and Mexico signed an agreement allowing more than 1,500 Mexican IT experts to receive work visas for the United States each year since 2002. (Similar agreements have also been signed with the Indian and Irish Governments.)

Business-to-business (B2B) transactions are not widespread in Mexico. Most large firms have web pages with catalogues of products and information on their distribution networks. Online sales need to be encouraged with better logistic and transmission infrastructure. Many companies do go online to make purchases, however.

Some of the most important companies in Mexico with binational operations are those in the maquiladora industry, which first emerged along the northern border several decades ago before spreading throughout the country.

Wherever Mexican SMEs have been integrated into the production chains of multinational suppliers, chain management methodologies and systems have been applied, with IT playing an important role in planning, production and monitoring. Large national firms and TNCs have, in conjunction with their suppliers and clients, adopted similar systems to create their own procurement and e-procurement models.

In northern Mexico' high-tech automotive industry, Delphi Automotive Systems² is introducing more advanced IT solutions in all its operations with customers and suppliers.

TABLE 1
CRITO SURVEY ON E-COMMERCE IN MEXICO, 2002
(% of companies surveyed)

Companies that use IT for:	
E-mail	98.3
Website maintenance	79
Intranet	50.9
Extranet	31.1
Extranet access by suppliers/partners	22.6
Extranet access by customers	16.2
Electronic data interchange (EDI)	58.4
Companies that use the Internet for:	
Marketing/advertising	72.9
Online sales	11.8
Aftersale customer service and support	40.2
Online purchases	64.8
Exchanging operational data with suppliers	50.1
Exchanging operational data with business customers	46.7
Formally integrating business processes with those of suppliers or other business partners	54.8
Companies that engage in online sales with:	
Other businesses	24.0
Mean percentage of total business sales conducted online (only includes firms engaging in B2B sales)	20.2

Source: United Nations Conference on Trade and Development (UNCTAD), *E-commerce and Development Report 2003* (UNCTAD/SDTE/ECB/2003/1), New York, 2003, and information from the Centre for Research on Information Technology and Organization (CRITO).

The number of Internet users in Mexico is growing, as new providers emerge, offering dial-up and cable- and wireless-modem service as well as Wi-Fi hotspots in shopping centres and other locations. Users for the most part are high school and university students and independent

² For more information, see Microsoft Corporation (<http://www.microsoft.com/resources/casestudies/ShowFile.asp?FileResourceID=551>).

professionals, among others, while SMEs are a less significant segment of Internet users. The number of Internet users is increasing by an average of more than 40% per year.

TABLE 2
INTERNET USERS IN MEXICO, 2000-2002
(thousands)

Year	Overall	Home	Other
2000	5,058	3,136	1,922
2001	7,047	4,095	2,952
2002	10,765	5,933	4,832

Source: National Institute of Statistics, Geography and Information (INEGI) (2001 and 2002)/Federal Telecommunications Commission (COFETEL) [online] www.cofetel.gob.mx.

Internet use by individuals to search for products and make purchases is increasing quickly, but still lags far behind the levels seen in other industrial countries.

TABLE 3
PERCENTAGE OF THE POPULATION MAKING PURCHASES ONLINE
IN THE SELECTED COUNTRIES, 2002

Country	E- commerce	
	Among entire population	Among Internet users
Germany	11	16
Australia	7	14
Canada	10	16
Denmark	14	22
United States	19	32
United Kingdom	9	23
India	1	4
Ireland	9	19
Italy	3	7
Korea	16	31
Mexico	1	7
Taiwan	5	12

Source: INEGI, with data from CRITO Global e-Commerce Report, 2002.

Almost all SMEs have an adequate number of personal computers (PCs), which are used mainly by office staff for management and accounting tasks. Some companies limit Internet browsing by employees, to avoid distractions and ensure efficiency.

TABLE 4
OFFICE EMPLOYEES AND INSTALLED PCS IN COMPANIES
AND GOVERNMENT OFFICES, 2002

Type of establishment	Total	% with PCs	Number of companies with PCs	Office employees	% of office employees with access to PCs	Total number of PCs
Micro	2,311,230	28%	647,844	2,586,990	23%	643,858
Small and medium-sized	68,940	92%	63,261	1,304,858	65%	882,331
Intermediate	5,265	100%	5,265	919,526	75%	714,447
Large	470	100%	470	758,582	88%	624,259
Education-related	144,197	52%	74,754	1,174,065	43%	577,941
State and federal Government offices	3,019	100%	3,019	3,733,823	15%	551,959
Total	2,533,122	31%	794,613	10,477,843	37%	3,994,794

Source: Ministry of the Economy, "Identificando Nichos de Actividad Económica con un Fuerte Potencial para Adoptar Tecnologías de Información", 2003.

B. IT PENETRATION AND E-COMMERCE AMONG SMES

As in other countries with insufficient investment in IT capital, in Mexico the largest share of annual IT investment is in hardware (60.8%), while the smallest share is commercial software (10.3%).

In fact, in Mexico commercial software as a share of total IT investment is expected to decline, unlike in other countries –including both countries that have a paucity of IT capital investment and those that do not.

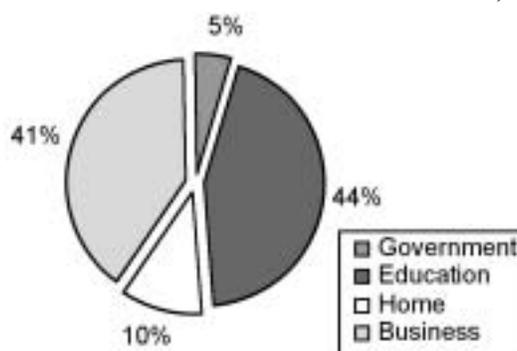
Mexico's IT investment totalled US\$ 19.3 billion in 2002. If the make-up of that investment were to remain the same in 2006 as it was in 2002, 80,419 more jobs would be created in the country's IT industry than can be expected with lower investment in software.

Moreover, because SMEs in Mexico lack a formal organizational structure or even personnel qualified in tasks as specialized as those required for IT, they must hire specialists or external consultants. In addition, SMEs are not fully aware of the ways in which available technologies can be applied.

An attractive option for SMEs with low IT budgets is to establish ties with universities, which generally have IT-training programmes for graduate students. Such cooperation allows SMEs to introduce IT in a cost-effective manner.

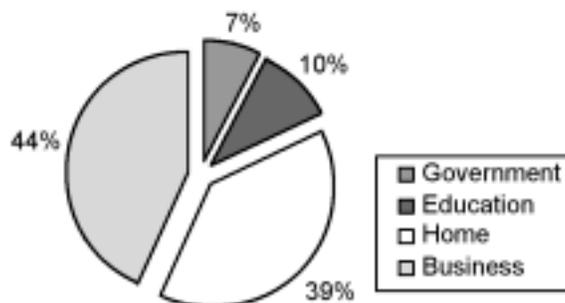
Regarding the breakdown of Internet users, users in the education sector declined from 44% of all users in 1994 to 10% in 2002, due to the strong increase –from 10% to 39%– in the percentage of home Internet users. Business continues to account for the largest segment of Internet users, with its share rising from 41% to 44%, while government's share climbed from 5 to 7%.

FIGURE 1
INTERNET USERS IN MEXICO BY SECTOR, 1994



Source: SELECT-IDC

FIGURE 2
INTERNET USERS IN MEXICO BY SECTOR, 2002



Source: SELECT-IDC

III. SME development in the IT revolution

A. OVERVIEW OF THE IMPORTANCE OF SMEs FOR THE OVERALL ECONOMY

Recent evolution of Mexico's economy

Mexico's economic development strategies and policies from the mid-1950s to the mid-1980s failed to bring economic stability. The high social costs of this failure included an exacerbation of social disequilibria, poverty and exclusion. Underemployment and informal employment became the normal way of participating in the economy for an ever-growing number of Mexicans.

By the mid-1980s, the Government abandoned import substitution as an economic-development model in favour of a one based on opening the country to foreign trade. In 1986, Mexico joined the General Agreement on Tariffs and Trade (GATT). During the 1990s, economic policy was geared to further opening Mexican markets through deregulation and the signing of free trade agreements (FTAs). Mexico has thus far signed 12 FTAs with over 40 nations. The most important of these, the North American Free Trade Agreement (NAFTA), underscored the Government's aggressive opening to foreign trade. Along with a gradual recovery of the economy and a favourable international environment, increased foreign trade introduced a new scenario that has led to dynamic export growth in recent years. From 1994 to 2000, exports rose from US\$ 60.9 billion to US\$ 166.5 billion, for an average annual increase of 18.2% in real terms.

Constraints on SME growth

As in other countries, the SME sector in Mexico accounts for an important share of economic activity. There are estimated 2 million SMEs in the formal sector throughout the country, or about 60% of all businesses. They contribute about 45% of the value added by the private sector and account for about 55% of private-sector employment.³ As is the case elsewhere, Mexican SMEs are very heterogeneous and are distributed in the commerce, services and manufacturing sectors. In the Federal District, for example, registered SMEs in the industrial sector are concentrated in the food, clothing, furniture and wood-products, publishing and printing and metalworks sectors. SMEs operate in a variety of settings, including home offices, commercial premises, industrial facilities and, to a considerable extent, industrial parks.

SMEs have benefited little from export incentives because SME exporters have failed to establish linkages with domestic suppliers. SMEs have a minimal participation in total direct exports of 6.65%, compared with 51.86% for large exporters and 41.49% for large and medium enterprises located in maquiladoras.

Slow domestic growth has had a serious adverse effect on SMEs. In addition to macroeconomic considerations, other factors directly undermine the competitiveness of Mexican companies. The manufacturing sector points to the following causes:

- High costs of meeting regulatory requirements;
- Lack of training in and development of entrepreneurial skills;
- Limited training in and development of human resources;
- Lack of information systems and of an awareness of the market and marketing issues;
- Lack of efforts to promote technological innovation; and
- Lack of access to timely, affordable, and appropriately targeted financing.

³ FUNDES Mexico, Gaxiola Meléndrez (2003).

Business Development Programme

For the Mexican economy to grow, the country must address its huge inequalities and respond to pressing social demands. Accordingly, the present Government has put forth the National Development Plan, the aim of which is to achieve growth with equality. The plan's five key targets are to:

- spearhead responsible economic growth in the country;
- enhance the level of competitiveness throughout the country;
- ensure that development include the participation of all social sectors;
- achieve regionally balanced development; and
- establish conditions allowing for sustainable development.

SMEs are the driving force of the Mexican economy, the pillar of development and the most important engine of wealth creation. They should receive special attention in order for them to take full advantage of opportunities in Mexico and in the global market and help the country modernize, by acting as job creators and as instruments for social development and a more equal income distribution.

The federal Government has introduced the 2001-2006 Business Development Programme, as part of the core strategy of the National Development Plan, to allow business to meet three major challenges.

The first challenge consists in promoting an environment conducive to enterprise development and a healthy macroeconomic climate through structural reforms and sound government management. The aim is to allow companies of all sizes and in all sectors to grow and to become more competitive, in addition to encouraging the creation of new enterprises.

The second challenge is to make SMEs competitive, by helping them develop the internal capacities they need to be successful players both domestically and internationally.

The third challenge is to identify economic opportunities in specific regions and productive sectors, all while enabling States and municipalities throughout the country to leverage their competitive and comparative advantages. This turn, should consolidate regions and sectors with local businesses that are striving to meet world levels of competitiveness and encourage the transformation of existing production chains and the formation of new ones.

Mexico's Government has devised six strategies to meet these challenges:

- Promoting a competitive environment for enterprise development;
- Giving companies greater access to financing;
- Promoting business creation, worker training and production techniques to raise companies' competitiveness;
- Promoting better management techniques and greater technological innovation and development;
- Developing regions and productive sectors throughout the country; and
- Rebuilding and developing production chains to consolidate the domestic market.

In line with the six strategies outlined, in the federal Government's Business Development Programme, actions are being planned at all three levels of government (judicial, legislative and executive) to implement the following initiatives related to SMEs, to municipal procurement procedures and to the monitoring of companies' performance:

- a system to streamline procedures for opening businesses, to be implemented by the Federal Regulatory Improvement Commission (COFEMER);

- the Electronic System for Government Procurement (Sistema Electrónico de Contrataciones Gubernamentales, known as “Compranet”) of the Civil Service Ministry (SECODAM; formerly known as the Ministry of Comptrollership and Administrative Development); and
- electronic portals to allow government agencies to provide services online.

B. CASE STUDIES ON E-COMMERCE AND SCM IN SELECTED INDUSTRIES

1. Infocentre of the Quintana Roo Hotel Association

Project objectives

The association’s prime objective in establishing the Infocentre was to provide SMEs with a site to offer their services, through the coupling of IT with an innovative marketing channel. Hence, the Infocentre was viewed as a way for suppliers to use IT to establish business models that would strengthen their commercial linkages with hotels through what was called a “Buyers Club”.

Antecedents

In 2000, the World Bank, Nacional Financiera, S.N.C. (NAFIN), and the Quintana Roo Hotel Association devised a project to create a business centre bringing together services for supplier development, training, technical assistance and online commercial activities. The aim of the project was to encourage the adoption of best practices by SMEs and thereby strengthen suppliers of goods and services to the hotel sector in the State of Quintana Roo.

The project’s principal objective was to develop local suppliers in the States of Quintana Roo, Yucatán, Campeche, Tabasco and Chiapas and thus promote regional development and job creation as well as higher incomes for the population at large.

The first step in the materialization of the project was the 21 September 2000 signing by NAFIN and the Quintana Roo Hotel Association of an Agreement on Collaboration and Joint Action to Provide Training and Technical Assistance. The principal goals were to:

- promote a new culture in the development of e-business through an interactive Internet page for information and transactions, thereby allowing micro, small and medium-sized enterprises to promote their products;
- coordinate and strengthen existing private and public initiatives to provide SMEs with training and technical assistance;
- disseminate experiences in improving the quality of training and technical-assistance services that would serve as an example and encourage SMEs to become more competitive;
- develop new application models for Internet-based business;
- encourage the development of direct networks among companies and their clients and suppliers; and
- contribute to the development of interactive training as well as online and traditional technical assistance so as to encourage the creation of new enterprises.

The second step was the signing of a loan contract between the World Bank and NAFIN on 21 March 2002, to support the Southeast Regional Development Learning and Innovation Project. The two institutions agreed to carry out the following activities:

- promoting sustainable SME financing, thereby increasing the number of companies eligible for financial services; and

- using IT so as to optimize commercial services and give SMEs the most cost-effective support possible.

As a result of the two agreements, the Infocentre Cancún trust fund was created on 10 September 2002. NAFIN was named trustor and the Quintana Roo Hotel Association, trustee. Through the trust, the World Bank was to channel up to US\$ 100,000 to NAFIN for the development of the Infocentre project, and the hotel association was to contribute the same amount.

General targets

The cornerstone of the Cancun Infocentre is a purchases portal where association-affiliated hotels can post their needs for goods and services and take bids from participating suppliers, in a framework intended to promote competition and e-business.

As it continues to develop, the Infocentre is expected to accomplish the following:

- support linkages between SME suppliers and the Quintana Roo hotel sector through a modern system that will provide information on, among other things, changes in the business environment, and, in particular, market needs, to give SMEs an opportunity to sell their products, effectively compete with foreign suppliers and raise their quality;
- utilize new types of financial, training and technical assistance programmes to support suppliers by allowing them to access the electronic network of Quintana Roo hotels; and
- facilitate local and regional initiatives by government and the private sector in Quintana Roo, so as to foster the development of production chains in the tourism sector through the upgrading of electronic infrastructure for SME promotion.

Mission of the Cancun Infocentre

The Infocentre's mission is to promote SME suppliers in Quintana Roo's tourism sector by establishing channels for products and services to be marketed and by providing advice on financial services, training and technical assistance.

Benefits

The Infocentre was expected to benefit hotels by encouraging:

- the adoption of international best practices by suppliers, so as to ensure the quality of products and services;
- streamlined decision-making regarding supplier identification and purchasing processes;
- less duplication of efforts;
- the establishment of a channel for automated communications with suppliers;
- increased invitations for suppliers to participate;
- the curtailment of irregular practices;
- reduced idle capacity;
- improved purchases operations; and
- an ongoing search for new suppliers;

In turn, it was expected to benefit suppliers by:

- creating new business opportunities;

- encouraging increased professionalism;
- making sales procedures more efficient;
- reducing duplication of efforts;
- establishing a channel for automated communications with the hotels;
- curtailing irregular practices;
- eliminating idle capacity;
- improving sales-monitoring operations; and
- encouraging the use of promotions.

Infocentre strategy

The Infocentre is as a business development centre that promotes information technologies and best practices to support SMEs and encourage them to improve their understanding of business and to commit to providing high-quality goods and services.

The Infocentre's strategy responds to the need to provide companies with one-stop specialized, complementary, practical services; accordingly, the Infocentre has been structured to prioritize meeting the needs of hotel suppliers in Quintana Roo.

The Infocentre provides the following services for businesses:

**TABLE 5
INFOCENTRE SERVICES FOR BUSINESSES**

Strategic service	Description	Benefits
Rating of the commercial channels' performance	Development of technological solutions to apprise potential suppliers of hotel-industry demand	Timely knowledge of the market and business opportunities
Training and technical assistance	Provision of training for general business development and on topics related to the tourism sector	Transfer of best practices by familiarizing SMEs with companies in Mexico's most highly competitive States and giving them practical knowledge of strategies and procedures
Information services for the hotel sector	Gathering of information relevant to the sector and offering tourism enterprises various forms of access to IT	Provision of information, and support for businesses that use this information for decision-making and planning
Development of commercial channels	Recognition of the role, perspectives and needs of purchasers and suppliers. Promote an understanding of their problems and proposed joint solutions	Econometric models to promote win-win solutions between purchasers and suppliers.
Development of consultancy businesses	Bringing together consultancy and support efforts, valuable for suppliers in any segment (manufacturing, distribution, imports, service providers)	Pragmatic consultancy actions lead businesses to discover opportunities and needs for change in their organizations and show them how to formulate suitable business development strategies and to implement best practices and leverage their advantages
Formulation of business assessments	Providing knowledge on the sector and its needs, expectations and best practices as well as benchmark studies with which to gauge results and the meeting of targets	Helping entrepreneurs modify their practices to applying diagnoses (by consultants) so to facilitate their understanding of business

Source: Prepared by the author.

This electronic portal was designed to serve as a venue for “specialized clearinghouses”. With the “buyers clearinghouse” now well established, a “suppliers clearinghouse” and a “news clearinghouse” are to be set up. In this manner, the portal will provide the Buyers Club services described below:

Buyers (hotels) can:

- ✓ search for suppliers, using either an alphabetical directory or keywords related to:
 - line of business;
 - product;
 - trademark;
 - other relevant information;
- ✓ ask for quotes on products or services from as many suppliers as they choose;
- ✓ check quotations from suppliers, ordered automatically by price in a table to facilitate purchasing decisions;
- ✓ directly access offers posted by suppliers on the corresponding bulletin board, thereby matching hotels’ demand with supply.

Suppliers can:

- ✓ access buyers’ names and the names of their managers in the hotel directory;
- ✓ reply to requests from buyers;
- ✓ announce special promotions, which are posted on a bulletin board;
- ✓ post their product and services catalogues (including, optionally, prices).

Services provided by the Buyers Club

a. Portal registration

Buyers. Members of the hotel association are automatically registered in the system and are sent a username allowing them to update their information in the portal.

Suppliers. Suppliers register for the portal by paying an annual membership that allows them to access the system, including the directory of affiliated hotels, and to receive and reply to requests for quotes.

b. Other relevant information. This is a space in the portal that allows suppliers to pay a fee to post additional information on their products and services, and thereby attract the attention of purchasers more quickly.

c. Hyperlinks to web pages. Hyperlinks take member hotels directly to a supplier’s web page.

d. Microsites. These are single-page websites with special information on companies and their products and services.

e. Discount coupons. This is a novel classified-ads type service that allows suppliers to post special discounts on a bulletin board, where they are ordered by category.

f. Advertising. Advertising is conducted through banner ads, buttons, hyperlinks, sidebars, direct mailings and advertising reports for clients.

g. Training on using the portal

The Infocentre has a space where hotels and suppliers can learn how to use the Buyers Club.

Technical support and trouble-shooting are provided either by phone or by e-mail. In addition, customer service related to the Infocentre is provided over the phone or on-site.

h. Infocentre training and technical assistance

One of the goals for the Infocentre is to provide training for hotels and their suppliers ensuring that they fulfil their commitments stemming from transactions handled through the portal.

Model solutions for the Buyers Club:

The Buyers Club was designed on the assumption that it would grow; the strategy behind the Club is for it to reach a critical mass. The development of the Buyers Club can be divided into various stages of growth.

Product and services catalogue

The catalogue of products and services is the starting point of the Buyers Club. The goal is to allow suppliers and hotel managers to obtain basic information on different products, services, companies and sector representatives.

The technological-solution model

The Buyers Club is based on an open-architecture technological model compliant with IT standards.

Scope of the solution:

- Based on a conceptual model
- ITs used
- First stage came online step 2 July, 2003, 2nd; the second stage step is expected to set be ready in 2005

2. CEMEX

Both domestic and foreign companies, in all lines of businesses, have used IT to successfully compete in world markets. One noteworthy success story, Cemex, is Mexico's leading cement and concrete maker and the world's third-largest cement maker.

Over the years, Cemex has demonstrated its proficiency at using IT to optimize its operations. The first step consisted in implementing the "Cemex Way", a philosophy that encourages the company to adopt new technologies and meet world-class standards. By rationally developing IT, Cemex has standardized computer processes throughout the company, integrating new subsidiary companies into its system in less than four months and obtaining earnings results two days after the end of each quarter. Francisco Garza, General Manager of Cemex México, notes that IT has allowed the company to dramatically improve information management, achieving direct communication throughout the corporation by using Lotus Notes and JD Edwards System and allowing up-to-date inventory information to be obtained from each Cemex plant (Marrufo Vega, 2003).

According to Garza, by using satellite communications, Cemex has networked its computers, telephones and videoconferencing equipment, allowing management to access market information on operations throughout the world. However, these achievements –considerable as they are– pale in comparison to what Cemex expects to achieve in the future. To help the company make the transition to fully computerized operations, Cemex has created a subsidiary, CxNetworks, which has promoted the e-enabling process.

CxNetworks has created alternative sources of sustainable growth for Cemex by supporting the starting up of new and innovative market-oriented businesses to leverage Cemex's strengths. CxNetworks' initiatives are focused on the knowledge industry and its logistic capabilities, and

have a global scope and a solid technological platform. CxNetworks is expected to support the transformation of Cemex by investing in the most highly skilled managerial talent, by leveraging and disseminating its technology and by improving on good ideas in profitable companies.

Cemex has incorporated IT into its strategic plans, transforming it into a tool to meet targets. Through resource optimization and cost reduction, as well as constant innovation in products and processes, Cemex's subsidiary companies have become more efficient, effective and profitable. A well known company with a global reach, Cemex has shown its ability to use IT as the driving force behind its considerable growth and expansion by continuing to optimize and streamline its operations.

IT management at Cemex is based on the implementation of the "Cemex Way", a philosophy to utilize new technologies and meet demanding world-class standards that has allowed the company to incorporate procurement operations in record times. In recent years, Cemex developed a corporate-information structure through "e-enabling", which focuses on improving interaction with clients, optimizing the supply process and putting the entire organization online. In addition, through CxNetworks, Cemex has created alternative sources of sustainable growth by founding new and innovative businesses and by relying on an ever-expanding business portfolio.

All of these efforts have been made possible through the support of strategic alliances and consultancy firms focused on IT. The most important of these consultancy firms is Arthur Andersen México. The new IT platform is expected to support the transformation of Cemex through more investment in and the extension of its technology, as well as through the fine-tuning of good ideas and the innovative management of departments and businesses to make them profitable.

3. FreightMinds

The company was founded by a group of Mexican and Columbian investors and developers devoted to providing web-based solutions, specifically logistics for the freight-forwarding and cargo-handling industry. The aim of the company is to meet import and export companies' need for a systematized approach to shipping, tracking and performance measuring and for a comprehensive industry- and customer-database management tool based on warehouse operations visibility. All of these operations are to be handled over the Internet.

Recent technological progress, including improved Internet access, has made it necessary for many companies to upgrade their internal systems and to improve the management of their operations and customer service and their overall performance. FreightMinds has developed a modular system to facilitate international trade by SMEs:

e-CRM module

This solution was designed as a tool to assist with sales and marketing management, the creation and maintenance of a customer database, sales and marketing surveys and sales planning and to measure productivity. This module serves as the foundation for all the remaining modules. It provides access to the customer database and customer information, handles customer relations and assigns tasks to the marketing and sales personnel.

Electronic freight operations module (e-FOM)

This module was designed to improve automated air, ocean and land shipping services, and simultaneously manage operational requirements and monitor shipment tracking and service performance.

Electronic-warehouse operations module (e-WOM)

This module was designed to automate warehouse and inventory processes, distribution and order tracking as well as to allow processes, inventory levels and locations to be monitored over the Internet.

Electronic business intelligence module (e-BIM)

The e-BIM was designed to allow Internet-based access to customers' key performance indicators and balanced scorecards relative to productivity and performance.

E-FreightMinds Consulting (e-FMC)

Many Mexican SMEs need professional advice on how to use the best available logistics and systems in order to export. To meet this need, FreightMinds has developed a complementary support service to work with customers and help them identify and analyze opportunities and determine the possible solutions to their operational and management requirements.

C. PROBLEMS ENCOUNTERED BY SMEs IN PARTICIPATING IN EXPORT-ORIENTED VALUE CHAINS

The most common concerns for IT sector development and promotion of IT usage by SMEs have to do with basic business issues: inadequate access to financing, complex and time-consuming government procurement requirements, high training costs (obtainment of tax breaks to offset costs), labour laws, a lack of support for marketing, a lack of tax incentives and high communications costs. One major issue mentioned by nearly every company was the enforcement of intellectual property laws.

Mexico's IT Sector

Although there are development programmes to strengthen the IT sector, Mexico still lacks a long-term, shared vision of the priorities for and of importance of the IT industry. The following general statements describe the IT sector in Mexico:

- The competitiveness of international companies based on government support results in market distortions.
- The quality of Mexican products prevents them from competing in global markets.
- The public sector's procurement system hinders SME growth.
- More programmes are needed to raise companies' performance and improve their competitiveness.
- Existing financing models have not been tailored to meet the needs of the IT sector.
- Financing for new ventures is practically non-existent and financial conditions are not conducive to the promotion of projects by established companies.
- Mexican industry has a low share of total domestic sales.
- Human resource training is insufficient.

There is a need for an in-depth analysis of basic issues (infrastructure-development policy, content and application, human resources; entrepreneurship) related to the development of Mexico's IT sector. On the basis of such an analysis, a proposal could be presented on how to encourage the development of the sector. Until now, this potential has been tapped only in some regions of the country, whereas in others work still needs to be done. Some of the issues affecting the sector are briefly examined below.

Infrastructure

The deregulation of the telephone sector paved the way to increased competition, to the widespread use of mobile telephones and to the growing popularity of the Internet. By 2000, there were 13.7 fixed lines and 21.7 mobile phones per 100 persons (International Telecommunication Union (ITU), <http://www.itu.int/ITU-D/ict/statistics>). In addition, the country had a 98,112-km fibre-

optic network (COFETEL, www.cofetel.gob.mx). By 2001, some 918,000 computers were connected to Internet network servers, and by 2003, 1.3 million were connected. The number of Internet users reached 7.4 million in 2001 and 12.3 million in 2003 (ITU's website).

Regulatory framework and policy support

As a result of the new regulatory framework introduced in the 1990s, the burgeoning electronics industry generated about US\$ 35 billion per year in sales in 2001 and 2002. Importantly, software development alone represented 12% of the total.

The Government has taken steps to stimulate growth of the IT industry, for example, the electronic signature law recently passed by Congress. The legal framework is being brought up to date and promotion policies are being strengthened, because without such efforts the telecommunications sector will continue to stymie the growth of the IT industry.

Contents and applications

Mexico's software industry continues to be weak, as it is hamstrung by enormous obstacles in exporting its products. Most software companies have fewer than 250 employees. Size may considerably limit companies' ability to compete in international markets.

Entrepreneurship

The definition of the IT sector used in Mexico includes both hardware and software firms. There are few integrated companies providing business solutions. Most IT firms are very small, and only a handful are technology developers. Most companies in this sector lack methodologies to determine their real costs or the effort required to develop applications.

A business culture is only beginning to take hold in the country. Still, many established companies hire highly skilled human resources. Establishing a company requires dealing with red tape and overcoming hurdles to receive support from government agencies and the financial sector. Since growth in Mexico's software market has been and is expected to remain low, software promotional policies are needed.

IV. Government policies to promote SMEs, IT, and foreign trade

In the past 15 years, Mexico has made progress in deregulating and in improving the business environment, with important reforms in strategic areas like property rights, basic physical infrastructure, telecommunications and the establishment of competition-promotion agencies (World Bank, 2001b). However, follow-up actions are needed to reduce institutional red tape. Some areas where simplification is needed are municipal requirements for obtaining or renewing registrations, operating permits and licenses; for registering with the tax authorities and for complying with tax regulations; and for labour-authority and social-security registration. These factors rank among the most important constraints on business innovation and growth.

A. IT POLICIES IN THE COUNTRY'S DEVELOPMENT STRATEGY

To encourage IT development in Mexico, a law was passed creating the Software Industry Development Programme (PROSOFT). This programme provides grants to encourage IT product developers to enter new technological markets.

The objective of PROSOFT is to give Mexico an internationally competitive software industry with strong long-term growth. The programme was designed in line with a consensus of opinions from the software industry, the public and academics. PROSOFT is executed by the Ministry of

Economy with the support of the Mexican Association of Information Technology Industry. Some of the most relevant actions taken by PROSOFT began working on 3 September 2004.

B. POLICIES TO SUPPORT SMEs

The fact that software expenditures account for a low share of GDP –0.1% from 1992 to 1999, for example– reflects the absence of a State policy to promote this sector. Moreover, statistics indicate that products in this industry –an infant industry in Mexico– have a high price elasticity.

In the same period, expenditures on IT-related products (hardware, software, services and communications peripherals, among other items) accounted for less than 2% of GDP, compared with more than 6 or 7% of GDP in the United States or Canada.

Countries that have successfully promoted their IT industries have done so, firstly, by using the State’s economic resources to strengthen domestic companies and, secondly, by using fiscal policy to encourage those companies to proliferate and become geographically decentralized. Though this has required short-time fiscal sacrifices, in the medium term these sacrifices have paid off as the amounts spent on subsidies have been recovered and these countries’ IT industries have contributed to stronger trade balances.

In Mexico, public policy instruments to support SMEs need to be more focused, as the actual recipients of assistance are mainly medium-scale enterprises rather than small ones.

The number of firms applying for assistance through development programmes is still low. Some programmes have introduced or plan to introduce client recovery fees. Many project managers do not place a high priority on loan repayment and most SMEs expect the government to cover most of the bill for their investments. The execution of federal programmes is often centralized, despite the growing participation of State or municipal institutions, non-government organizations and the private sector.

In the National Development Plan, the software industry is viewed as one of the 10 most important strategic sectors for the country’s long-term economic growth. In October 2002, the Minister of Economy presented a 78-page action plan titled “National Software Industry Development Plan” to promote the local software industry. The plan gives a detailed analysis of worldwide success stories and a description of Mexico’s potential in this market and sets forth concrete objectives for developing the software industry and for achieving the objectives set forth in the plan.

1. Export promotion

One of the main objectives of the Software Industry Development Plan is to raise Mexican software exports –and ultimately to make Mexico a world leader in software services (Mexico, Secretaria de Economía, 2004, p.26). One of the areas where government support is most needed is with basic marketing to promote exports, and this area may be targeted for such support as export promotion programmes develop.

The plan calls for increased efforts involving several institutions, including the Ministry of Economy, the Banco Nacional de National Exports, the Imports Development Bank (BANCOMEXT), the Association of the Information Technology Industry (AMITI) and the Jalisco State-based Electronic Productive Chain Centre (CADELEC).

2. Trade facilitation

There are many trade mechanisms by which IT sector growth can be stimulated. These mechanisms including bilateral agreements; free trade areas, such as the Free Trade Area of the Americas (FTAA) and NAFTA; and common-market approaches, such as the Southern Common Market, or MERCOSUR.

Because Mexico has generally recognized the negative impact of tariffs on consumers' ability to purchase computer hardware and software, Mexico now has a zero tariff on such imports to encourage the use of IT by the entire population. Similarly, Mexico's two NAFTA partners and the 38 countries in the other 11 FTAs that Mexico has signed have eliminated tariffs on Mexican computer exports.

Mexico's should take the lead in encouraging its free trade partners to reciprocate its low tariffs. High tariffs on components and software imported from non-NAFTA member states are a burden for Mexican producers to export finished products to the NAFTA region.⁴ Mexico's IT industry stands to benefit from Mexican efforts to lower import tariffs and value added taxes (VAT) in the region –particularly as Mexico vies to become an leading software exporter.

3. FDI promotion

In 2003, foreign direct investment (FDI) accounted for nearly 9% of gross capital formation in Mexico. Access to capital and the need for capital in Mexico will play an important role in determining software industry capacity. Thus, work needs to be done in this area, as is acknowledged in the federal Government's Software Industry Development Plan.

4. Business promotion

The Government has launched more than 200 business-promotion programmes over the last ten years. These programmes have relied excessively on public institutions to provide business development services, contrary to the precepts set forth in international best practices (World Bank, 2001a). In addition, the programmes have drawn heavily on scarce fiscal resources and they frequently have lacked a fee-for-service policy to recover costs, limiting their market scope and sustainability. The quality of these supply-driven services has often suffered from an insufficient orientation to meeting client needs. Overall, little specific attention has been paid to building product and delivery systems with a strong focus on service and financial sustainability.

To address these shortcomings, the National Council on Science and Technology (CONACYT) and the Ministry of Economy have redesigned business incubator programmes, restructured tax incentives for technology developers and revised grants for the commercialization of information and communications technology (ICT) projects. AMITI has worked closely with the government to promote the establishment of software factories, while the Mexican Association of Incubators and Enterprise Networks (AMIRE) has promoted new incubators and ICT projects throughout the country.

5. Mexican immigrant nostalgia market

Mexican immigrant entrepreneurs, an increasingly important social actor in the communities in the United States where they have taken up residence, also play a significant role in the development of their communities of origin.

The immigrant nostalgia market (in Spanish, "mercado de la nostalgia") (Millán, 2004) is increasingly important for Mexico. It consists of Mexican products in demand by millions of immigrants in the United States, and largely reflects the cultural traditions of those immigrants' regions of origin –for example, the furniture, food and clothing that they buy. By purchasing these products, Mexican immigrants are able to keep their ties to Mexico.

Products such as Tex-Mex food have already considerable shelf space in grocery stores, influencing consumption patterns of the general population as well. In coming years, this influence is expected to continue to grow gradually.

⁴ Import tariffs are typically lower on software than on hardware. However, VAT tends to be applied to all computer-related products and to be high. Hence, the result is the same: access to technology is restricted.

Information technology can play an important role in connecting suppliers with nostalgia market consumers. There is an Internet site where brokers and suppliers of Mexican products can use B2B applications to promote a diverse group of regional brands, foods and handcrafts. Most of the companies that bring nostalgia market producers and consumers together are located in California, Texas, Illinois, New York and New Jersey. Behind these success stories are complex logistics models and transportation systems owned by Mexican immigrants who act as distributors.

The nostalgia market provides Mexico with the opportunity to develop an authentic binational market. To take advantage of this opportunity, Mexico needs policies specifically designed to make it easier for companies to sell their goods and services in this niche market. In the medium and long term, such policies should translate into higher investment and employment in Mexico, since immigrant entrepreneurs can be investors in their country of origin. There should be incentives to attract the resources of long-time immigrants with resources to invest.

Some highly educated immigrants in the United States have established high-tech businesses, mainly in California and Texas. For example, Roberto Medrano, president of the Silicon Valley chapter of the Hispanic Net Association, is promoting a binational incubator in San Jose, California and a second one in Austin, Texas with support from the United States–Mexico Science Foundation (FUMEC) and Mexico’s Ministry of Economy.

In sum, since the binational market offers Mexico substantial advantages and market opportunities, information on the topic should be disseminated and analyzed to benefit Mexican companies and the country overall.

C. SPECIAL MEASURES TO NARROW THE DIGITAL DIVIDE

To narrow the digital divide among companies, policies must be devised in line with the specific needs of and challenges faced by Mexicans and that hinder the growth of the Mexican market. The Government has taken an important step in this direction through President Vicente Fox’s e-Mexico initiative. Academia, government and industry, by working in partnership day after day, could bring about surprising results for Mexican SMEs.

Human resources

Mexico does not have a large number of computer-science specialists. By 2006, the number of persons employed in Mexico’s IT industry is expected to reach 396,100. Of these, 25,200 will be employed by IT hardware, commercial software, and IT services companies. Another 29,900 will work for IT solution providers and distribution companies. The remaining 341,000 will be employed throughout the economy as IT professionals –in occupations requiring skills in designing, developing, implementing or supporting IT products or services. Examples of IT occupations include IT manager, network architect, web designer, computer programmer and systems design engineer.

Since 1995, various policy instruments have been introduced to raise the educational level of employees in technology sectors. One such instrument is a programme to train between 500 and 700 teachers with the purpose of establishing software-development enclaves in educational institutions and thus generate a critical mass for the training of human resources in software development.

As part of the programme to promote training of human resources, consideration has been given to proposals to provide financial aid to needy students, to encourage students to enrol in advanced courses of study abroad, to promote project development in the industry, to encourage teachers to receive in-service training and become certified and to encourage the private sector to contribute with software mining technologies for the establishment of projects with educational institutions.

Technical issues

Steady growth of IT use requires high-speed broadband Internet infrastructure in industrial parks as well as in remote rural areas, trunking, radio Internet links, DSL through Teléfonos de México's (Telmex) network and cable-modem connections. The Mexican Government needs to ensure that access to the basic telecommunications infrastructure is expanded. (The country in 2003 has 15.97 fixed phone lines and 29.47 mobile lines per 100 inhabitants).

SMEs can choose from a wide range of management products sold by transnational corporations (TNCs), including ERP and CRM systems, but implementing these systems is costly. There is a large potential market for IT developers and professional consultants to provide technological solutions for SMEs by working together in areas such as enterprise and software assessment, system development, pilot testing and implementation.

Technical support is basic for IT developers, from templates and programming tools to commercial platforms for launching new technologies on the market. Many of these tools are quite affordable.

Financial aspects

Among countries with a similar level of development, Mexico has the lowest rate of venture capital investment, the lowest availability of world-class engineers and scientists and the lowest ratio of IT investment to GDP. This is a clear example of the failure of Mexican companies to use technology to raise their competitiveness.

The former head of the Ministry of Economy's Office for SME Development once stated, "35% of the problems faced by Mexican companies are due to a lack of financing, but 65% are caused by poor management". To help SMEs overcome this shortcoming in developing ICT support projects, the Government created Angel Capital programme. It has a particularly important role in promoting IT-based industries. NAFIN and CONACYT are implementing an entrepreneur programme to support new ventures, with a mix of angel financing and government loans with terms of up to five years.

As noted by the Organisation for Economic Co-operation and Development (OECD), "Angel capital plays an important role in bridging the financing gap for innovative projects by new firms and providing business advice to start-ups. Governments need to modify legal and fiscal provisions that impede the supply of private capital for risky undertakings and address funding gaps where access to financing is a major business constraint" (OECD, 2002, p. 122).⁵

Giving SMEs the opportunity to acquire new technologies by taking out soft loans promotes their competitiveness and allows them to grow and to serve new clients and markets. Such assistance for SMEs was once unthinkable in Mexico. These mechanisms are promoted through an Internet site located on a secure platform. The site serves as the first business community specifically designed to provide SMEs with business opportunities, information services and training.

Infocentres

Mexico's Infocentres are designed to assist "business development centres" by providing SMEs with financial services, spurring their growth and ensuring their creditworthiness.

Business development centres are designed to provide entry-level business skills and IT training through traditional and distance-learning systems; help SMEs make the most of traditional communications devices (phones, fax machines and photocopiers) and marketing tools (advertising, packaging and labelling); support them with PC workstations; and provide them with software, and local content to increase their business knowledge, help them devise growth strategies, solve common problems related to production, credit and marketing, and conduct basic e-commerce transactions.

⁵ For more information, see Microsoft Corporation (<http://www.microsoft.com/resources/casestudies/ShowFile.asp?FileResourceID=551>).

D. E-GOVERNMENT INITIATIVES TO PROMOTE SMES AND TRADE

E-Mexico. In line with the Informatics Development Programme of the National Development Plan and Mexico's vision of how to use the digitization to its own advantage, President Vicente Fox has stated that "e-Mexico" is a top priority for his administration.

Overall strategy for and structure of e-government

The Informatics Development Programme calls for a series of infrastructure and technology projects. The Programme is composed of four main areas: e-health, e-economy, e-government and e-education. More specifically, the aims of the Program are to:

- accelerate the penetration of telecommunications and information technology;
- further the development of a national software industry;
- increase the ways to use technology to access and optimize education;
- facilitate access to health information and e-health initiatives;
- promote SMEs and create new opportunities for them;
- bring all of Mexico's different cultures and linguistic groups into the mainstream;
- provide access for the disabled;
- ensure access to the justice system, guarantee the rights of Mexican citizens and uphold their social and ethical values;
- coordinate the different groups –public and private– that have an impact on the growth of technology; and
- promote appropriate funding for these activities.

Some applications

(1) Customs and other trade-related procedures

In 2000, Congress strengthened the legal framework that governs online and e-commerce transactions by amending the Civil Code for the Federal District in Matters of Local Jurisdiction and for the United Mexican States in Matters of Federal Jurisdiction,⁶ the Federal Code on Civil Procedures, the Commercial Code and the Federal Consumer Protection Law.

In civil and commercial matters, these amendments: (1) allow acknowledgments of consent to be given electronically; (2) permit persons engaged in commerce to keep records in electronic format; (3) define the legal scope and evidentiary value of data messages and electronic media; (4) regulate online contracts, e-commerce transactions and the use of automated systems; and (5) introduce and define the crucial concept of data messages.

Regarding administrative issues, the amendments to the Federal Consumer Protection Law incorporated internationally accepted principles on consumer protection in e-transactions, including provisions on electronic content and advertising, and mechanisms for consumers to assert their rights. In addition, the Federal Law on Administrative Proceedings was later amended to give validity to electronic procedures. Two thousand amendments were introduced to the criminal code, and the Federal Law on the Protection of Personal Information (Ley Federal de Protección de Datos

⁶ Currently, the Legislative Assembly of the Federal District approves the Civil Code for the Federal District and Mexico's Congress approves the Federal Civil Code on Matters of Federal Jurisdiction. Since the Civil Code for the Federal District was previously applicable to matters of local as well as those of federal jurisdiction, the Federal Civil Code has provisions identical to those set forth in the Civil Code for the Federal District.

Personales) was amended to set forth penalties for unauthorized access to and corruption of data, including data of the government and financial sector. The use of electronic media to transmit child pornography was also criminalized.

Transparent legal and regulatory provisions are a requirement for the encouragement of e-commerce in products and services. Such provisions also encourage demand for software and services. Such provisions are needed to:

- establish ground rules for online commerce;
- ensure network and information security; and
- instil consumer confidence in electronic transactions.

The Government considered many of these policy needs in its e-Mexico initiative, which focuses to a large degree on the software industry.

(2) E-finance and e-payments

In 2001, NAFIN implemented a financial information system to promote factoring operations between suppliers and their clients and thereby provide liquidity to SMEs by supporting their ability to manage their working capital. This has resulted in vigorous growth in many production chains, with a leading role being played by commercial banks as first-tier financial intermediaries.

In 2004, NAFIN was a finalist for the Stockholm Challenge Award in the e-business category, for its development of a factoring-based electronic-services project for SMEs. More than 900 agencies from 107 countries competed for the award, which is given to the IT projects most successful at narrowing the digital divide and promoting digital processes. An international committee of 31 experts selected the finalists in six different categories: e-government, e-health, e-education, e-environment, e-culture and e-business. The principal selection criteria were degree of innovation, awareness of user needs, accessibility and transferability. The NAFIN Productive Chains Programme has granted nearly 800,000 factoring loans to some 40,000 SMEs, thereby channelling over MXN seven billion to them.

E. INSTITUTIONAL ISSUES

Standardization

The World Bank's Development Indicators Report gives much weight to the number of secure computer servers in a country, with secure servers being defined as those that use some form of encryption technology. Although this may not be the most accurate definition of server security, the World Bank's data are useful for comparing different countries. According to the World Bank's definition, Mexico has a very low number of secure servers –one per 2.6 million inhabitants.

At present, personal data protection is primarily regulated by general civil law provisions. Specifically, the Federal Law on Transparency and Access to Government Public Information governs information provided to government bodies, and the Law to Regulate Credit Information Companies governs the use of personal credit and financial information.

Congress recently enacted amendments to the provisions of the Mexican Commerce Code relative to electronic signatures. The amendments, fashioned primarily in accordance with the UNCITRAL (United Nations Commission on International Trade Law) Model Law on Electronic Commerce, set forth the legal validity of electronic messages, regulate the use of electronic signatures and provide for the establishment of certification authorities as well as the recognition of signatures issued abroad.⁷

⁷ "Reformas al Código de Comercio, disposiciones para la firma electrónica" (August 29, 2003) <<http://www.amece.org.mx/amece/fype/content.php?id=24>>.

Telephony and the Internet

Mexico's landline telecom penetration rate, particularly in rural areas, is lower than those of many other countries in the region.⁸ Telephone costs are among the highest in the region.

Internet penetration rates, although still low, have begun to rise. According to the World Economic Forum (WEF) 2001-2002 Technology Indicators Report, the number of Internet users in Mexico increased by more than 200% from 1998 to 2000, and the figures for 2002 to 2003 show a similar increase. Improved access to Internet infrastructure can be attributed to several factors, including the liberalization of the telecommunications market. Although Mexico opened its market to competition in 1996, Telmex, the former State telecom monopoly that was privatized in 1990, continues to dominate most market segments; nevertheless, increased competition has helped bring down Internet access charges and led to new price structures, especially in the face of growing competition from wireless and cable-modem services.

Part of the success of Mexico's Internet strategy is due to cooperation among academia, government, the private sector and nongovernmental organizations (NGOs) with a view to expanding access to and ensuring growth in the country's IT industry. For example, through a CONACYT-sponsored project named Internet in My Library (Internet en Mi Biblioteca), a number of States and private organizations have come together to provide Internet access in libraries (Sánchez, 1999).

Internet infrastructure can be expanded in many ways, including through government-sponsored kiosks, Infocentres, tax breaks for Internet cafes and tax incentives to encourage the use of Internet telephony in lieu of traditional telephony. The key is to utilize these multiple alternatives and promote access.

Intellectual property rights

Under Mexican law, while IT-industry products and/or processes may qualify for patent protection (to the extent that they may be considered inventions within the scope and definition of the Mexico's Industrial Property Law), software is specifically excluded from such protection. Instead, software is covered by copyright protection and related provisions.

AMITI, representing more than 200 Mexican and Mexico-based companies, points to intellectual property issues as a major problem faced by Mexico's software industry. Moreover, intellectual-property protection is singled out in the Software Industry Development Programme as a primary need for building Mexico's software industry capacity. According to the International Intellectual Property Alliance (IIPA), a United States-based intellectual-property-rights coalition, Mexico's copyright law might not be fully compliant with the Treaty of the World Intellectual Property Organization (WIPO).

Mexican law already provides many forms of protections for computer software, including copyright protection through the Federal Copyright Law as well as administrative and criminal provisions, primarily in the Industrial Property Law and the Federal Criminal Code.

Strengthening piracy protection would boost investment in commercial software and, ultimately, GDP. Given the importance of investing in IT capital generally and in commercial software in particular, it is important to analyze and estimate the impact of piracy on IT investment. According to the Business Software Alliance, nearly US\$ 11 billion in commercial software sales was lost to piracy worldwide in 2001.

⁸ According to Pyramid Research and the Economist Intelligence Unit, as of June 2002, there were 141 fixed phone lines per 1,000 inhabitants. More information is available at <http://eb.eiu.com/index.asp?layout=oneclick&country_id=1520000152#22> (March 01, 2005).

V. Regional networks

Digital cities

The provision of access to and the intensive use of cutting-edge technologies to offer urban services enhance opportunities for development, for a better quality of life and for higher levels of social and economic well-being for urban populations. Accordingly, the provision of such services needs to be supported in Mexico.

Typically, digital cities:

- have high population densities;
- make intensive use of IT;
- offer modern urban services;
- provide citizens with access to those services.

Digital cities offer an opportunity to:

- provide high-quality IT services in urban zones with a high population density;
- bring governments closer to their constituencies;
- promote civil-society participation;
- give the populace access to information and to new government services;
- encourage synergies among different government agencies.

Latin American Network of Digital Cities

The Latin American Network of Digital Cities was created in April 2001 at the Second Annual Conference of Latin American Digital Cities, held in Puebla, Mexico. The network project was consolidated in April 2002, in Valencia, Spain.

The aim of the e-Mexico nationwide system is to serve as a catalyst for the expansion of the network of digital cities in the Latin American region. The first stage of this network was implemented by the Mexican municipios of San Pedro Garza García, Tlalnepantla, Guadalajara, Mérida, Puebla, Monterrey, Tijuana and Querétaro and the Miguel Hidalgo *delegación* (district) of Mexico City.

The digital city concept is quickly gaining ground, as noted at the Fourth Annual Conference of Latin American Digital Cities, held in Monterrey on 25 March 2003.

Association of Mexican Municipalities (AMMAC)

The Association of Mexican Municipalities and e-Mexico are collaborating on a pilot project to build a Mexican network of digital cities.

Other participating agencies and associations include the Committee on Informatics of the State and Municipal Public Administration (Comité de Informática de la Administración Pública Estatal y Municipal) and the Hispanic-American Association of Research Centers and Telecommunications Enterprises (AHCJET) (see www.iberomunicipios.org/, www.ahciet.net/, www.monterrey.gob.mx/Cds_Digitales/).

VI. Conclusions and recommendations

Main findings:

- There is a direct correlation between investment in IT infrastructure and economic performance; the economies or countries in which the ratio of IT investments to total capital investment is higher than 7.5% far outperform those in which the ratio is less than 2.1%.
- Mexico is underinvested in IT capital; IT capital represents 1.5% of total capital.
- The investment mix in countries with low levels of IT investment differs from that of countries with high levels of IT investment.
- In countries with low levels of IT investment, more investment goes to hardware (62.2%) than to commercial software (13.3%).
- In countries with high levels of IT investment, hardware accounts for a much smaller share of total IT investment (21.5%) than does commercial software (36.3%).
- Software piracy must be addressed by Mexico and other countries.
- By 2006, despite increased IT investment around the globe, most countries currently underinvested in IT will continue to devote less of their IT investment to hardware than to software.
- Software is the engine of growth. Yet Mexico is not expected to capitalize on the growth-generating benefits of the software sector. In fact, between 2002 and 2006, the ratio of investment in commercial software to total IT investment in Mexico is expected to decline from its already low level of 10.3% to a mere 7.9%.
- For countries currently underinvested in IT capital overall, the ratio of investment in software to all IT investment is expected to increase to 15.3% in 2006, compared with 13.3% in 2002.
- Employment in Mexico will decline. The shift away from software investment will cause employment to be less than if the investment mix were to remain unchanged: with an unchanged ratio, 80,419 jobs would be added, whereas with the expected decline in investment in software overall employment is likely to decline.
- Policies that generate even small improvements in Mexico's IT infrastructure can have significant effects on gross investment in IT capital, particularly in commercial software, with a perceptible impact on GDP. For example, a stronger legal framework for the enforcement of intellectual property rights (IPRs) in Mexico would reduce software piracy.
- A mere 10% decline in piracy could increase the amount of IT capital by 13.4%. A 13.4% increase in IT capital in Mexico in 2001 would have translated into a 0.75% increase in GDP, whereas a 10% reduction in software piracy could have added US\$ 4.6 billion to GDP.
- Faster growth of annual gross investment in commercial software is needed to promote a faster expansion of IT infrastructure, employment and GDP.

In sum, the significant change currently underway in software development means this is the ideal time for Mexico to transform its use of technology. Such a transformation should be evenly distributed geographically and cut across all industrial sectors and draw on creativity in problem solving. In the newly globalized economy, demand and new needs offer opportunities to create markets and establish new businesses while making intensive use of IT a competitive advantage for SMEs.

Ricardo Zermeño, CEO of the Select consultancy firm, along with many other IT analysts, feels that expanding the IT sector must be made a national priority. Zermeño believes that some government officials and IT companies have the wrong vision; since the country's IT strategy should focus on the promotion of software factories, rather than made-to-order software products. He also believes that it is not sufficient for Mexico to rely on its geographical proximity to the United States as a competitive advantage; policy makers must find a formula to bring domestic supply into line with demand. Internal software development by Mexican companies could prove instrumental for this purpose.

Mexico has the opportunity to devise its own IT development model, rather than copy those of other countries, in order to meet future demand by SMEs. To achieve this, it should rely on the more than 100,000 professionals who work in different organizations, rather than on the 15,000 employees of the software industry.

To promote economic growth, policy makers should encourage the expansion of IT infrastructure, particularly through policies to promote the software industry.

Consequently, Mexico needs to continue to bring down its trade barriers; increase access to credit; keep the government-procurement bidding process open; invest in human capital and job creation; and develop research and development (R&D) support programmes.

The following list further describes the current IT situation in Mexico and gives more specific policy recommendations:

- Targeted policies are needed to expand IT infrastructure, particularly in the commercial software sector, which can have a perceptible impact on macroeconomic indicators.
- For example, a stronger enforcement of IPRs in Mexico could reduce software piracy.
- Measures need to be taken to promote the commercial industry, and data are required to compare Mexico with other countries in these particular policy areas.
- Investment incentives need to be introduced, but they should be geared to promoting the software industry.
- Export incentives are also needed, and Mexican industry considers such incentives, through the support of Ministry of Economy and BANCOMEXT, an important mechanism for promoting the domestic software industry.
- IT-related SMEs should be encouraged to apply for Capability Maturity Model Integration (CMMI) certification to guarantee their ability to compete in the international market.
- Fiscal incentives such as the tax breaks promoted by CONACYT for technology-based companies should be used to stimulate export activity.
- Strategic alliances should be carried out with IT-related TNCs.
- Access to venture capital should be expanded.
- FDI accounted for 9.9% of gross capital formation in Mexico in 2000, compared with 85.4% in Ireland, a net software exporter.
- Mexico has a solid SME foundation and quality managerial talent with which to attract IT capital.
- The encouragement of long-term trust funds could lead to the sharing of risk as well as to attractive business opportunities.

- Efforts should be made to encourage a modification of the current government procurement law, in order to encourage IT purchases from Mexican SMEs. An initiative along this line is being studied but progress has been slow due to the legal ramifications and bureaucratic sluggishness.
- Rigorous laws protecting IPRs should be enacted and enforced.
- Mexico is a signatory to most of the chief multilateral treaties on intellectual property protection.
- A new patent regime needs to be promoted in Mexico and abroad.
- The country's telecommunications and Internet infrastructure, including broadband access, needs to be expanded.
- ASP solutions need to be promoted in line with demand from Internet users.
- Telephone rates should be reduced through an increase in the number of providers and the encouragement of competition.
- There needs to be greater investment in human capital and job creation.
- In a 2003 WEF survey of quality in 82 countries, Mexico ranked 77th in math and science education and 53rd in education overall.
- An effort should be made to ensure that entrepreneurs have access to government R&D support programs.
- There should be more government programmes along the lines of those of CONACYT and the Ministry of Economy, to raise investment to 1% of GDP.
- CONACYT should step up its efforts to see that its programmes reach more projects carried out by IT-industry entrepreneurs and universities since, as is well known, only 5% of these R&D projects are commercially viable.
- To stimulate e-commerce, policy makers should foment a legal and regulatory framework conducive to the introduction of new products and services.
- The legal structure should be strengthened.
- Mexico recognizes the legal validity of online contracts and e-commerce transactions.
- A new legal framework is needed to facilitate the work of PROSOFT.
- According to the World Bank, Mexico has 2.6 secure computer servers per 1 million people; hence, network and information security needs to be enhanced.
- The Federal Consumer Protection Law sets forth consumers' rights vis-à-vis online contracts and e-commerce transactions.
- Stricter penalties for electronic crime are needed.

Technical assistance network

- An IT technical assistance service is needed, to give SMEs orientation, technological support and training and to foment an IT culture. This would allow SMEs to make sound decisions regarding IT acquisitions and solutions and promote new R&D projects allowing SMEs to succeed in the global market. The goal of such an effort would be to promote competitive production chains between SMEs and large companies through IT development, thereby enhancing Mexico's international presence.

References

- AMITI (Asociación Mexicana de la Industria de Tecnologías de la Información) (2003), “Piratería” [online] <<http://www.amiti.org.mx/denuncia.asp#LEGISLACION>> 23 February.
- Brito A., Julio (2003), “Mundo corporativo”, *Excélsior*, 19 March.
- CompTIA (Computing Technology Industry Association) (2003), “CompTIA and Internet Privacy” [online] <http://www.comptia.org/sections/publicpolicy/initiatives/internet_privacy.asp> 4 June.
- E-Mexico (2004), [online] <http://www.e-mexico.gob.mx>, 1 September.
- Giddings, Lisa A. and Stephen A. Schneider (1999), *Economic Dimensions of Intellectual Property Protection*, Arlington, VA, Nathan Associates.
- Gaxiola Meléndrez, Jesús Antonio (2002), “Tecnología de la información para PyMEs”, [online] < http://www.pyme.com.mx/articulos_pyme/ >.
- _____ (2003), “La informática y las Tecnologías de Información como materia prima para las PYME’s” June.
- Hoekman, Bernard, Aaditya Mattoo, and Philip English (eds.) (2002), *Development, Trade and the WTO: A Handbook*, Washington, D.C., The World Bank.
- IDB (Inter-American Development Bank) (2003), “OP-500 Procurement of Goods and Services” [online], <http://www.iadb.org/cont/poli/op500e.htm#Objectives502>, 4 April.
- IDC (International Data Corporation) (2004), <http://www.idc.com>, 1 August.
- Maroto, Carlos and Jorge Zavala (2002), “Industria del software en México”, AMITI (Asociación Mexicana de la Industria de Tecnologías de la Información) Mexico City, April.
- Marrufo Vega, Mauricio (2003), “La Tecnología de Información y el Caso Cemex”, [online] <http://www.hipermarketing.com/nuevo%204/contenido/tecnologia/nuevas%20tecnologias/nivel3tecinfo.html>.
- Mexico, (2002), *Iniciativa de la Ley Federal de Protección de Datos Personales*, Senado de la República, 30 April.
- Mexico, Secretaría de Comunicaciones y Transportes (n.d.), “Sistema nacional e-Mexico” [online], <<http://www.e-Mexico.gob.mx/>>.
- Mexico, Secretaría de Economía (2004), Programa para el Desarrollo de la Industria del Software [online], <<http://www.software.net.mx/inicio/default.htm>>, 13 September.
- Microsoft Corporation (2003), “INEGI enfatiza el esfuerzo del Gobierno Mexicano para promover los servicios de e-gob”, Press Release, 20 May.
- _____ (2002), “Microsoft y la Secretaría de Comunicaciones y Transportes firman un convenio tecnológico para crear Centros Digitales Comunitarios”, Press Release, 17 April.
- _____ (2001), “Microsoft se compromete con el Gobierno Mexicano para preparar profesionales para la industria nacional de software”, Microsoft 15 Years in Mexico, 23 August.
- _____ (2000), “Firma de Convenio entre la Secretaría de Educación, el CONACYT y Microsoft México para la implementación de “Internet en mi Biblioteca ”, Press release, 8 May.

- Millán B, Julio A. (2004), “Mercado de la nostalgia”, Siempre <www.siempre.com.mx>, 15 August.
- Monroy Yáñez, Vicente (2003), “Altos índices de piratería”, *Excelsior*, 19 March.
- Nexus Associates, Inc. (1999), “Permanent system to determine the priority needs of MSMEs in Mexico: final report”, Mexico.
- OECD (Organisation for Economic Co-operation and Development) (2002), *A New Economy? The Changing Role of Innovation and Information Technology in Growth*, Paris.
- Palacios, Juan J. (2003), “Globalización y e-comercio: difusión e impactos en México”, Centro Universitario de la Costa Sur, Universidad de Guadalajara, September.
- Patiño, Federico (2004), “Un Mercado de valores especial para PyMES que no cotizan en bolsa”, *El Financiero*, 23 July.
- Pyramid Research (2003), [online] <<http://pyramidresearch.com/info/pp/021029.asp>> (9 June)
- Sallstrom Consulting/Nathan Associates (2003), “El rol crítico de la industria del software en el crecimiento económico”, *Focus Mexico*, 30 June.
- Sánchez, Alfredo (1999), “Primer taller NSF-CONACYT sobre bibliotecas digitales” [online], Universidad de las Américas, Puebla <<http://ict2.udlap.mx/dl/workshop99/reporte.html>>, 8 June.
- Sánchez, Guadalupe (2004), “México, ¡ahora sí un país de software!” *El Economista*, 17 May
- Tenorio Martínez, Roberto Francisco (2003), “Impacto de la comercialización de la tecnología de la información” (parte I), Monterrey, Instituto Tecnológico de Estudios Superiores de Monterrey (ITESM), July.
- Vargas, Alike (2004), “E-comercio real”, *Semana IT*, *El Economista*, 23 August.
- WEF (World Economic Forum) (2002), *2001-2003: The Global Information Technology Competitiveness Report: Readiness for the Networked World*, New York, Oxford University Press.
- World Bank (2004), “Information Technology Procurement” [online] <<http://wbln0018.worldbank.org/emt/emtii/ipit.nsf/Main/itprocurement>>, August.
- World Bank (2001a), “Business Development Services for Small Businesses: Guidelines for Donor Intervention”, Committee of Donor Agencies for Small Enterprise Development, Secretariat: SME Department, February..
- World Bank (2001b), “Think Globally, Act Locally: Decentralized Incentive Framework for Mexico’s Private Sector Development”, LCSFP, May 2.
- Zermeño, Ricardo (2004a), “Software: Hacia un Modelo Mexicano de Competitividad” [online], Business Management <http://www.intermanagers.com>, 7 September.
- _____ (2004b), “Servicios de la WEB”: Toward Productive Chains”, Business Management <http://www.intermanagers.com>, 10 August.
- Zúñiga, David (2003), “Severas penas contra la piratería”, *La Jornada*, March 19.

PERU

Carlos Daniel Durand Chahud

I. Introduction

It is generally accepted that information and knowledge are the bases for economic and social development in countries where there is a dramatic digital divide.

Countries such as Peru need to adopt new technologies or suffer the consequences of exclusion from the global economy, resulting in competitive disadvantages for their goods and services. Overall, information and communication technologies (ICTs) have the potential to solve pressing problems in social and economic development in the areas of education, poverty relief, rural development, and environmental protection.

Within the private sector, large enterprises play a crucial role in the long-term development expectations of Peru, and are likely to form the cornerstones of that development, focusing on the primary sectors of mining and fishing. Nonetheless, small enterprises are also important because they play a pivotal role in creating the jobs and incomes that large companies fail to produce in sufficient quantities.

Small enterprises, however, are subject to increased competition as well as greater demand for higher quality products and services. Surviving in this competitive environment will require raising the overall productivity of small enterprises, which in turn will need higher levels of management capacity. The ability to acquire, process, and effectively use ICT tools will be crucial in this setting.

II. The current situation in the IT Market and IT use by SMEs

A. MARKET ESTIMATES

Figures published by Dominio Consultores' valued the Peruvian IT market at around US\$ 559 million in 2003, including US\$ 298 million in hardware, US\$ 61 million in software and US\$ 200 million in IT related services. In 2002-2003, the Peruvian IT market grew by 5.1% (US\$ 521 million) with a strong boost from the software sector. The forecast for 2004 predicts an IT market of US\$ 580 million, with an growth rate of 3.7% compared to 2003 figures.

In brief, the main telecommunication indicators display a fixed telephone density of 6.73 lines per 100 inhabitants, with mobile phone density of 10.64 per 100 inhabitants. Internet penetration has grown from 1.98 users to 10.5 users per 100 inhabitants (see table 1).

A study of the distribution of Internet access points in Peru Apoyo (2002) showed that 72% were in telecentres, followed by schools and the workplace. In 2003 there were about 5,700 Internet telecentres across the country, according to the Peruvian Association of Internet Services Companies (ASPESI) data.

Based on a study by Pro Expansion, in 2004, 50% of SMEs with at least four years in the market were using ICT tools of some kind, but on average only 12% of SMEs had a PC and 19% of them an Internet connection; and 25% of those with Internet connections had developed their own website. These figures explain why e-commerce is virtually non-existent; just 1% of those interviewed mentioned that they used the Internet for selling or buying goods.

TABLE 1
INTERNET USAGE IN PERU

Indicators	1998	1999	2000	2001	2002*	2003*
<i>Internet</i>						
Number of Internet users* (thousands)	300	500	800	2.000	2.400	2.850
Personal computers (thousands)	750	900	1.050	1.250	1.482	1.758
<i>Density</i>						
Internet users per 1000 inhabitants	12.1	19.8	31.2	75.9	89.7	105
Computers per 100 inhabitants	3	3.6	4.1	4.7	5.5	6.5

* Person with access to the service

* Calculated data

* Projected data

Historical data ITU, BCRP, OSIPTEL

Source: MAXIMIXE.

B. ICT USE BY PERUVIAN ENTERPRISES

Many executives are reassessing the advantages that the ICTs provide to their businesses, and are taking steps to ensure that their information systems and business units are working together in coordination. They are also confident that ICTs can help manage the business strategically –in harness with an excellent corporate strategy– to increase company profits and achieve success.

A survey shows that 80% of businesses nationwide have computers in their workplaces, irrespective of the type, capacity and number of computers. The other 20% of the 6,769 companies surveyed did not have computers – a result that draws attention to the fact those surveyed were medium-sized and large companies. Accordingly, 20% of the groups of the companies considered medium and large do not have computers (Source: Instituto Nacional de Estadística e Informática, 2001).

An analysis by economic sectors shows that of all firms with computers in their workplaces, 40.9% belong to the productive sector and 59.1% are in the services sector.

Data on the number of computers in an enterprise's various workplaces show that in the administration area, 65.2% of companies with computers have between 1 and 5 PCs, 16.3% have between 6 and 10 units, 5.8% have between 11 and 15 units, 3.7% from 16 to 20 computers, and 8.9% of all companies with computers in the administration area have over 20 PCs.

At the national level, 64.2% have an Internet connection, while 33.6% do not. From a sectoral standpoint, 63.9% of productive-sector companies have Internet connections, and 34.3% do not. In the services sector, 64.5% of firms have an Internet connection, while 33.1% do not.

Hence, 22.6% of the companies use the Internet to publicize the corporate image, 45.2% of firms that have computers and are connected to the Internet carry out business over the web, 37.8% use the Internet for research and investigation, 11.5% carry out training through web-based courses, and 8% maximize the benefits that Internet provides them.

A quick situational analysis of firms would show that, regrettably, only 14.1% of companies undertake some type of e-commerce activity. Of the various e-commerce modalities used by firms,

the most frequent is “Business to Business” (B2B). At the national level, this modality represents 74.5% of all business types. Second in importance is “Business to Consumer” (B2C) which accounts for 49%, and third, “Business to Government” (B2G) which represents 8.9%.

III. SME development in the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMEs IN THE OVERALL ECONOMY

Law No. 28015 for the Promotion and Formalization of the Micro and Small Company defines an SME on the basis of the number of employees or the total annual sales according the following range:

- Microenterprises of up to 10 employees or annual sales of 150 Taxation Units (UITs)
- Medium-sized firms from 11 to 50 employees or annual sales up to 850 UITs

SMEs make up over 98% of the enterprises or establishments and provide about 75% of the private sector jobs. As a result, they are of special social and political importance.

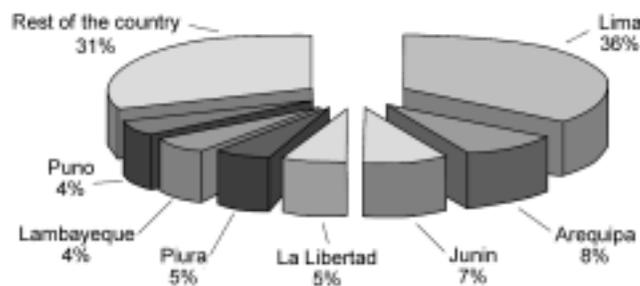
The SME sector is clearly an important part of the productive structure of the Peruvian economy; and in some regions, it represents the only enterprise level, which is the basis of economic activity. It is also clear that a large portion of the labour force consists of independent workers, for which reason there is a lot of instability.

SMEs by economic sector and region

In general, the SME sector in Peru is not very knowledgeable of the national economy because they produce goods focused on the final consumer, competing with products made by large firms enjoying economies of scale. The textile cluster in Gamarra and the leather cluster in Trujillo are exceptions because of their expertise and market focus. Although SMEs are present in industry, they are more common in the services and commercial sectors, since these areas require less investment and in turn provide more flexibility.

The geographic distribution of SMEs shows that the Peruvian capital, Lima, accounts for nearly 36% of firms, with the remaining regions ranked as follows: Arequipa 7.8%, Junin 6.6%, La Libertad 5.0%, and Piura 4.6%, among others shown in figure 1:

FIGURE 1
GEOGRAPHIC DISTRIBUTION OF SMES IN PERU (1994)



Source: Commission for the Promotion of Small Business (PROMPYME), 2003.

Trends in Peruvian exports

The level of entrepreneurial knowledge in the SME sector is very poor, and, compounded by their practically non-existent participation in the industrial sector, there are few SMEs exporting goods and services. On the other hand, it is not common to find SMEs working closely with large exporting enterprises. The reasons for this are, basically, that the SMEs cannot achieve standard levels of quality, volume, and committed delivery dates. According to figures published by the National Superintendent of Tax Administration (Superintendencia Nacional de Administración Tributaria) (Sunat) and PROMPYME, the SME sector contributed 3.2% of Peruvian exports in 2003.

At the national level, mining products overall registered a positive trend, growing to US\$ 4,532.46 million of exports, or an increase of 19%. This important sector contributed 51.1% of Peru's total exports in 2003.

The fishery sector made an important contribution of 11.6% to the country's total exports. Overall, aquaculture products displayed a negative trend, with a slight drop of US\$ 35.98 million of exports, mainly due to a reduction in fishmeal exports.

Exports of petroleum and petroleum products registered a positive performance, attaining a value of US\$ 665.44 million in 2003, representing an increase of 39% with respect to the previous year. The leading final markets for crude oil were Chile and the United States. While foreign sales of petroleum products grew by 28.5% in 2003 with respect to the previous year, the main markets were the United States and Panama. The average price of petroleum increased by 22.5% rising from US\$ 20.74 per barrel in 2002 to US\$ 25.4 in 2003.

The agricultural sector as a whole displays a positive trend, with an increase of US\$ 80.17 million in 2003, compared to 2002. The sector contributed 9.6% of Peru's total exports.

In the case of coffee –the main export item in this sector– exports fell by 3.7% in 2003. The leading final markets were Germany, the United States, and the Netherlands. The international price of this product was favourable, rising by 6.2% from US\$ 1,329.83 per metric tonne in 2002 to US\$ 1,412.43 in 2003.

Agricultural exports grew by 13.2% in the analysis period. The main items include: fresh or refrigerated asparagus, canned asparagus, mangos, grapes, paprika, red pepper, evaporated milk, frozen asparagus, avocado pears, cocoa butter, animal feed, biscuits, sweets, marigold flour and onions.

Sales of textile products and garments made a significant contribution of 9.6% to Peru's total exports. The FOB (Free On Board) value of textiles and garment exports amounted to US\$ 822.83 million in 2003. The main products were: T-shirts, cotton knit shirts, other cotton garments, combed or woven fine wool, acrylic cables, trousers, garments and accessories for babies, sweaters and cotton pullovers and cardigans. Sales of cotton T-shirts for men or women trended positively, growing by US\$ 23.7 million during the period under analysis. The main end-market was the United States. Exports of cotton knit shirts for men, in one colour, grew by US\$ 14.2 million in 2003 with respect to the previous year, the United States being the main market. Sales of other T-shirts made of cotton, for men and women, increased by 11.4%, with the United States again as the main market. The FOB value of other blouses for women grew dramatically by 35.6%. The main destination market was the United States. Similarly, sales of cotton T-shirts for boys increased by 56.8%. Once again, the main destination market was the United States.

The chemical sector contributed 3.6% of Peru's total exports in 2003 and experienced growth of US\$ 59.39 million during the period. The main items in this sector were: beauty products, other sweets and jars; other laminated sheets, new tires for automobiles, xanthophyll, sulphuric acid, colorants, boric acid, ethyl alcohol, colorant sprays, zinc oxide and cochineal.

Exports in the metallurgical sector registered an increase in a FOB value of US\$ 30.49 million in 2003 relative to the previous year, and this important sector accounted for 2.2% of Peru's total exports. The main items were copper wire, unalloyed zinc, laminated rods, zinc alloys, iron bars, copper bars and profiles, flat zinc sheets, other veneers, hexagonal zinc discs, among others.

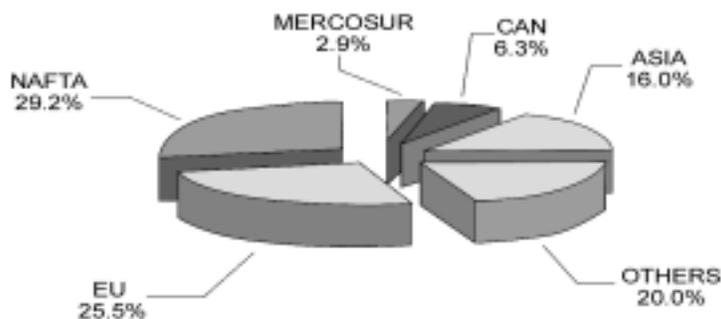
Foreign sales in the metalworking sector declined by US\$ 12.4 million in 2003 with respect to the previous year. This sector continues to exhibit re-exports, thereby nullifying the effect of the real export figures. The main export items in this sector were household refrigerators, parts for pumps, machine parts and appliances, other electrical conductors, balls and articles for mills, other cast products, among others.

Exports in the non-metallic mining sector grew by 6.6% in 2003 with respect to 2002. The leading items were marble, cement, other ceramic tiles and slabs, unpolished cement, other statuettes, safety glass for automobiles, sinks, washbasins and dissolved salts, among others.

Exports of hides and skins increased by 18.1% in 2003 with respect to the previous year. The main items were wet depilated bovine hides and skins, alpaca fur articles, other wet depilated tanned hides and skins, wet depilated caprine skins, wet tanned hides, hides of other animals prepared after tanning or drying and handbags.

The United States is the main market for Peru's exports, absorbing 26.5% of the total. The trend of sales to this country was positive, with 18.6% growth in 2003 with respect to the previous year. Exports to the Canadian and Mexican markets account for just 2.7% (US\$ 243.9 million) of Peru's total exports. Exports to both countries performed negatively: sales to Mexico slumped by 16.7%, while those to Canada fell by 3.1%.

FIGURE 2
MAIN MARKETS FOR PERUVIAN EXPORTS (2003)



Source: PROMPEX, 2004.

B. CASE STUDIES

1. Gamarra Textile Cluster

The Textile and Apparel Sector

As stated above, exports of the textile and apparel sector continued to post positive growth rates (21.55%) in January-December 2003, accumulating a value of US\$ 822.8 million. The garments segment remains the leading subsector, accounting for 79.47% of the sector's total exports, or US\$ 653.9 million. The textile segment accounted for 20.53% of the sector's total exports during the period under study.

Once again, knitted T-shirts and cotton undershirts are the leading export products in the textile and apparel sector, accumulating 28.89% of total sales of the sector and continuing the positive trend (21.31%). Secondly, cotton-made knitted undershirts for men or children, posted strong growth of 42.20%, representing 17.20% of total sector exports in January - December 2003.

The United States is the most important destination market for each of the main products, followed by Venezuela, Spain, Chile, and Italy. For example, cotton knitted T-shirts for men or women sent to the United States represent 87.8% of total exports of this product.

In apparel manufacturing subsector, just over 24,100 or roughly 91% of firms are involved in garment production, according to information provided by SUNAT. In terms of size, 96.7% of these firms are microenterprises. The enterprise structure of the textile sector, and in particular the apparel subsector is pyramidal, i.e. it concentrates a large number of small firms and microenterprises at the bottom, relative to medium and large enterprises at the top. It is important to note that roughly 93% of sales in this subsector are generated in the city of Lima.

The Gamarra Business District

The Gamarra business district dates back to around 1950 when businesses mostly belonging to families of Arabic origin were established to sell textiles in the area around Gamarra Avenue.

Roughly 60% of the products sold in Gamarra are targeted on the final consumer. Only around 27% are sold to resellers as the main customers – companies engaging solely in manufacturing; 10.44% are sold to other manufacturing companies as main customers; 1.71% to service enterprises, 0.95% to subcontractors, and 0.57% to the Peruvian government.

ICT USAGE BY SMEs INCLUDING THE GAMARRA CLUSTER

A total of 404 surveys were carried out by Prompyme in the conglomerates of Gamarra, Villa El Salvador, Jiron de la Union, Mesa Redonda and the Central Market (roughly 80 cases in each area) (PROMPYME, 2003).

Overall, consumption habits in terms of information use among the different conglomerates considered in the survey are quite similar. In keeping with widespread usage, the managers interviewed mentioned the following as the best ways to receive information: commercial television (42%), radio (26%) and newspaper (14%).

A significant finding on PC penetration and use is that, while 50% of managers/owners have a PC in their homes, only 32% have one in their business or office. Lastly, regarding the place where they usually use the Internet, 50% connect from public booths or telecentres, 25% from their business and 21% from their homes.

Word processing remains the dominant application, e-mail and the spreadsheet tie for second place, followed by use of the World Wide Web. Growth rates are fastest in e-mail and the World Wide Web.

Companies that use ICTs typically display two characteristics:

1. **Size:** Given cost considerations, it is unlikely that firms with a yearly business of less than US\$ 20,000 will embrace the use of ICTs.
2. **Subsector:** ICT use is concentrated in a few subsectors where there are common ICT applications within the primary value chain, (e.g. printouts and advertising) or connections, or both, with suppliers or customers that use ICTs (e.g. firms with customers abroad).

Firms tend to be very efficient at recognizing the total and immediate costs of possessing hardware and software. In contrast, firms are less efficient at recognizing the other components that contribute to the total cost of these technologies. Estimates of the latter costs can range from 60% to 70% of total costs, and may include: operating costs; connection to the Internet; upgrade costs for new hardware and software; training costs; and time costs in relation to the business manager and staff.

At least 90%, and probably even 95%, of all SMEs nationwide do not use ICTs at the present time. The reasons for this digital divide may include:

- Lack of money.
- Lack of skill or knowledge, or both.
- Lack of technological infrastructure, for example, electricity and telecommunications.
- Lack of other resources in the information chain.
- Lack of a “critical mass”, i.e. not enough people or organizations in the local environment that use computers or e-mail, provide web content, or are able to make purchases using e-mail.

Some of these problems are being solved through ICT intermediaries or Telecentres (known in Peru as *Cabinas Publicas*), but many others cannot be solved in this way.

Our investigations identified four different categories of SMEs in relation to ICTs.

- **SMEs that do not use ICTs: other technologies first, then ICT telecentres**

This category encompasses firms that so far are not connected to any form of telecommunications or to any basic ICT network. It includes the vast majority of small enterprises in Peru.

Such companies will be able to satisfy their needs more effectively through native and informal information systems than through formal systems based on ICTs. Most firms that currently do not use ICTs not only use native social networks to gain access to information but also intermediate channels, such radio and television, along with printed media, such as newspapers, news bulletins and manuals.

- **Users without access to information technologies: ICT telecentre and better information practices**

Although SMEs in this category do not use computers, they do have access to telecommunication services (particularly, telephone and fax) and they use them regularly.

Lack of financing and management skills, including staff training, is the key obstacle faced by firms in this group. This group would probably benefit much more if its existing information practices were to be improved using the information systems and technologies they already have in place.

- **ICT users not connected to a network: solid support for ICTs**

ICT users not connected to a network are aware of the benefits of computers for small companies: they have access to computers in their business facilities, but their levels of computer use are always low.

ICT users not connected to a network frequently suffer from a lack of skills to manage their business; they therefore share many of the features of those who do not use ICTs. Firms may need to expand their use of ICTs to maintain compatibility with their customers and suppliers; they may also feel pressure to adopt ICTs for fear of being overwhelmed by the competition, and to create a modern image. Nonetheless, failure rates in the use of new technologies are very high in this group.

- **Intensive ICT users connected to the Web. Priorities for assistance with ICTs**

These firms make considerable use of ICTs and their interconnectivity: frequent use of e-mail and the World Wide Web, and computer use in applications such as accounting and customer billing. Nonetheless, these firms have typically applied and adapted such systems mostly in an *ad hoc* fashion. In many cases, employees do not have the necessary skills to effectively operate the systems that have been developed. In other cases, the development process itself is faulty.

In some cases these types of firm are receiving additional help to maintain their current systems: for example, better perception of marketing and promotional advertising as a preliminary step to achieving more effective use of the Internet.

2. EXPORTIMO S.A.C. (Wood Sector)

Peru's largest export furniture producer currently produces 80% of its total furniture exports. Close to 40% of Exportimo's production is Forest Stewardship Council (FSC) certified, and there are plans to expand this to 95% FSC certified production by the end of 2005.

Four years ago, Exportimo completely phased out the use of mahogany, precisely because of the illegal logging associated with the species. Since then, the company has relied on alternative hardwoods, such as sauco (*xanthoxilon*), yesquero negro (*cariniana estrellensis*) and eucalipto (*eucalyptus grandis*), which come from FSC-certified forests.

Exportimo efforts do not stop with the manufacture of its furniture. To further the company's environmental commitments, it established Partnerships and Technology for Sustainability (PaTS), a Peruvian-based non-profit organization dedicated to linking sustainable resource management with the global marketplace. Much like the Rainforest Alliance's TREES programme, which links producers and buyers of certified wood, PaTS works with indigenous and local communities on forest management, helping to establish market linkages, identifying uses for secondary species and fostering additional sources of income, such as ecotourism, timber and non-timber forest products (NTFPs).

More recently, the company has launched an awareness-raising programme to educate consumers and retailers on the benefits of certification. The aim is to inspire other furniture companies also to source their raw materials from Smart Wood/FSC certified forests.

Exportimo had already passed through the transition point of formalization and integration of its total processes. In that regard, the manufacturing process starts by drying the wood in their own kilns to ensure its stability; this is followed by a rigorous industrial production process, and culminates in the handcrafted finish that reflects the high quality of their product. Exportimo's qualified design team is responsible for developing new models that keep it at the forefront of the industry and enable it to respond to specific needs of its customers. Thus, for example, use of internal information in the business has become more important year by year. The overall business was suffering, like the industry, from a lack of productivity, because of the inability of workers to meet production targets in terms of time and quality. In fact, there were no clear targets set and there was no structured system of work for the workforce to follow. Jobs were just given to workers with no set times allocated for different processes. At that point a basic system was introduced using "Worksheets" to be filled in for each job, with times specified for each process (preparing, cutting, assembling, finishing, etc).

ICTs applied across the business have been effective in improving workflow and raising productivity. Exportimo has applied ICTs in a way which it thinks will benefit the business, while also realizing that it would probably add to costs through further training for staff, investment in new hardware/software, and additional time spent implementing systems.

The firm emphasizes the use of ICTs in the production processes, implementing a system that tracks each order using bar code technology. This means that each part of a given piece or product in the production line is tagged with a bar code label so that the system can read how many pieces were finished and how many are in progress at each step of the production process. This information is then compared to the original order, and can be checked as to whether the committed delivery time will be achieved.

Its future plans include the acquisition of equipment and software to allow for a fully automated process for wood cutting in order to gain productivity and save costs in this stage of the production process.

The firm has connected to a local Internet service provider, and e-mail and Internet access have proved useful to them. Internet is used for most communications with customers and providers; to support its sales force in obtaining information on stocks and shipments leveraging the web presence of its partner SouthCone; for a virtual catalogue of the products produced by Exportimo,

and more importantly as a means to maintain their distribution channel in the United States, which is their primary market.

3. Case of Export Promotion: www.perumarketplaces.com at PROMPEX

The purpose of Peru's Export Promotion Commission (PROMPEX), created by Legislative Decree 805 dated 3, 1996, is to serve as a Peruvian export promotion agency integrated into a dynamic foreign trade system, leading a network of institutions engaged in the promotion and development of Peruvian exports. Prompex thus seeks to execute efficient actions aimed at generating a competitive, diversified and value-added supply, to manage the development of international markets with a forward-looking approach, to earn the support of competitive businessmen with a technically-based labour force and export-oriented culture; and to act as an implementing agency of export promotion policies.

The following multisector programmes serve as instruments designed to deal with several aspects of markets, products, and enterprise management development.

- **PROMEX - Market analysis and research**

Jointly executed with the Ministry of Foreign Affairs, and particularly with Commercial Offices around the world, this programme aims to identify products that have potential in international markets, provide individual services for exporting companies with the aim of compiling up-to-date information and evaluating target markets to adapt commercial strategies to the specific requirements of each market.

- **EXPORTA PERU Programme**

This programme was created to improve SME export management skills by defining and executing export plans. The goal of the programme is to create an export plan that clearly defines the product's characteristics, the target markets, the costs and export price, and the promotion strategies in international marketing and distribution channels.

- **EXPORTA CALIDAD Programme**

This promotes the implementation of quality systems (such as ISO and Hazard Analysis and Critical Control Point [HACCP]) among SME exporting companies, and acts as a management tool that works for cost reduction, boosts confidence, and creates a sense of accomplishment between suppliers and clients.

- **E-COMMERCE**

This provides technical support to small and medium-sized exporting companies on how to maintain an active presence on the Internet, providing basic alternatives such as the presentation of products in e-catalogues and virtual fairs, including the execution of e-commerce projects managed by the company.

In order for the participating companies to expand their commercial actions, PROMPEX has developed an Exportable Supply Vertical portal, which includes tools such as the company's directory, and a virtual stand to promote products and services.

- **PROMPEX STAT**

This provides statistics on Peruvian exports classified by tariff code, market destination, FOB value, and net and gross volume. Exporters have access to classified information held by PROCOM (Business Opportunities Programme) and can obtain information about foreign commercial demands via fax or e-mail.

PERU MARKET PLACES: The SME strategy for e-commerce

The new strategy of the E-Commerce Programme would concentrate on developing an Internet portal for the presentation of SME exporters and their products, including functions allowing all company information on the portal to be administered remotely by the firms themselves, thus giving them some independence from PROMPEX support. Aspects of interactivity were also included on the portal, allowing potential buyers to contact firms by selecting the products appearing on the portal. When a product is selected, the portal automatically prepares a request for a proposal, which is sent to the firm that owns the requested product. In other words, firms participating in the programme access a “website” inside a specialized portal, a virtual marketplace, a system for proposal requests, for order follow-up, and a platform for creating marketing plans based on the traffic generated to their website.

Execution of the strategy to implement the new objectives involved two phases.

The first phase covered the following:

- Development of the portal’s technical platform to offer exportable Peruvian products. The portal was named: perumarketplaces.com
- Recruitment of the consulting team.
- Promoting the programme and creating awareness.
- Searching for partners.

The second phase included:

- Request SMEs to affiliate to the programme, i.e. to enrol in the portal by signing the affiliation contract; 82 SME companies signed.
- Execution of the e-marketing plan and development of an e-marketing manual.
- Register the portal, perumarketplaces.com, with 150 web searchers.
- Links and exchange programme. An exchange programme was designed and transmitted by e-mail.
- Preparation of programme manuals: Operations Manual, Portal Organization and Functions Manual.
- Preparation of training seminars and conferences to increase awareness, including presentation of the portal.

This e-commerce programme, operating through the perumarketplaces.com portal, provides SME exporters with a tool that facilitates their presence on the Internet to promote their products.

C. PROBLEMS FOR SMES PARTICIPATING IN THE TRADE-ORIENTED VALUE-CHAIN

SMEs that attempt to start export activity encounter considerable difficulties in directly exporting their goods for themselves. This requires an individual approach to all production and marketing tasks, and to the logistics of the export process, which in many cases is beyond their control because of financial, human resource, infrastructure, and organizational limitations, compounded, more often than not, by a lack of market knowledge.

Recent policies to remove trade barriers and reduce tariffs have generated sustained import growth, affecting all SMEs that produce for the domestic market. They now need to find ways to meet this new competition. Moreover, SME links to the international market will remain weak, and possibilities for export development may be reduced to a small portion of these firms. Although under some circumstances SMEs have certain advantages in terms of flexibility, they generally display structural deficiencies in their operations, caused by their small size.

There has been rapid economic progress since 1992; nonetheless, there is a wide range of constraints/barriers inhibiting enterprise start-up and growth in Peru: human capital constraints; lack of an entrepreneurial tradition; insufficient backward/forward linkages; competitive pressures; constraints of market demand; financial constraints; lack of premises; and technology/technical constraints.

IV. Government policies designed for SMEs, IT and international trade

A. IT POLICIES IN THE COUNTRY'S OVERALL DEVELOPMENT STRATEGY

Preparation of this report on the situation of government policies towards information and communications technologies in Peru has focused on those developed by the National Office of Electronic Government and Information Technology (ONGEI), which indicates the development level in terms of implementation and use of ICTs.

This framework has been used to evaluate the Peruvian government's action plan on role of ICTs in the creation of new opportunities, elimination of access barriers to information, and in elimination of physical and virtual isolation among individuals, promotion of efficiency in production and distribution, and reduction of transaction costs for individuals, firms and government.

The five areas developed as part of State policies correspond to: leadership, connectivity, information security, human capital and e-commerce.

The 2003-2006 National IT Development Policy raises the need for public-private sector coordination to promote a national system of investigation, development and innovation in information technologies, as a network of agents that will develop information technologies in Peru.

These efforts were started by a variety of entities such as the Peruvian International Cooperation Agency (APCI), the Peruvian Chamber of Software, and recently the Peruvian Association of Software Producers (APESOFT).

B. POLICIES TO SUPPORT SMES

The Peruvian development strategy and policies to promote the SME sector

The problem with small companies is not their size but their isolation. The current characteristics and conditions of the economy hinder the survival of SMEs that remain alone with no contact with other companies, support institutions, universities, or business organizations. The strategy should put an end to such isolation. To achieve this, a series of policies and specific instruments are required that range from performance in their product markets to consolidation of service markets, in order to attain the competitive conditions prevailing in the global markets where SMEs operate. Considering that the new macroeconomic environment generated very tough competitive conditions for SMEs, in a way it makes sense to begin with the instruments to open new markets and create opportunities (product markets), and then move on to key input markets to achieve the necessary competitiveness in the global market.

Policy 1: Expansion of product markets

Instrument 1: Government procurement - Every year the Government carries out goods and service procurements in the domestic market under Law 26850. Nonetheless, as these regulations are not integrated into the organizational reality of the country, a broad sector of SMEs are in many cases excluded from this potential business. Following the examples of developed countries that use government procurement to expand markets for small companies should allow a significant percentage of procurements to assist firms in this sector.

Instrument 2: Development of subcontracting - Subcontracting has been the key instrument in the development of the small enterprise in Japan, Taiwan Province of China, and other countries; but unfortunately this has had a minimal effect in Peru. Progress can be made through persuasion campaigns including incentives for medium-sized and large companies that have the potential to become contractors, thus, increasing the expectations of these firms in the SME sector.

Policy 2: Promotion of Exports

SMEs have scant participation in Peruvian exports, thereby losing the opportunity to make an important contribution to the national economy. In this sphere, PROMPEX, along with ADEX and other private institutions, are using advisory activities, training, information, and participation in international fairs, but so far with little impact on the sector.

Instrument 1: Support the formation of clusters among small firms, either for exports to offset government procurement through imports, or to meet the demands of the large companies.

Instrument 2: SMEs can expand their market by organizing periodic fairs (back to school, Independence Day, Christmas, etc.), or permanent ones (every weekend or end of month).

Instrument 3: Implement a coherent tariff policy that assures competitiveness for domestic producers in relation to their counterparts in other countries of the region, along with commitment and firmness in the struggle against smuggling, and in controlling illegal dumping practices. Open dialogue with the authorities and government institutions responsible for these issues is also required.

Instrument 4: Consolidation and expansion of centres for the development of management capabilities (modules or service centres, for example) that offer services, either directly or through third parties, according to local SME needs.

Instrument 5: Promote the transfer and creation of modern technology in the SME sector with new technologies and long-term credit lines for acquisitions, including the creation of programmes for technological innovation in productive areas with the potential to develop and establish technological investigation centres, known as CITEs.

Instrument 6: Information intelligence is needed to increase competitiveness. A good example of such a policy is the project entitled Integrated Foreign Trade Information System (SIICEX), which integrates the services and infrastructure of the public and private institutions that generate, process, and publish information on the foreign trade sector. The aim of this project is to maintain an extranet/intranet portal that can be used to access the Integrated Foreign Trade Information System project, which would offer centralized and secure access to the various resources and services published on this portal. The portal would integrate information from a variety of institutions for online queries and host content, and deliver what each of these institutions offers. The project's specific objectives include the following:

- Provide specialized and classified information adapted to the requirements of Peruvian companies and institutions that develop foreign trade activities, and whose communication channel will be the SIICEX portal.
- Maintain statistical information, databases, and other sources that allow for the generation of negotiation scenarios providing results to evaluate different alternatives in the decision-making process.
- Provide export firms with access to commercial and up-to-date value-added market information that supports the creation, penetration and consolidation of new markets.
- Establish mechanisms for training SME users, and the dissemination of content using information technologies as well as mechanisms available in the web, controlled and administered through the portal.

- Create a repository of information, allowing for access to information sources from diverse institutions – a repository that can be accessed and administered through the portal.

The following services are available for registered users of the SIICEX portal:

- An account to access the portal.
- A group of web pages for each registered user – which will be used as virtual offices.
- A content area that allows the user to publish information.
- An e-mail account with limited storage.
- A Web interface to access the respective mail account.
- Events and training programmes are published.
- Access to an e-learning module.
- To allow completion of the export chain, the portal allows for the registration of firms that offer complementary services to normal export activities.

Another important element of the SIICEX project is the promotion, trade, and competitive intelligence module, which is integrated into the portal's functionality.

Another module is responsible for exportable supply and managerial administration, with the following main functions: to offer up-to-date specialized and systematic content that promotes and facilitates decision making in the promotion and administration of Peruvian exportable products – specialized supply and qualified information adapted to the requirements of SMEs and Peruvian institutions that engage in foreign trade activities.

Moreover, it was necessary to follow up on published exportable supply, which was distributed to portal users in order to determine whether the economic sector benefited in any way, to create an electronic payment infrastructure for certain products or services offered through the portal, or to serve as a channel between buyers and bidders. And finally, to allow the publication of information of interest to the exporting community, on tariff rates, standards, technical barriers, competition policies, and complementary services on foreign trade.

Instrument 7: To allow SMEs access to financing through credit lines and formal financial institutions, such as Guarantee Fund for Loans to the Small Industry (FOGAPI) and Fund for Supporting Small Enterprises (Fondo de Respaldo a la Pequeña Empresa, FONREPE).

Policy 3: Improvement and adaptation of the legal and regulatory framework

Law No. 28015, on Promotion and Formalization of the Micro and Small Enterprise, passed through Supreme Decree No. 009-2003-TR, and published on 12 September 2003, seeks among other things to promote the micro, small and medium-sized enterprise sector in the following ways:

1. The National Council for the Development of the Micro and Small Enterprise (CODEMYPE) serves as an advisory body accountable to the Ministry of Labour (article 7). It has a technical secretariat in charge of the national management of SMEs (article 8). Its operation will be established through the organizational and functional regulation to be approved within a maximum of 30 days following its installation (article 10).

2. Promotional instruments for development and competitiveness of SMEs start from the premise that the Government promotes training services and technical support, prioritizing the creation of new enterprises, and strengthening SMEs and their association with other small enterprises with export and job creation potential (article 16).

It will also implement promotional measures for private institutions that offer training and technical support to the SME sector (article 17), such as formation of consultants and trainers, best practice contests, internships, incentives and promotion of managerial development services, and transfer of methodologies and technologies.

3. Access to market information.

The regulation establishes that SMEs can enter into association contracts to gain greater access to the private market and to government procurements (article 18).

The regulation notes that PROMPYME facilitates SME access to government procurements (article 19), through dissemination of annual purchase plans, demand mechanisms, goods and services supply, promotion of consortia, subcontracting programmes, and centralized negotiation mechanisms.

It also states that regional and local SMEs must have preference (over other SMEs not located in their area) when government purchases are carried out in their area, and they must also have an alternative system to that in which bid bonds have to be presented. Government entities are required to submit their annual budget to PROMPYME for publication, and reserve at least 40% of total purchases for the SME sector.

4. Export promotion.

The National SME Administration, in coordination with PROMPYME and the other bodies mentioned in the article 23 of the Regulation, will publicize up-to-date information on export opportunities for the SME sector.

C. POLICIES AND STRATEGIES FOR THE DEVELOPMENT OF HUMAN SKILLS

As a result of a Peruvian Government initiative, the Commission for the Development of the Information Society (CODESI), a multisectorial public-private commission, developed a strategy throughout 2004 to gradually eliminate the digital divide. A summary of its policies and strategies for human development is as follows:

Policy: Promote the Peruvian citizen's development in the information society from a personal, work, and productive perspective, taking advantage of the opportunities offered within this new context, hence reducing the risks of exclusion.

Strategy

Develop the citizen's skills through the various stages of personal development in the information society:

0 - 5 year-old level

- Promote the development of child educational software.
- Design training programmes for grade school instructors with the aim of promoting digital literacy among their students.
- Promote the use of information technologies in child libraries.

6 - 12 year-old level

- Promote projects that generate access to and adoption of ICTs such as electric and electronic apparatus among children.
- Promote the pedagogic use of ICTs when integrating them into the curriculum in developing skills and learning.

- Develop programmes that familiarize children and parents with the use of local public, and school libraries, in order to train them in information search.

13 - 16 year-old level

- Promote pedagogic use of ICTs when integrating them into the curriculum in developing specific skills and achieving potential learning situations.
- Disseminate current legislation that protects and respects intellectual property.
- Develop online participation programmes, which stress the importance of written communication skills, ensuring that the messages travelling through the Internet are clear and precise.
- Develop programmes that familiarize adolescents and parents with the use of local public, private and school libraries, in order to train them in information search.

17 - 25 year-old level

- Recommend that the national university system makes it mandatory to define digital and information literacy to students and teachers.
- Promote the accreditation of universities that offer quality library services through the use of ICTs.
- Promote cultural extension courses for non-university youth and adults in digital and information literacy.
- Promote the formation of new skills, the key being technological innovation in the task of higher learning institutions.

25 year-old level and up

- Strengthen the National Library System to consolidate public library networks integrated through ICTs.
- Develop programmes that familiarize citizens and their families with the use of local, national and international, private and public school libraries, within various contexts such as the real and the virtual, with the goal of training them in their quest for information.
- Encourage websites containing public information to show content that is accessible and specific to disabled, incapacitated, and high-risk-of-exclusion groups, among others.
- Promote the formation of new work skills, the key being technological innovation.
- Encourage the production of alternative methods of information media such as diskettes, audiotapes, Braille prints in large type, and others.
- Promote programmes that motivate online synergetic work.
- Promote programmes for managing information resources in public libraries.
- Encourage long-term economic, social, and cultural programmes that consider strategic investment as the premise for providing basic services to indigenous cultures, and promoting their autonomous organizations in a joint effort between the private and public sectors.
- Encourage the identification and training of rural and urban indigenous organizations that find themselves in a position to self-manage community information system undertakings.

- Formulate policies at the national level that encourage research and development.
- Motivate the private sector through tax relief, to enable it to support research facilities for industrial development including the creation of new technologies, exploitation of raw materials, etc.
- Create strategic partnerships with the private sector in order to study the country's natural resources, and their exploitation and sustainable development.
- Create research incentives in the universities.
- Boost potential in exploiting the software industry through the creation of centres of excellence, and technological funds for ICTs, all with the required formal support when adapting and updating legislation to the new ICTs.
- Train teachers, and university and technical school educators on the use of acquired technology, and create public zones (with acquired technology) in all public and private educational centres.
- Adapt physical, technological, and human resources to facilitate the inclusion of disabled persons in the work force.
- Encourage the implementation and maintenance of e-government web pages so that their design complies with the accessibility norms set by World Wide Web Consortium (W3C) and Web Accessibility Initiative (WAI).
- Support the introduction and dissemination of international standards on ICTs, together with standards for e-learning and the use of resources, tools, and technological services.
- Support projects to create acquired technology or adapt current technologies to the needs of the disabled.
- Offer access and use of ICTs under equal terms, keeping in mind such aspects as gender, generation, disability, ethnics, and culture.
- Strengthen the State's corporate library services and network integration using ICTs, with their active participation in e-government.
- Coordinate efforts to include government, private enterprise, and the public in creating a network of information on job vacancies, employment opportunities lists, training, and general information on the labour market.
- Keep information in State public websites up-to-date.
- Implement specific programmes to access technologies; starting with a comprehensive diagnosis undertaken with active participation from the indigenous communities, respecting their social, cultural and economic structures.
- Implement long-term programmes that allow intra-community analysis to decide how ICTs will be incorporated, on the premise that the indigenous communities might decide not to use them in the same way as other national social groups.
- Provide educational opportunities to older adults through virtual extension courses at all (educational) levels in public and private schools and universities.
- Maintain continuous educational programmes in the universities.
- Motivate the extensive use of communication space on the Internet.
- Create a National Centre of Acquired Technology (CNAT) within the National Council for Science and Technology (CONCYTEC).

- Help reduce levels of prejudice and discrimination in Peruvian society, through specific communicative actions.
- Promote positive attitudes toward ICTs in the indigenous population and in its leadership.
- Promote illiteracy reduction programmes and raise the population’s overall educational level, particularly through ICTs.
- Promote the method of shared access to ICTs through telecentres in rural and semi-urban areas.
- Enable instances of social, local, and community control that guarantee the effectiveness of the coordinating mechanisms, which control the administration of information resources and supervise equal distribution at the community level.

D. E-GOVERNMENT AIMED AT SMES AND TRADE PROMOTION

Under Supreme Decree No. 067-2003-PCM, the Regulations governing the Organization and Functions of the Cabinet’s Presidency, published in the official newspaper, “El Peruano”, on 28 June 2004, establish that the National Office for e-Government and Data Processing depends directly on the Secretary of Public Administration.

The functions of the National Office for e-Government and Data Processing are as follows:

1. Promote State policy on e-government and data processing in accordance with the Plan for the Development of the Information Systems Community in Peru, created by the Multisector Commission for the Development of the Information Systems Community (CODESI).
2. Set standards and coordinate the development of e-government and information systems activities in public administration, thus driving its modernization.
3. Create actions aimed at consolidation and development of the National Information System Administration.
4. Design and develop the national e-government strategy, and coordinate and supervise its work.
5. Coordinate the development of data processing solutions with branches of government to optimize public administration.
6. Coordinate and supervise the functional integration of the State’s information systems.
7. Coordinate and supervise the development of Internet websites for public sector organizations, in order to establish a single window to serve companies and citizens.
8. Outline the characteristics of the State’s contractual policies, as prescribed in Line III of Supreme Decree No. 031-2002-PCM.

The e-government strategy aspires as much to increase citizens’ access to State information services as to improve the efficiency of public administration. An e-government policy will be developed and implemented for this purpose, which includes the institutionalization of the organization, policies, and standards of e-government; the development and installation of online services (through the Peruvian State website) as well as the development and implementation of the State intranet, and a single window to serve all citizens. The training of government officials and advising citizens on the development of these new information technology tools will supplement these efforts.

With regard to the administration of e-government purchases, the programme's purpose is to increase the transparency and administrative capacity of the Peruvian State in relation to government procurement, by institutionally strengthening the State's Superior Council of Contracts and Acquisitions (CONSUCODE), and by development and implementation of the e-government procurement system (SEACE), thereby creating greater opportunities for the network of small firms and microenterprises. The implementation of these activities includes financing the information infrastructure, training, disseminating, and supporting the system.

Furthermore, the Multisector Commission for Integration of the State's Information Systems and Technological Platforms (COISIP) was created to increase the efficiency of public administration and improve living standards, enabling citizens to carry out their functions in an integrated, efficient and transparent manner using ICTs.

Improving domestic connectivity in Peru is a priority, along with simplifying processes and achieving greater transparency in State procurement, establishing certification and digital signatures (to be fully identified to carry out transactions), integrating the State's systems (single window), and creating a methodology for administrative simplification, among others.

V. Conclusion and recommendation

1. Lessons learned on IT and information usage by SMEs

Information needs gap

The findings presented here suggest there is large information needs gap across a wide range of small enterprise activities. This can be best understood as the difference between the stated demand for information from entrepreneurs and their success in obtaining it. By far the greatest information gap, found in roughly three-quarters of all urban SMEs, was an urgent need for market information pertaining to new local customers, or the need to expand into export markets, or both.

Other important information gaps in the formal SME sector largely concern the key business constraints: information about internal and external finance, and information about sources of skill development and training. Similar information needs, relating primarily to markets, money and skills, were found in rural micro and very small enterprises. Overall, lack of the necessary information was reducing income and raising costs for SMEs.

Limited role for ICTs

There is only limited potential for information and communication technologies to overcome the information needs gap in the light of other information and non-information-related constraints faced by SMEs.

ICTs can also be seen to bring benefits to small enterprises. Studies show that they can reduce the time and monetary costs of business processes, and can improve their certainty and quality. Word processing remains the dominant application, while e-mail and spreadsheet use compete for second place, with web use slightly behind. Communication-based applications display the fastest growth rates, and ICTs can be of particular value in supporting communication since this addresses the relatively information-poor and isolated nature of the enterprise.

Demonstrable short-term benefits, however, were limited to enterprises meeting two criteria that were key determinants of whether or not ICTs were present and being used in an enterprise. Firstly, size: there was a threshold –typically expressed in terms of a few tens of thousands of US dollars of annual turnover, and therefore related to the concept of transition point, below which ownership of ICTs was very unlikely. Secondly, subsector: ICT use was concentrated in a few subsectors in which there were either common ICT applications within the primary value chain, or linkages, or both, with ICT-using suppliers or, particularly, customers.

For manufacturing exporters and the tourist industry, a strong Internet presence is already becoming a powerful and inexpensive marketing tool, both for raising the profile of the business and for rapid dissemination of information to potential and existing customers at home and abroad.

SME access to ICTs

The SME share of the domestic economy is very large: 97.6% of all enterprises are small businesses, and they account for 42.1% of gross national product (GNP).

Nonetheless, SMEs are not incorporating information technology into their productive or organizational processes, thereby generating a phenomenon of resistance to technological change. Hardware and software costs, lack of training, and limited sources of funding to develop processes based on technology projects also influence this phenomenon. SMEs suffer restrictions in terms of Internet access as a way of improving their organizations, business models and competitiveness.

In Peru, one of the main ways of accessing the Internet is through public telecentres (*cabinas públicas*). It is therefore necessary to analyse this sector as a potential source of access and development of SMEs towards ICTs; 87% of users access the Internet through telecentres. The telecentre phenomenon has enhanced the country's image, as the number of Internet users reached 3.6 million in 2003.

Work and advancement of employment

Information technologies affect labour productivity and the advancement of employment. In the latter case, the impact is direct when measured in terms of the percentage of the economically active population (EAP) in the communications sector, and indirect through the supply of goods and services.

The communications sector has enjoyed sustained development since the 1990s. In this field, investment through private companies that undertake operational, maintenance, support, and design activities, among other telecom-related activities, have proven to be an important driving force in spreading this service.

Although such growth is remarkable, it is insufficient to satisfy market needs. In fact, the promotion of youth employment is considered one of the main policy goals of employment promotion. In the ICT sphere, promotion of the use and application of free software can generate great opportunities for the development of a sector specializing in new software.

2. Policy and measures for SMEs and trade

SME size is not everything

Throughout this report, there has been a consistent message that “small enterprises” are different. They are different in size, have different locations, work in different subsectors and, above all, have different needs. A balanced approach requires thinking about all these different needs but it also means that a single set of recommended interventions will not be suitable. Interventions need to be customized to particular enterprise needs.

SMEs with potential are more likely to be export-oriented, from the formal sector, larger, urban, with a diversified customer/supplier base. For such enterprises, information moves up the priority list and they have a greater capacity to meet their information needs. They need help in building business linkages. ICTs can be very valuable, and these enterprises should be the priority focus for ICT interventions: they are better placed than others to make use of ICTs, and they have a greater capacity to generate wealth, employment, exports, and innovations.

Enterprise networks

Equity plays a vital role in the information life of enterprises; and enterprises need help to build better networks of information-providing contacts. Generally speaking, the more linkages,

the better and greater their variety. The greater the flow of information along the linkages, the better. As noted, there is a need to build business linkages rather than social linkages, and business linkages to sources that are themselves well connected.

A corollary is that enterprise-supported public agencies should try to facilitate linkages between their client enterprises and other businesses, rather than between clients and the agency. Part of this would mean providing inputs (financing, training, technology, etc.) via existing private-sector suppliers rather than via the agency. Governments should not lend money or subsidize; they should enable existing financial institutions to lend money to small enterprises. Governments should not provide training; they should enable existing training firms to train small enterprises. In this way, more valuable business linkages rather than less valuable institutional linkages would be created. Other ways in which business networking can be promoted include:

- Arranging meetings between entrepreneurs, especially between potential suppliers and customers, for example at trade fairs.
- Creating enterprise clusters.
- Encouraging the growth of subcontracting.
- Monitoring schemes that link managers in large firms to entrepreneurs in small enterprises for the purpose of providing advice and support.
- Supporting the creation of private-sector trading firms that will sell small-enterprise goods.
- Supporting demonstrator enterprises: selected enterprises with good information/ICT practices that agree to give occasional presentations and assistance.

Clusters

These conclusions highlight the need for Government to address systemic or market-failure constraints on cluster development. Public intervention should be catalytic and should not seek to create clusters just for the sake of it. The emphasis is on working through partnerships and networks to achieve outcomes that the market alone cannot achieve.

Such networking and partnership initiatives can also benefit from an international dimension. Again, the integration of national, regional, and local initiatives and institutions is recommended, and further examination of best practices and countries' experiences is suggested in areas such as the role of universities and knowledge-intensive services in cluster development, regional attractors of knowledge-intensive foreign direct investment, and governance structures and means of evaluating cluster initiatives. Additionally, help must be provided to local actors in order to implement cluster strategies primarily through schemes to stimulate collaboration between public and private research institutions, improve the availability of market information and strengthen co-operation among firms. Relevant fields include market intelligence, design and branding, and technological and human resource development. Finally, the exchange of experiences at the national and international levels, especially regarding governance structures and the evaluation of cluster initiatives, must be encouraged.

3. Policy for promoting e-commerce

E-commerce

In e-commerce, Internet use has changed the traditional way of doing business. While contracts are signed promptly, a variety of information on the market for goods and services is available. However, according to the e-commerce development index cited by Telefónica del Perú (2002), "Peru stands close to last place –precisely number 62– in a ranking of 75 countries", owing mainly to problems of self-assurance in this environment.

In spite of the various electronic payment mechanisms existing in the market today, credit and debit cards, scant use of this payment method persists in commercial operations transacted through the Internet, because users still do not trust this method.

E-government

In the case of administrative procedures in Peru, there is limited capacity for measuring the satisfaction of citizens' growing demands, because of factors such as a lack of mechanisms to provide solutions, and effective and immediate attention to citizens' demands and complaints; lack of a definition of minimum quality standards in public services; and the absence of clear and specific criteria in applying regulations, thereby giving rise to abuse, discrimination, and corruption. There is also slowness in procedures and paperwork due mainly to obsolete mechanisms, lack of bylaws and defined basic structures, and a lack of operating procedures and public service manuals. This has impacted the timeliness of responses, and it has generated unquantifiable social costs resulting in nuisance, distrust, and a deterioration of the institution's image.

Priorities in Peru include improving domestic connectivity, simplifying paperwork to achieve greater transparency in State procurement, establishing certification and digital signature (to be clearly identified to carry out transactions), integrating the State's systems (single portal), and preparing a methodology for administrative simplification, among other items.

Electronic government procurement for SMEs

As the government's electronic procurement presence grows in different ways, the participation of small businesses in this activity is critical if the government is to meet its small business procurement goals, headed by PROMPYME. Small businesses have successfully obtained a relatively large share of government procurement in the specific online procurement programmes launched by PROMPYME. At the same time, concerns about obstacles to small business participation in electronic procurements are still revealed in studies and surveys and by organizations representing and working with small businesses. These entities report that small businesses continue to face obstacles when participating in electronic procurement procedures with the Government, such as a lack of: (i) technical expertise; and (ii) knowledge about the Government's electronic procurement strategy. The key to success in terms of small business participation in government electronic procurements is that both parties –the Government and the businesses themselves– persevere in overcoming them and any future obstacles that may arise. The government has taken, or plans to take, actions to address some of these obstacles.

ICT infrastructure

There is notorious inequality in access opportunities to public telecommunication services between residents of the capital and the rest of the country. Lima and Callao account for the largest percentage of telecommunications services per 100 inhabitants: an estimated density of 13.8% in fixed telephony (subscribers), 23.30% in mobile services, and 6.88% in public telephony registered during the fourth quarter of 2003.

Analysis at the provincial level, reveals stark contrasts between province capitals and the rest of the provinces. Such is the case of Lima, where the province of Yauyos displays a 0% penetration in fixed telephony (subscribers), and 0.48% in public telephony. Unequal access to telecommunication services is the cause of exclusion and digital divide in the country.

The installation of fibre optic networks is mainly confined to the coast, making the development of public and private services extremely difficult, especially for those that demand high capacity in data communications, which is fundamental to the information society.

Nonetheless, it is not enough to have efficient infrastructure; it is also necessary to guarantee conditions for citizens to access it.

Science, technology and human development

In Peru, the current situation in terms of development of Science, Technology and Innovation (CT&I) is critical, characterized by a deterioration of its hitherto incipient capacity to generate, adapt, and transfer knowledge for social applications. This situation, which explains economic stagnation and the widening of the digital divide relative to other Latin American countries, could result in Peru's exclusion from the world development and the process of building the information society.

The fundamental problems of the current situation are:

- Deterioration in the quality of university education generally, and of researchers in particular, who are detached from CT&I institutions and socioeconomic reality.
- Loss of investment opportunities.
- Loss of research and training opportunities.
- Creation of isolated initiatives without clear perspectives, detached from a nationally integrated and coherent proposal.

The main causes of the situation described above are as follows:

- Absence of a widespread perception of the importance of science and technology in national development and in troubleshooting critical social and productive problems.
- Insufficient investment in R&D, despite the magnitude of global expense in CT&I activities.
- A nonexistent legal framework defining rules of engagement for the various instruments for development of science and technology in areas of special national interest, to actively promote human development and competitiveness in the national and international environment.
- Absence of a national CT&I policy with a strategic plan to guide and promote the actions of the various agents, with qualified leadership and the necessary institutional and legal support.
- Private-sector participation is at a minimum in the generation, acquisition, and adaptation of products and scientific technological services, resulting in the loss of already scarce skilled workforce. Firms do not constitute a dynamic force in requirements for innovation. Large and medium-sized firms apply "turnkey" technologies that exclude local capacity from generating, adapting, or participating in the creation and incorporation of knowledge. Small firms do not have appropriate mechanisms to identify and channel their innovation needs.

The information technology industry

Peru has several comparative advantages, such as the skill of its professionals and the quality of its products (both in software and in ICT services), for which it enjoys certain acceptance in foreign markets. Comparatively speaking, the country has a cheap labour economy, and it is culturally and geographically close to markets where potential demand is immense.

The information technology industry earned revenues of US\$ 559 million in 2003, with US\$ 580 million projected for 2004. Hardware sales account for 53% of the market; software licenses and maintenance 12%; and services 35%. Projections for 2004 suggest that this distribution will broadly persist.

Hardware

The hardware market in Peru consists of equipment, parts, and imported spares. Peru does not have companies that can really be referred to as the “Peruvian hardware industry”, although hardware assembly is becoming a very important business activity in the country.

In the case of computers assembled locally, which account for 49% of the total hardware market, value is added through transformation of the finished product and skill creation.

Software

The software market in Peru is relatively small. Most of the revenue (76%) comes from the sale of licenses and maintenance on imported software (i.e. software developed in other countries on which Peru does not own the intellectual property). The remainder of the licenses sold come from software developed locally.

There is a software industry in the country with export plans, and the activity of this market has grown over the last three years. Software piracy is a threat to development of the local market; while it has been possible to reduce piracy indexes in the country, development of this industry is still at risk, for which reason redoubled efforts are needed to strengthen the audit and protection of intellectual property.

References

- Adams N. and Valdivia N., 1991, “*Los otros empresarios: Ética de emigrantes y formación de empresas en Lima*”, Lima: IEP.
- Aguilar Cruz, J., 1994, “*Promoción de la Microempresa*”, Peru, Editorial Alternativa.
- ALADI/SEC/Estudio 157, La brecha digital y sus repercusiones en los países miembros del ALADI, May 2003.
- ALADI. Situación Actual y Perspectivas del Comercio Electrónico en la Región (Actualización). ALADI/SEC/di 1514, May 2001.
- Aspilcueta, Marco, “Desempeño de la Pequeña y mediana empresa exportadora del sector textil y de confecciones en el Perú”, Oficina Internacional del Trabajo 1999.
- Carazo Inés, 2000, Estrategia Nacional de Desarrollo de la Innovación y la Productividad en el Perú, 2000, MITINCI, Lima.
- Caser, Riesgo de mercado, April 2003.
- Cillonez, Fernando; Desarrollo Empresarial y Cadenas Productivas, Lima 2003.
- Coronel A., 1999, “Servicios para la micro y pequeña empresa en el Perú”, GTZ-MITINCI, Lima.
- Chacaltana, Juan; Miguel Robles; Jaime Saavedra; Máximo Torero and Néstor Valdivia; Estrategia y Racionalidad de la Pequeña Empresa. Lima: OIT/GRADE, 2001.
- Ferrando, Iván. Gobierno electrónico en Perú. Documento de trabajo. II Seminario Taller ALADI Economía Digital y Gobierno Digital. Montevideo, November 2002.
- García J., “La Institucionalidad Público-Privada de Apoyo a la Pequeña Empresa en Perú, Lima 2003.
- Instituto Nacional de Estadística e Informática (INEI), Indicadores de Tecnologías de Información y Comunicación en las Empresas, Lima November 2001.
- INEI, Situación de las Tecnologías de la Información y Comunicaciones en el Perú, Informe Nacional - September 2002.
- INEI, Política Nacional de Informática, Sistema Nacional de Informática, Lima 2002.
- INTENDENCIA NACIONAL DE ADUANAS del PERU, Pago Electrónico de documentos Aduaneros ePago. Programa para el Intercambio de las Mejoras Prácticas en la Administración Aduaneras del Este de Asia, Latinoamérica y el Caribe - BID. Superintendencia Nacional de aduanas. Lima, Peru 2001.
- Marco Aspilcueta, Los servicios de Desarrollo Empresarial para las Pymes del subsector Confecciones. July 2000.
- Mifflin I., 2002, “Documentos de evaluación del Proyecto PRA”, MIMEO, Lima.
- Mifflin I., 2002, “Evaluación Intermedia del programa de Servicios de Desarrollo Empresarial MIMEO, Lecciones del Programa DESIDE y el Proyecto PARA”, Lima 2001.
- MITINCI, Programa de Pequeña y Micro Empresa (PPME), Lineamientos Básicos de Política para la promoción de la Pequeña y Micro Empresa, Lima, December 1996.
- Organización Internacional del Trabajo, Informa América Latina y El Caribe: Panorama Laboral 2000, Peru, 2000

- OSIPTEL, Diagnostico de la situación de Internet en el Perú / Documento de Trabajo - May 2002.
- OSIPTEL. Diagnóstico de la situación de Internet en Perú. Documento de Trabajo. Lima, May 2002.
- Ponce Monteza, Carlos Ramón; Gamarra – Formación, Estructura y Perspectivas, 1994.
- Presidencia del Consejo de Ministros – Gobierno del Perú – ONGEI, “*Perú: Situación de las Tecnologías de Información y Comunicaciones*”, Lima, August 2004.
- Comisión para la Promoción de Exportaciones (PROMPEX), Reporte del sector Maderas año 2003, Lima, March 2004.
- PROMPEX, Reporte del sector Textil año 2003, Lima, March 2004.
- PROMPEX, Evolución de las Exportaciones año 2003, Lima, March 2004.
- Centro de Promoción de la Pequeña y Micro Empresa (PROMPYME), Presentación Institucional, “El Rol de PROMPYME en la promoción de la Pequeña Empresa”, LIMA 2004.
- Red Científica Peruana, Estudio sobre el fenómeno de las cabinas de Internet en el Perú, Lima 2002.
- Roquez, Adolfo. “Lineamientos e Iniciativas para Construir la Sociedad de la Información en el Perú”, INEI, Lima, June 2000.
- Roquez, Adolfo. “Evolución del Mercado de las Telecomunicaciones en el 2000 en el Perú”, PCWorld, Lima, May 2001.
- Swisscontact/COSUDE, “Los Servicios de Desarrollo Empresarial para las PYMEs del Subsector Confecciones”, Tercer Registro DESIDE, 2000.
- Telefónica del Perú. La Sociedad de la Información en el Perú. Presente y perspectivas. Lima, noviembre 2002.
- Universidad Ricardo Palma, Redes de la Información en Gamarra, 2001.
- Universidad Católica del Perú – Aspiraciones, reconocimiento y ciudadanía en los noventa., LIMA 1997.
- Villarán, F. and Chíncono, S.; Promoción estatal a las PYMEs en el Perú, Swisscontact, Lima, 1998.
- Villaran, Fernando, *Las PYMEs en la estructura empresarial Peruana*, SASE, Lima 2000.
- Villarán Fernando, 1998, “*La promoción Estatal a las PYMEs en el Perú*”, Swisscontact DESIDE, Lima.
- Villarán Fernando, 1993, “*Empleo y Pequeña Empresa en el Perú*”, Fundación Friedrich Ebert, PEMTEC, Lima.

CHINA

Xingmin Yin

I. Introduction

Over the past ten years, the most noticeable characteristic of China's industrialization is that the information technology (IT) sector has overtaken textiles, long the country's largest sector as well as the one with the highest growth rate. In 1995, China's IT industry produced goods valued at 253.61 billion yuan.¹ Just seven years later, in 2002, the figure had more than tripled, to 1.143 trillion yuan.

The rapid growth of China's IT industry can be attributed to the following two critical strategies: First, the liberalization of investment and trade, which encouraged a large increase of foreign direct investment (FDI) into the IT sector. For instance, by the end of 2005, when import tariffs on IT products will be eliminated, a fiercely competitive IT market will have emerged, which should lead to a new boom in the IT industry.

The second element was the increased popularity of IT, that is, the higher demand for IT products. Between 2000 and 2002, the value of computer sales grew 35.5%, from 174.05 billion yuan to 235.84 billion yuan. In the same period, the percentage of homes with computers more than doubled, from 9.72% to 20.36%, and then to 32% by June 2004.

Closely tied to the spread of IT is the promotion of digitization by enterprises. Increased use of digitization by the management of small and medium-sized enterprises (SME) has created a large market for routers, servers, switches, broadband Internet and other IT products. SMEs have begun to see that IT products can be used not simply for processing or storing data on a single computer but also for managing the flow of information. The higher the level of digitization, the larger the demand for IT products by SMEs.

When an SME learns to use the Internet, first to search for information and potential customers and then finally to conduct business transactions, it is using IT. In this process, it will acquire the ability to use IT and will find a niche in the global economy. However, it takes time for SMEs to make the transition to digitization. During this process, there will be an ongoing demand for IT products.

Clearly, the rapid growth of the IT industry and the increasing demand for IT products reinforce each other. This is the fundamental reason for the success of China's IT development policy.

¹ Exchange rate (22 December 2004): US\$ 1.00 = 8.2765 yuan; 1.00 yuan = US\$ 0.1208.

II. The current IT market and IT use by SMEs

The rapid growth of the IT industry is necessarily predicated on increased domestic demand. From 1995 to 2002, the value of information and communications technology (ICT) production in China increased more than fourfold, from 308.29 billion yuan to 1.652 trillion yuan. In the same period, China's information infrastructure improved greatly, spurring continuous growth in demand for IT products.

The Chinese government aggressively promoted the transition to an information society. The declarations making 2000 the "Year of Government Online" or making 2001 the "Year of Enterprises Online" have done much to promote the transition to an information society and encourage the spread of computer use.

A. MARKET DATA

China's computer market has grown rapidly in recent years. The ongoing transition to digitization in domestic telecommunications and in the financial sector, in addition to the enormous demand for IT applications for the home, has greatly promoted growth in hardware sales. In general, hardware constitutes the largest share of China's IT market, although demand for software and information services is also growing quickly.

TABLE 1
GROWTH IN SALES OF COMPUTER HARDWARE IN CHINA, 1999-2002
(Billions of yuan)

Product	1999	2000	2001	2002
Mainframes	58.60	68.87	78.92	88.82
Peripherals and terminals	31.17	27.26	30.09	31.92
Applicable products	14.00	18.96	21.80	24.25
Networking products	7.78	10.08	11.74	13.42
Total	111.55	125.09	142.55	158.41

Source: State Information Centre/China Association of Information (SIC/CAI), "2003 China information yearbook", Beijing, China Information Yearbook Press, 2003.

Table 1 gives sales for various kinds of hardware products. Demand for computer hardware has shown sustained growth, with sales increasing from 111.55 billion yuan in 1999 to 158.41 billion yuan in 2002. From 1999 to 2002, sales grew at more than 12% per annum.

Software sales have climbed year after year, rising from a mere 13.8 billion yuan in 1998 to 50.74 billion yuan in 2002. In the same period, sales of software services have increased from 18.7 billion yuan to 46.86 billion yuan. In 2002, the value of software products, services and exports totalled 110 billion yuan. The results of a recent survey indicated that software sales would reach 210 billion yuan by the end of 2004.²

Government and institutional purchases of legal copies of software products and the stronger protection of intellectual property rights are the two key policy-related factors that explain higher software sales. Software services are the largest category of software-related sales, followed by software exports, which, nonetheless, have remained low. In 2001, although software exports totalled only 60 billion yuan, exports were growing rapidly. In 2002, the value of software exports was double that of 2001.

² 2004 China Information Yearbook, p.29.

TABLE 2
SOFTWARE SALES IN CHINA
(Billions of yuan)

	1997	1998	1999	2000	2001	2002	2003
Software products	11.2	13.8	18.2	23.8	33.0	50.74	82.00
Software services	14.8	18.7	23.9	32.2	40.6	46.86	78.00
Software exports	/	/	2.1	3.3	6.4	12.40	16.56
Growth rate (%)	/	25	36	34	34	38	61

Source: State Information Centre/China Association of Information (SIC/CAI), “2002 China’s information yearbook”, China E-Commerce Yearbook Editorial Commission; “2003 China E-commerce yearbook”, Beijing, China E-Commerce Yearbook Publisher, 2003.

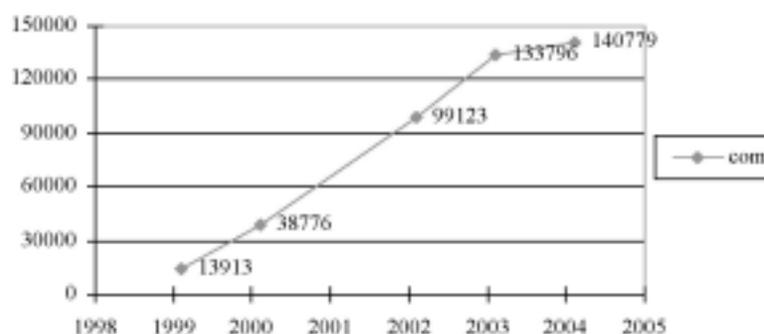
The rapid growth in software sales in recent years has been closely linked to the broader range of applications found for IT products. For example, 500 new enterprises specializing in software for installation on computers prior to sale were established, with sales of 23.45 billion yuan on such software in 2001.

B. IT USE BY FIRMS

Enterprises are increasingly relying on the Internet for communication and negotiations, eschewing traditional office automation (OA) techniques. Hence, they are buying IT products that can give them Internet access. In fact, to a certain extent, firms are buying IT-related products solely because of their need to connect to the Internet.

A firm is said to be “online” when it uses a computer network to improve its production and operations tasks. Being “online” can also be viewed as a significant indicator of an enterprise’s degree of digitization. In a narrow sense, being connected to a network means being connected to the Internet, while a broader definition of connectivity also encompasses intranets (whether local area networks [LANs] or wide area networks [WANs]). The number of Chinese firms that are “online” has continued to grow quickly in recent years. Figure 1 shows the growth in the number of registered Internet net addresses in China ending in “.com” or “.com.cn”.

FIGURE 1
REGISTERED INTERNET ADDRESSES ENDING IN “.COM” OR “.COM.CN”



Source: China Internet Network Information Centre (CNNIC), “Statistical survey report on the Internet development in China” [online] July 2004 <<http://www.cnnic.org.cn>>.

Advances in Internet technology and the surge in its use have prompted ever-larger numbers of enterprises to connect to the Internet. Eighty-nine percent of the firms surveyed in 2001 had Internet access, compared with 98.6% of those surveyed in 2002. Most firms have connected to the Internet by all available means.

Dial-up connections were the preferred way of accessing the Internet. In 2001, 50% of the firms used this method, although the figure declined to 43.77% in 2002. The next most common method was dedicated lines, the use of which rose from 25% in 2001 to 36.83% in 2002. Asymmetric digital subscriber lines (ADSL) ranked third, as the use of this technology soared from 2% in 2001 to 26.51% in 2002. Integrated services digital network (ISDN) connections ranked fourth, accounting for 16% of the firms surveyed with Internet connections. Optical fibre and others had smaller market shares –4.45% and 5.26%– although these methods were becoming increasingly popular.

TABLE 3
HOW ENTERPRISES IN CHINA CONNECT TO THE INTERNET

Year	Dial-up	Dedicated line	Cable	ISDN	ADSL	Optical fibre	Others	Did not reply
2001	50	25	0.005	16	2	/	2	9
2002	43.77	36.83	1.6	16.01	26.51	4.45	5.26	/

Source: China Internet Network Information Centre (CNNIC), “2002 China Internet development report”, Beijing, Posts & Telecom Press, 2003.

Note: Because some of the firms connected to the Internet in more than one way, the totals are greater than 100%. “Other methods” includes dedicated line and digital data network (DDN), among others.

Data on the make of IT-related products recently purchased by firms indicate that Lenovo, IBM, Dell and Founder are the leading suppliers of personal computers (PCs), while IBM, Hewlett-Packard (HP), Lenovo, Dell and SUN are the leading sellers of servers, and Cisco, 3Com and Nortel dominate the market for switches. In addition, Cisco has a near monopoly of the router market, with 80.2% of sales.

Regarding database software, more than 70% of the firms used products sold by SQL and Oracle. In the firewall segment, 39.2% of the firms used firewalls made by Cisco, followed by Check Point and Net Screen, each of which had 17.2% of the market.

After years of investing in IT hardware and software, most firms in China had a basic information system in place and had worked out problems related to internal “information islands”. In 2002, 321 firms, or 56.32% of the firms surveyed, considered implementing a financial management information system their top priority. The other information management systems (IMSs) they hoped to implement, in order of preference, were systems for OA (49.47%), human resource management (38.95%), enterprise resource planning (ERP), 32.46%, manufacturing resource planning II (MRPII, 28.77%), supply chain management (SCM, 18.95%) and customer relationship management (CRM, 18.25%).

At present, most firms use the four major functions of SCM, i.e., purchases management, warehouse management, sales management and supplies management, and only 18.9% use the channel management subsystem.

According to the same survey, enterprises used the Internet for three main purposes: e-mail (90.18%), information gathering (82.81%) and web-site maintenance (59.65%). Only a few firms used it for IP telephony (7.54%), teletraining (5.96%), videoconferencing (4.56%), call centre management (1.58%) or other purposes (see table 4).

Moreover, even fewer firms –only 20, or 3.5% of the sample– took full advantage of the Internet and used it for tasks such as searching for information, applying specialized business systems, transmitting data, coordinating e-commerce transactions, handling CRM, selling products, setting up WANs by means of virtual private networks (VPNs), recruiting new employees, disseminating company-related news and handling electronic data interchange (EDI) operations.

TABLE 4
HOW FIRMS USE THE INTERNET

Use	Number of enterprises	%
E-mail	514	90.18
Web-site management	340	59.65
Gathering of economic, policy, technical, legal and market information	472	82.81
IP telephony	43	7.54
Call-centre management	9	1.58
Videoconferencing	26	4.56
Teletraining	34	5.96

Source: China Internet Network Information Centre (CNNIC), “2002 China Internet development report”, Beijing, Posts & Telecom Press, 2003.

Influenced by the emergence of OA techniques and Internet navigation, firms have gradually made the transition to digitization by purchasing IT-related products and services. Furthermore, greater IT use across society has allowed firms to reap the benefits of greater operational efficiencies. This, in turn, has led them to buy even more IT products and services.

Present purchasing trends for IT-related products point to continued growth in the IT hardware market, which will naturally require greater production of IT hardware.

The growth and geographical expansion of IT have accelerated the spread of e-commerce. In turn, e-commerce has not only played an active role in transforming the economic system and in making it more efficient but it has also had a profound effect on the structure of industry and led to the creation of new jobs. To a certain extent, e-commerce is also the driving force behind the retooling of traditional industry and advances in technology.

Since late 1995, when the Internet began to be embraced by the general public, it has gradually touched all aspects of society. Around that time, a variety of commercial websites engaged in e-commerce and Internet companies emerged, leading to accelerated growth of e-commerce in China. Since 1997, there has been a wide range of e-commerce sites and the Internet has been used increasingly for advertising. In 1998, Beijing, Shanghai and other cities launched e-commerce projects. In 1999, business to consumer e-commerce (B2C) portals such as <http://www.8848.com> first came online, and since then online purchases have become increasingly common. In the same year, other innovations such as e-companies, e-government, e-administration, online tax payments, online education and teliagnosis were introduced. Starting in 2000, e-commerce began to develop in earnest in China.

As shown in table 5, e-commerce is expanding quickly in China. The number of continually operating e-commerce websites rose from 575 in 2000 to 1,533 in 2002. Sales volume on e-commerce transactions has risen 3.5 times, from 77.16 billion yuan in 2000 to 355.6 billion yuan in 2003. Business to business e-commerce (B2B) accounts for over 97% of total electronic sales, making it by far the dominant form of e-commerce in China.

TABLE 5
VOLUME OF E-COMMERCE TRANSACTIONS, 2000-2003

	2000	2001	2002	2003
E-commerce websites	1,147	3,391	3,804	n.a.
Continually operating websites	575	1,320	1,533	n.a.
Volume of e-commerce sales (billions of yuan)				
B2B	76.77	107.5	178.4	346.4
B2C	0.39	1.3	2.5	9.2
Total	77.16	108.8	180.9	355.6

Source: China E-Commerce Yearbook Editorial Commission, “China e-commerce yearbook”, Beijing, China E-Commerce Yearbook Publisher, various issues.

A 2002 State Economic and Trade Commission survey on how firms use e-commerce found that most enterprises have websites, which have become the preferred means of establishing two-way connections and communicating with the public. There has been remarkable growth in the number of public websites. Eight-four percent of the firms surveyed had established public websites, 12% were in the process of doing so and only 4% had no plans to do so.

With the transition to an information society, enterprises began to see a causal link between having a website and growing. The Internet has allowed firms to increase sales abroad, undertake cooperative research, raise their market share and design production programmes. The survey showed that the top five uses for websites were to provide information on new products and services (73.5%), disseminate company-related news (70.5%), gather customer information (48.9%), provide after-sale service (25.4%) and take purchase orders (20.9%). In addition, 16.8% of the firms used the Internet to conduct online sales, 12.1% to make purchases and 7.7% to obtain supplies or conduct other types of online transactions. This points to a certain convergence between traditional firms and Internet-based firms (see table 6). Lastly, some firms also used the Internet to recruit employees, issue calls for bids, conduct official business from a distance, oversee the fulfilment of contracts, receive and send e-mail, raise their public profile or set up bulletin board systems (BBSs), among other uses.

TABLE 6
WAYS IN WHICH FIRMS USE WEBSITES

Use	Number of enterprises	%
Disseminate company news	402	70.5
Disseminate product/service information	419	73.5
Gather customer information	279	48.9
Take orders	119	20.9
Make online purchases	69	12.1
Make online sales	96	16.8
Order supplies	44	7.7
Provide after-sale services	145	25.4

Source: China Internet Network Information Centre (CNNIC), “2002 China Internet development report”, Beijing, Posts & Telecom Press, 2003.

However, there is a significant disparity between the importance enterprises place on digitization and their actual use of e-commerce. Currently, firms are setting up websites more to raise their public profile than to conduct online purchases and sales. According to the survey, only a small number of firms (1.05%) have fully implemented e-commerce operations, a few firms (16.48%) have partially implemented such operations, while most firms lack the capability to conduct e-commerce transactions.

This overview of demand for IT-related products and e-commerce in China allows four general conclusions to be drawn.

First, the hardware and software markets have experienced rapid growth. Hardware sales, for instance, have increased an annual rate of over 12% and even exceeded 20% during several years. Moreover, software sales rose at an annual rate of more than 35%. However, for an economy as large as China’s, computer hardware and software sales continue to be rather low.

A second, albeit obvious, feature of China’s IT market is the leading role of hardware, with over 70% of all IT-related sales, compared with just 11% and 16% for software and information services. Increased demand for IT products by businesses and homes has been directly responsible for the rapid growth in IT output.

Third, the ever-rising investment in IT-related products has greatly raised the level of digitization. Once firms have Internet access, they use it mainly to gather information and raise

their profile. Many firms are engaging in e-commerce. By contrast, the use of SCM is still too limited for it to enhance firms' efficiency.

Fourth, although Chinese firms are only beginning to turn to IT and e-commerce, the use of these innovations is spreading fast.

III. SME development in the IT revolution

SMEs play a crucial role in China's economic development. As of December 2003, 194,274, or 99%, of the 196,222 State-owned or privately owned industrial enterprises with annual sales exceeding 5 million yuan were SMEs. These firms accounted for 60.7% of sales, 57.8% of total assets, 75.7% of employment and conducted 60% of all transactions (*Economy Daily*, 22 July 2004).

A. AN OVERVIEW OF THE ROLE OF SMEs IN CHINESE INDUSTRY

It is well known that China has a large number of SMEs in a wide range of industries and that SMEs play a vital economic and social role. Because of their importance in providing employment, promoting market competition, spurring technological innovation, meeting various market needs and forming a rational system of industrial organization, SMEs cannot be supplanted by large enterprises. Furthermore, China would not continue to expand at its current rapid pace without SMEs.

The period from 1999 to 2002 witnessed the rapid expansion of Chinese industry, with an average growth rate of 9.3% per annum.³ Industry growth was much higher than GDP (Gross Domestic Product) growth, underscoring the fact that China is still in the industrialization stage.

New enterprises have continued to be created at a brisk pace. From 1999 to 2002, the number of small enterprises rose from 139,798 to 158,234, that is, by 13.19%, while the number of medium-sized enterprises increased by 1.39%, from 14,371 to 14,571, and that of large enterprises by 11.29%, from 7,864 to 8,752.

Industrial employment declined in this period. By contrast, employment at small enterprises rose by 4.27%, from 26.95 million to 28.1 million. This shows that small enterprises are the main engine of job creation.

In 1999, output by small enterprises was 2.841 trillion yuan, accounting for 43.86% of total industrial output; that of medium-sized enterprises was 921 billion yuan (14.22%); and large enterprises accounted for 2.715 trillion yuan (41.92%). By 2002, however, the value of output by small enterprises was 4.218 trillion yuan, or 42.12% of all industrial production; that of medium-sized enterprises, 1.320 trillion yuan (12.87%); while large enterprises accounted for 4.719 trillion yuan of output (46.01%). Hence, SME output declined slightly.

Small enterprises account for a relatively high share of industrial exports. In 2002, they accounted for 960.18 billion yuan in exports, or 47.88% of total industrial exports, compared with 267.51 billion yuan (13.34%) for medium-sized enterprises and 777.83 billion yuan (38.78%) in the case of large enterprises.

³ Specifically, the growth rate in these years was 8.5%, 9.8%, 8.7% and 10.2%.

TABLE 7
ECONOMIC CONTRIBUTION OF ENTERPRISES OF VARYING SIZES

	Number of firms	Workers (millions)	Value of output	Exports	Long-term investment	Net value of fixed assets
<i>Small</i>						
1999	139,798	26.95	2,841	NA	NA	1,347
2000	141,161	26.79	3,388	NA	NA	1,463
2001	148,269	26.59	3,477	784.62	99.44	1,404
2002	158,234	28.10	4,218	960.18	111.85	1,540
<i>Medium-sized</i>						
1999	14,371	9.52	921	NA	NA	657
2000	13,741	8.62	999	NA	NA	649
2001	14,398	8.32	1,172	216.83	68.87	699
2002	14,571	8.04	1,320	267.51	72.43	748
<i>Large</i>						
1999	7,864	21.59	2,715	NA	NA	2,933
2000	7,983	20.19	3,184	NA	NA	3,168
2001	8,589	19.51	4,029	623.07	490.77	3,441
2002	8,752	19.06	4,719	777.83	496.47	4,097

Source: National Bureau of Statistics of China (NBS), "China industry economy statistical yearbook", Beijing, State Statistical Press, various issues.

Note: Industrial output at 1990 constant prices; figures for output, exports and investment are expressed in billions of yuan.

Official statistics reveal that small enterprises have relatively little capital. In 2002, small enterprises made 111.85 billion yuan in long-term investment, equivalent to 22.53% of the investment made by large enterprises (496.47 billion yuan). From 1999 to 2002, the value of small enterprises' net fixed assets increased by 14.33%, from 1.374 trillion yuan to 1.540 trillion yuan, although as a percentage of the net fixed assets of all firms, it declined from 27.28% to 24.12%. At the same time, the value of large enterprises' net fixed assets rose from 2.933 trillion yuan to 4.097 trillion yuan, or by 39.69%, easily eclipsing the rate for small enterprises. Large enterprises' share of all net fixed assets increased from 59.41% to 64.17% in the same period. In 2002, average net fixed assets for small enterprises was 54,804 yuan, while that of large enterprises was 214,953 yuan, almost four times the figure for small enterprises. This underscores the mostly labour-intensive nature of small industrial enterprises and their crucial role in job creation.

The uneven distribution of industrial establishments in China is attributed to such factors as geography, population distribution, transportation and history.

At the regional level, the Yangtze Delta, the Pearl River Delta and the Round Bohai Bay region boast relatively high levels of industrialization (see table 8). Yangtze Delta includes the provinces of Shanghai, Jiangsu and Zhejiang; the Pearl River Delta comprises Guangdong Province; and the Round Bohai Bay region encompasses Liaoning, Hebei, Shandong, Beijing and Tianjin. In 2002, industrial output for these three regions was 7.252 trillion yuan, or 70.70% of China's total industrial output. Moreover, 30.952 million industrial workers, or 56.07% of the national total, were employed in these regions, which exported goods worth US\$ 280.69 billion, or 86.21% of the national total. This underscores the fact that China's industrial output is highly concentrated in the coastal regions, whose competitiveness can basically be seen as a yardstick for that of the entire country.

TABLE 8
REGIONAL BREAKDOWN OF INDUSTRIAL ENTERPRISES' ECONOMIC INDICES
 (2002)

Geographic area	Enterprises	Industrial workers (thousands)	Output (billions of yuan)	Exports (US\$ millions)	Investment (billions of yuan)	Net Fixed Assets (billions of yuan)
Nation	181,557	55,206	10,257	325,596	562.90	6,082.03
Yangtze Delta	53,429	11,534	3,135	99,913	124.78	1,208.22
Pearl River Delta	22,619	6,444	1,753	11,8463	44.73	6,15.78
Round Bohai Bay	37,000	12,974	2,364	62,315	1,44.95	1,529.15
Other	68,509	24,254	3,005	44,905	248.44	2,728.88

Source: National Bureau of Statistics of China (NBS), "2003 China industry economy statistical yearbook", Beijing, State Statistical Press, 2003 and "2003 China statistical yearbook", Beijing, State Statistical Press, 2003.

Note: *Investment* refers to total capital formation and investment in innovation during the year in question.

Because of rapid economic development and stiff competition, the structure of Chinese industry is constantly changing. For this reason, there are no clear records of the entry of new enterprises into the market or of their growth and exit. At the same time, as the country is undergoing an economic transformation, the competitiveness of enterprises that frequently change hands is also variable. This explains the difference between the structure of industry in China and that of other countries or regions of the world.

TABLE 9
PERCENTAGE OF SMES' PRODUCT VALUE AND LABOUR FORCE
 (percent)

	1996	1999	2000	2001	2002
Small enterprises					
Output	48.10	43.87	44.75	40.07	41.12
Employment	53.39	46.42	48.19	48.86	50.91
Medium-sized enterprises					
Output	15.91	14.22	13.19	13.50	12.87
Employment	17.23	16.39	15.51	15.29	14.58

Source: National Bureau of Statistics of China (NBS), "China industry economy statistical yearbook", Beijing, State Statistical Press, various issues.

Note 1: Output is calculated on the basis of constant 1990 prices.

Note 2: Figures for 1996 and 1997 include industrial enterprises at above the village level with independent accounting; starting in 1998, they include state-owned enterprises (SOEs) and non-SOEs with annual sales exceeding 5 million yuan.

The evolution of SMEs' share of output and employment in Chinese industry from 1996 to 2002 is given in table 9. These calculations show, first, that output and employment by small enterprises initially decreased, from 48.46% in 1997 to 40.07% in 2000, and then bounced back slightly, to 41.12% in 2002. Similarly, their share of employment declined from 53.39% in 1996 to 46.42% in 1999 before increasing to 50.91% in 2002. Second, the share of output and employment corresponding to medium-sized enterprises has declined continuously. Third, small enterprises account for a higher percentage of total employment than of total output.

The statistics used for this study indicate that SMEs are playing an increasingly pivotal role in job creation. In China, a country with a vast territory and continuously rising demand, it is nearly impossible for large enterprises to become monopolies. This leaves ample room for SMEs to emerge and thrive.

B. CASE STUDIES ON USE OF E-COMMERCE AND SCM IN VARIOUS INDUSTRIES

There are three main stages of network utilization by enterprises in China. The first is the basic, or preparatory, stage of IT utilization, such as the implementation of OA or financial management information systems or the construction of internal ERP systems. In the second stage, the enterprise begins to use these networks. For the most part this consists in the development and implementation of such network functions as information exchange, product promotion and the first steps to use SCM/ERP. The third stage is e-business, when there is coordination or e-trade among enterprises.

Most SMEs in China are still at the initial stage of IT use, although some have begun to use networks to exchange information. And since very few enterprises can conduct e-business transactions, only a small percentage of business is conducted online.

To examine in greater depth how SMEs apply IT to promote exports, six groups of SMEs were selected. Their locations can be seen in figure 2. The case studies are:

- A small import and export company in Shanghai
- Silk firms and the related industrial cluster in Wujiang
- Software-export enterprises in Hangzhou
- Appliance manufacturers in Cixi
- An IT-industry cluster in Suzhou
- An electronics-industry cluster in Ningbo

FIGURE 2
GEOGRAPHIC DISTRIBUTION OF CASE STUDIES



Source: Prepared by the author.

1. Xinmin Textile Technology

Xinmin Textile Technology Co. Ltd., which specializes in textile products made of silk, is located in the town of Shengze, near the city of Wujiang, in Jiangsu Province.

One of China's most famous silk-manufacturing clusters, the town of Shengze is the hub of production and commerce for the silk-textile industry in Wujiang. A silk-textile industry cluster with distinct advantages has emerged, centred on Shengze and spanning four adjacent towns. Production has branched out from silkworm silk to hundreds of kinds of silk in four major categories, including intertexture silk, synthetic silk and synthetic fibre. In 2003, Shengze had a population of some 230,000 and a per capita GDP of US\$ 3,800. About 90% of the town's output was in the silk-textile industry. There are more than 1,200 silk manufacturers and a well-developed supply chain. The steps in the production chain are: filature, weaving, printing and dyeing, finished product, in an optimal industrial network based on research and development (R&D), production, distribution, export and logistics. This work organization has made Shengze China's largest centre of production of silk textiles.

Xinmin is a labour-intensive enterprise. Eighty-seven, or 3.22%, of its employees, have at least an undergraduate degree. The degree of use of information management techniques inside the company is relatively low, with only 60 PCs and limited OA resources. Staffs in the finance and marketing departments have their own PCs. The computers in the managing department have Internet access for communication with persons outside of the company. The finance department, however, only has an intranet.

However, Xinmin has not completely switched over to digitized supply chain management. Internal matters such as production plans, procurement, production and inbound and outbound logistics are still handled in meetings and over the telephone, although e-mail, IP (Internet Protocol) telephony and instant messaging are now used more frequently for SCM, saving time and money while improving efficiency in interdepartmental communications. In particular, e-mail and IP telephony have reduced fax and telephone charges by about 30%.

Ninety percent of Xinmin's textile and clothing exports go to the European Union. Xinmin contacts new customers mainly at global textile and garment fairs, including two each in Europe, Hong Kong (China) and China. These fairs bring together both Chinese and foreign buyers, allowing Xinmin to meet directly with both old and new clients and make new business contacts. Although meetings last only 20 to 30 minutes, they allow trust to be enhanced between Xinmin and its clients. Clients can later enter Xinmin's website (<http://www.xmtex.com>) for more information on the company and any new products it has introduced. This underscores the importance for enterprises to have their own websites in order to expand their customer base.

Xinmin uses its website to post information on new products and on projects to improve its technology. Hence, the website use mainly used for advertisement. The company has joined Zhejiang Chemical Fibre Net to enhance its access to information. It does not yet conduct e-business transactions.

An examination of IT and e-business use by Xinmin and by the Shengze silk cluster overall indicates that online trading is hindered by the following factors. First, Chinese textile enterprises are still accustomed to traditional business practices as summed up, for example, in the saying "with transactions, you swap goods for cash in hand," which describes the main way of doing business at the Shengze silk market. Second, the lack of computerization in SCM is closely linked to the labour-intensive nature of industry. The widespread adoption of e-mail is the most obvious form of IT utilization in the silk industry. Third, e-business has not been adopted as a channel for exporting silk textiles, as trade fairs continue to be the main method for expanding the export market. Fourth, enterprises have not found that registration with an e-business platform leads to higher export volumes or increased sales opportunities. Fifth, there are limitations stemming from the payment system.

2. Software export cluster in Hangzhou

An examination of SME exports shows that software exports from Hangzhou have increased greatly in the last three years, turning this city into an important hub of the software industry.

There are three salient features of software exports from Hangzhou. First, most software exporters were established after 2002. Second, software enterprises are small, with an average of about 100 employees, making them typical information-intensive small enterprises. Third, exports of software products and services have increased dramatically.

Interviews were conducted at three small enterprises specializing in software for export. All three were set up between 2001 and 2003. Table 10 lists their names and websites.

TABLE 10
NAMES AND WEBSITES OF THREE SOFTWARE ENTERPRISES

Name	Website
Hangzhou Handsome International Software Co., Ltd. (Handsome International)	www.hsinternational.com.cn
Zheda Innovation UniverseSoft Co., Ltd. (UniverseSoft)	www.zdus.com
Zhejiang Innovation Fuji Technology Co., Ltd. (SIF: Software Innovation Fuji)	www.sifinic.cn

Source: Prepared by the author.

Handsome International was founded in August 2002 by Hangzhou Handsome Electronics Group, a software developer that focuses on financial applications such as security and banking. It also sells software to funding institutions. Handsome was established to meet increasing demand for outsourcing from the software industry in the United States and Japan. The company targets the international software market. Hence, Handsome is a small export-oriented software provider. The number of employees at Handsome grew from 15 in 2002 to 102 in June 2004, and sales rose from US\$ 0.12 million in 2002 to US\$ 1.2 million at the end of 2004.

UniverseSoft was established in late 2001 by four professors and fifteen graduate students at the State Street Technology Centre located at Zhejiang University. This centre had been developing software for the United States-based State Street, a large financial concern. State Street required software-consulting services to meet the large demand of its development team. However, the high turnover of graduate students made it difficult for the technology centre to continually meet clients' software needs. UniverseSoft has been able to recruit software engineers and conduct a large number of software development projects. UniverseSoft was set up earlier than was Handsome and its staff has grown from 15 at the end of 2001 to 170 in June 2004. Its exports increased from US\$ 500,000 in 2002 to US\$ 1 million in 2003 and were expected to reach US\$ 2.5 million by 2004.

SIF, a joint venture that specializes in making software for export to Japan, was founded by Zheda Innovation, which owns 65% of the company's equity, and Fuji Electric of Japan, which holds the remaining 35%. Fuji Electric intended for the joint venture to develop software on commission and lower its costs, since software development is expensive in Japan. For its part, Zheda hoped to expand software sales in China as well as to export software. SIF is a small enterprise oriented to making software exclusively for Japanese outsourcing projects. Its main tasks are writing and testing software codes. By the end of June 2004, after only one year in business, SIF had 60 employees and sales during its first year were expected to reach US\$ 1.3 million.

TABLE 11
SIZE OF SOFTWARE FIRMS IN HANGZHOU

Firm	Employees			Sales (millions of US\$)		
	2002	2003	2004	2002	2003	2004
Handsome	15	80	102	0.12	0.36	1.2
UniverseSoft	40	80	170	0.5	1	2.5
SIF	/	5	60	/	/	1.3

Source: Prepared by the author.

Note: Numbers of employees are as of June 2004. Sales for 2004 are predictions from the respective firms.

Since software enterprises specialize in IT-related services, they are able to make full use of IT innovations in their daily work. This enhances their ability to use the Internet and to take full advantage of technological breakthroughs. All staff at the Hangzhou software enterprises have PCs, and programming teams have testing instruments and servers for software development. Software makers provide online customer support on their websites.

Software products are now exported over the Internet. Before broadband technology had become sufficiently developed, companies had to send documents to their clients by fax or courier. This was expensive and time-consuming, as well as risky, since documents could be lost en route. The situation was even more complicated in the case of time-sensitive documents, since sending correction by courier could mean losing valuable time. The use of the Internet ensures that information can be shared and updated in a timely fashion and allows software versions to keep pace with changes in clients' requirements.

Hangzhou's experience exporting software provides several useful lessons.

National and local government promotion policies. Clause six of Document No. 18, titled Several Policies to Encourage the Development of the Software Industry and Integrated Circuit Industry, issued by the State Council of China on 24 June 2000, gives software enterprises established in China certain income-tax exemptions. Under this guideline, newly established software developers may qualify for full exemptions "for two years and partial exemptions for three years" after the year in which they first turn a profit. Moreover, in 2002, the central government issued Action Plans for the Prosperity of the Software Industry and stated that software-export bases would be encouraged so as to the domestic software industry.

Hangzhou municipality has implemented the guidelines giving tax breaks to software exporters and supports their attempts to build up capital. In addition, software parks have been set up where land is leased at a discount to software developers.

Improved infrastructure through IT application. In the last five years, sizeable government investment projects in communications and broadband infrastructure have accelerated the spread of the Internet. From 1998 to 2002, Zhejiang's long-distance optical fibre network was extended from 5,374 km to 14,959 km, for an 80% increase; the number of telephones per 100 persons increased from 20.5 to 78.4 (180%).

Increased availability of human capital. The software industry is human-capital intensive. In essence, to export software is to export human capital. The growth of Hangzhou's software-export industry can be attributed to local human-capital accumulation. A large number of software makers have been lured here by the availability of science and engineering majors at nearby universities. In addition, software engineers have been recruited from many universities throughout China.

University enrolment continues to climb. Between 1998 and 2002, new enrolments at Zhejiang' universities increased by 415%, from 36,668 to 152,470. Graduate enrolments rose from 2,155 to 6,111, a 283% increase. Since more persons are now attending university, human-capital accumulation is accelerating.

Close international ties. China's ties with foreign countries have been strengthened by the large numbers of Chinese who study and work abroad and then return to set up companies or take jobs. Software enterprises have closer ties with the international market than do other types of firms. Chinese students abroad bring software outsourcing and high-end software development to Chinese software firms.

The number of returning students increased from 7,130 to 17,945 between 1990 and 2002, for a nearly threefold increase. During the same period, the number of students abroad increased from 2,950 to 125,179, that is, more than 40 fold. The large numbers of students abroad point to closer economic ties between China and the rest of the world in the future.

3. The case of Cixi electronics firms

From 1991 to 2001, industrial output of Cixi city in Zhejiang Province climbed from 3.228 billion yuan to 29.055 billion yuan, a ninefold increase. Per capita GDP rose from US\$ 508 in 1991 to US\$ 2,944 in 2003.

Cixi's industrial cluster, which turns out a variety of home and other types of electric appliances, has expanded quickly. At the workshops that line the roads, local and transplanted workers produce small electric appliances to be exported all over the world. A total of 502 SMEs directly exported goods worth US\$ 1.638 billion in 2003.

Hongyi Electronics and Singfu Electric are labour-intensive enterprises that specialize in electric appliances. As medium-sized firms, they hire a relatively large number of workers. At the end of 2003, Hongyi employed 1,740 workers and Singfu 1,500. Some 40 to 50 SMEs in the surrounding area make similar products, although on a smaller scale.

TABLE 12
NAMES AND WEBSITES OF TWO ENTERPRISES IN CIXI

Name	Ownership	Website
Cixi Hongyi Electronics Co., Ltd	Private	www.cxhy.com
Singfu Electric Group	Private	www.singfu.com

Source: Prepared by the author.

Private enterprises in Cixi, including Hongyi and Singfu, have grown rapidly. The two firms were established after 1994. Spurred by China's rapid economic development, their once-small output of electrical and electronic products quickly grew.

Cixi appliance makers face three main obstacles in using IT.

Inefficiencies. Since Cixi's enterprises consider that promoting and using IT is an important way to improve the skills of their management and raise profits, they have made large investments in IT equipment and built LANs and WANs. A review of the use of IT products in Cixi shows the rate of adoption by SMEs is relatively high. However, efficiency in use is less impressive, as computers are often used only for word processing and e-mail.

Failure to implement SCM. Regarding the use of the Internet for internal information management, companies have begun using OA and IT techniques for finance and personnel management, all while stressing ERP. Most importantly, their manufacturing divisions have implemented resource information management. However, SCM techniques are missing from most business IMSs. Neither Hongyi nor Singfu yet have complete SCM systems, preventing them from using internal IT techniques in tandem with SCM.

Reluctance among potential clients. The failure of e-business to catch on is due to a lack of trust among enterprises. The online sales that do take place are with existing clients; hence, the Internet is not being used to create new business opportunities.

4. The case of the Ningbo electronics cluster

Ningbo, an export-processing zone, is mainly made up of clusters of export-oriented IT and precision-machinery firms. Since June 2004, electronic Customs applications have been used by all export firms in the bonded zone. Hence, exporters may connect by network to the Customs Bureau and conduct import and export procedures online using an EDI system.

All of the firms in question are small IT manufacturers that have been in business for a relatively short time. Table 13 lists their basic characteristics. Except for Online Monitoring, a private high-tech firm, they are all owned by Taiwanese investors.

All four firms specialize in electronics-related products. Yeongyang Technology, a maker of computer cases for large PC manufacturers, has adopted the OEM model. NUTEK makes car alarms. Both Yeongyang and NUTEK export 100% of their production. Bridge Technology, which produces power supplies according to clients' special design and other specifications, exports 95% of its products. Thus, the Taiwanese-owned firms are oriented to the international market. Most of the products made by Ningbo Online Monitoring, a privately owned manufacturer of electronic devices such as transformers and online malfunction-detection systems, are sold domestically.

TABLE 13
NAMES AND WEBSITES OF PARTICIPATING ENTERPRISES

Name	Foundation Time	Labour Force	Website
Yeongyang Technology Co., Ltd.	2000	385	www.yycase.com
NUTEK	March 2002	375	www.nutek.com.tw
Bridge Technology Co., Ltd.	May 2001	180	www.wantec.com.tw
Ningbo Online Monitoring	June 2001	60	www.zjnblne.com

Source: Prepared by the author.

Note: Number of workers is as of June 2004.

The three Taiwanese enterprises are small, labour-intensive operations based on a typical assembly-line organization of production. The use of IT at these small enterprises is an extension of their parent firms' management systems. The degree of automation of production and use of IT for management by Taiwanese SMEs is very high.

Lessons from IT use by Ningbo's electronics manufacturers are as follows.

The first lesson is that firms should set up a complete IMS so as to raise the quality of their management, with OA being just one component of the overall system. Moreover, daily management tasks can be increasingly automated through the implementation of ERP and SCM systems, allowing firms to make the most of their PCs, servers and similar equipment.

Second, firms that export using the original equipment manufacturer (OEM) or original design manufacturer (ODM) models mostly rely on traditional export channels rather than using the Internet to find new markets. Hence, true e-business procedures are used very seldom. Only niche markets with very small number of quality manufacturers are suitable for a certain amount of e-business.

Third, electronic Customs applications will greatly encourage export enterprises to use IT, eventually making it impossible to do business without computers or an Internet connection. This will spur growth in the IT market, further encourage enterprises to enhance their capacity to use IT products and make management more efficient.

5. The case of Suzhou IT firms

Suzhou Jiangsu's IT industry has experienced rapid growth in the last decade, Taiwan Province of China due to three factors. First, FDI –mainly from the United States, Japan, Europe, Republic of Korea and Taiwan Province of China– has been used to establish scores of IT-related

companies. Second, these transnationals mainly produce for export and thus are important links in the global IT chain. They have turned Suzhou into an important global manufacturing base. Third, the local firms set up by transnationals in Suzhou need to raise the local content of their inputs so as to cut costs. Therefore, in addition to the SMEs that were already in the transnationals' supply chains and that followed transnationals to Suzhou and set up factories there, there are local SMEs that serve as component outsourcers for transnationals. This has promoted the development of local SMEs and the transfer of technology to them.

Table 14 lists the three IT enterprises that were interviewed. Taiwanese-owned Sampo and BenQ make only high-value-added products, such as Sampo's liquid crystal display (LCD) televisions, LCD multimedia displays and digital videodisc (DVD) players. BenQ's product line includes web-based, wireless and broadband devices, computer peripherals, optronic instruments and multimedia players. Neither company is large.

TABLE 14
NAMES AND WEBSITES OF IT COMPANIES IN SUZHOU

Name of firm	Workforce	Website
Sampo Electronic Technology	1,500	www.sampotech.com.tw
BenQ (IT) Co. Ltd	7,600	www.BenQ.com.cn
Suzhou Victory Technology	1,200	www.victory-tech.com

Source: Prepared by the author.

Sampo and BenQ apply IT in management as an extension of their parent companies' systems. Their internal information management (OA, financial software, human resources [HR] management, etc.), business information management and organizational methods mirror the high degree of digitization of Taiwan enterprises.

Sampo is an example how IT is applied by Taiwanese firms. The ERP system was established first. It consists of modules that manage inventories, orders, production and manufacturing, purchasing and administrative matters. The core of the system is the finance module, while an Oracle application serves as the hub of the ERP system. Sampo's servers in Taiwan are connected to Suzhou by dedicated line. Both the subsidiary and the parent company use the same IMS. In fact, this is the model most Taiwan companies follow to simplify management tasks.

Sampo's IT products require thousands of different materials and components from around the world. Sampo uses computers to update its information, manage inventories and ensure punctual delivery of its products. Sampo also relies on videoconferencing to oversee the operation of its SCM and facilitate long-distance communication. The company has a large number of computers (100), which are used for communication and management. Twenty percent of its computers have Internet access through a firewall. Sampo normally makes orders for materials from overseas over the Internet. However, some overseas orders are sent by fax because of the lack of security with Internet transmissions. E-business operations are handled by the parent company in Taiwan. Hence, Sampo uses the Internet to process purchases but it uses traditional methods for sales. To raise its employees' ability to use IT and enhance efficiency, Sampo requires new employees to receive training.

A few aspects of BenQ's use of IT are worth noting. Because BenQ is itself an IT company, its operations are highly digitized. The plant is equipped with 3,000 PCs, which are employed in every aspect of production management. The high level of digitization has undoubtedly raised the company's competitiveness while enabling it to process customer information quickly and accurately and without disruptions. BenQ receives orders for exports from transnational corporations (TNCs). It keeps tabs on its supply-chain operations by exchanging visits with its suppliers. In addition, imports and exports are handled online. Since the export orders for BenQ's Suzhou plant are received at the parent company, the plant communicates with customers through it, which enables customers to access information such as date of shipment, date of export, name

of shipping company, date of arrival and destination. The fact that clients can follow this process online ensures transparency. BenQ's website is maintained at an e-commerce centre where online orders are received.

Unlike Suzhou's local IT firms, Sampo and BenQ are at the high end of the high-tech industry and they use digitization for management much more than do local companies. Still, the level of digitization by these companies merely reflects the business methods of their parent firms in Taiwan.

Unlike Sampo and BenQ, Victory is fully locally owned. Victory has been part of the global IT industry's supply system since 1995. Victory is an outsourcer for large IT and telecommunications equipment firms. The products it assembles include televisions, mice, scanners, digital cameras, PCs and circuit boards for ICT products. For example, it assembles mice for Dell and circuit boards for Sony digital video (DV) cameras. While Victory is a part of the supply chain of several transnationals, it also outsources products to eighteen companies that form a smaller local supply chain.

Victory's IMS is closely tied in to those of the transnationals for which it outsources. The company's warehouse is a part of the transnationals' SCM systems. Hence, one aim of the ERP and SCM systems currently being implemented is for the entire staff to adapt to a new management model and thus change their deep-seated views of production and management.

The government's overall effort on many fronts has greatly raised the enterprises' level of digitization, especially in terms of OA, ERP and SCM. However, few transactions are conducted over the Internet. The current state of development in China points to a couple reasons that account for the slow growth of e-commerce. First, enterprises do not have high degree of confidence in negotiating over the Internet, which makes it difficult for the B2B model to gain acceptance. Second, electronic payments entail a high degree of risk. Overall, little negotiation takes place through online bidding. Thus, the time does not appear ripe for promoting e-commerce as a widespread business model.

6. The case of Shanghai Guochi Import & Export

Shanghai Guochi Imp. & Exp. Co. Ltd. is a small importer and exporter of glass with 40 employees and 5 million yuan in registered capital. It had US\$ 8.8 million in exports in 2003 and was expected to reach US\$ 10 million in 2004.

Guochi acts as an export broker for SMEs. As an import and export company, rather than a producer, it receives orders from abroad and channels them to glass manufacturers in Shanghai or Jiangsu. It also sells manufactured products on the international market. Guochi has played a pivotal role in promoting local SMEs.

Guochi's website, located at www.sgc-glass.com, mainly serves to publicize the company and its products. The website is updated only about once a month. Guochi's website is maintained by Global Sourcing, which targets purchasers in Guochi's leading markets, Europe and the United States. Guochi chose Global Sourcing over Alibaba, a Chinese e-commerce platform, despite Global Sourcing's higher fees. Only 5% to 10% of Guochi's total export sales are conducted online.

The customers of large foreign-trader firms are often major players both in their own country and abroad. And large trading firms use a higher level of digitization in management, which enables them to launch ERP and SCM system for communication with their clients. SMEs like Guochi that are involved in foreign trade face several problems in applying IT.

First, due to their limited resources, SMEs are unable to set up their own e-commerce platform. This means that they often use third-party platforms to expand their business. These platforms are very expensive; for instance, whereas Alibaba charges a yearly registration fee of 60,000 yuan, while Global Sourcing charges 150,000 yuan. Hence, high costs preclude many SMEs from doing business online.

Second, Guochi's domestic suppliers are SMEs with between 200 and 300 employees who generally are unable to use IT for management tasks. Therefore, Guochi visits its domestic suppliers to meet them or become better acquainted with them. This adds to the difficulties preventing Guochi from establishing its own SCM system. This is an example of why SMEs involved in foreign trade need to raise their IT capacity before implementing SCM. Third, SMEs involved in foreign trade have a small number of employees, which makes it difficult for them to adjust to IT-based management.

Rapid economic growth in China since 1992 has created market opportunities for SMEs, whether as joint ventures, private companies or joint-stock enterprises. These companies' sales and exports have quickly grown. With the expanding market and the opportunities to make profits, SMEs are more inclined to invest in IT equipment to improve their management. This is seen in the higher penetration rate of IT equipment among SMEs. However, SMEs need to do more in terms of using IT to expand their market and promote exports. The main obstacles faced by SMEs are listed below.

- SMEs have purchased a large number of computers and other IT products; implemented OA, financial management, human resource management; digitized their operations; and partially implemented IMSs, including SCM and ERP. However, these firms still need to make the transition from storing information on a single computer to using software for shared information management over the Internet.
- Having more highly skilled employees is the starting point for a company to increase its presence in value chains. The human resources of most SMEs are not highly skilled, especially in some traditional industries such as textiles, in which most workers have no more than a middle school education and only managers have college degrees. To further improve the way they use IT, SMEs, including those specialized in software development, are trying to improve the skills of their human resources.
- Increased IT use brings enterprises closer to each other. SMEs have set up websites to raise their profile and publicize their products. Yet Internet transactions still represent a small portion of total sales, and many SMEs do not engage in e-commerce at all. The main impediment to more use of e-commerce is the lack of a legal framework to instil confidence in purchasers.
- The financial support structure for e-commerce is not yet in place. One reason for this is that banks are unable to provide highly efficient Internet services. Another reason is that firms regard online payments as risky. Thus, the lack of efficiency and security in the online payment system hinders the spread of Internet transactions.
- As SMEs do not have the financial means to set up their own websites, most of them turn to third-party e-commerce platforms or portals, which charge an annual fee. When the volume of e-commerce transactions is small, the annual fee can be onerous for an SME. Only when an SME is in a position to make large transactions through a portal website will it become more involved in e-commerce. These considerations reduce online business and make SMEs reluctant to pay annual fees to portals.

IV. Government policies vis-à-vis SMEs, IT and international trade

Above all two policies have strongly contributed to improving China's international competitiveness. First, the transition to digitization, which has been the cornerstone of industrial technology-promotion policies. Second, trade liberalization, which has been one pillar of more open policies designed to attract foreign capital and expand international trade. However, among policies that have had a greater or lesser influence on firms' behaviour, the special policy to promote SME development has been sorely inadequate.

A. IT POLICIES IN CHINA'S DEVELOPMENT STRATEGY

In a word, the central government's IT development policy seeks to promote a market-oriented application of IT products, the use of networks for resource sharing, technological innovation and greater competition. Through the government's IT strategy, outlined in the Tenth National Economic Development Plan, the Chinese government ratified its commitment to promote the use of IT in society and its widespread application in traditional industries as well as the rapid development of the electronics and information industries. Hence, the government has sought to encourage IT development by spurring demand for IT-related products and services.

Since 1995, the IT industry has been propelled to a new stage of development in China, all while being transformed into the engine of economic growth. In constant 1990 prices, production of electronics and telecommunications equipment was 259.90 billion yuan in 1995, accounting for 5.22% of manufacturing output. By 2002, the figure had risen to 1.208 trillion yuan, or 11.48% of manufacturing output. Moreover, office equipment and computer sales rose from 48.40 billion yuan to 443.80 billion yuan, a more than ninefold increase, in the same period. In 2002, IT accounted for 16.8% of output in manufacturing, surpassing textiles and machinery, the traditional mainstays of Chinese manufacturing.

With the constant advance in Internet technology, infrastructure also needs to improve to meet quickly growing demand for Internet access. China has greatly increased its investment in Internet infrastructure and laid a solid foundation to allow the Internet-based market to expand. For example, from 1992 to 2002, the capacity of the long-distance telephone exchange increased from 521,885 to 7,730,133 circuits, and long-distance optical cable lines increased from 14,388 km to 487,684 km. Bandwidth for international connections increased from 25 megahertz (MHz) in 1997 to 53,941 MHz by June of 2004.

As the number of PCs in homes increases and broadband access in new communities becomes increasingly common, the number of Internet access points is growing rapidly. This makes it much easier for people to access the Internet anywhere and at any time.

Table 15 shows the ways in which Chinese users access the Internet. By June 2004, the number of Internet users in China had increased to 87 million, of whom 28.7 million used "special line" connections; 51.55 million, dial-up connections; 6 million, ISDN connections; and 31.10 million, broadband connections.⁴ Although the most common form of access continues to be through dial-up services, the number of special line and ISDN users has increased steadily. Cable broadband is by far the fastest growing type of access.

TABLE 15
CHANGES IN HOW THE INTERNET IS ACCESSED IN CHINA
(10,000 users)

	Dec. 2001	Jan. 2003	June 2004
Special line	2,023	2,660	2,870
Dial-up	4,048	4,916	5,155
ISDN	432	552	600
Broadband	660	1,740	3,110
Total Internet users	5,910	7,950	8,700

Source: China Internet Network Information Centre (CNNIC), "Statistical report of China Internet development", various issues.

Note: Since many Internet users are charged for more than one type of connection, the number of users indicated here is greater than the actual number. *Special line* Internet users refers to those who are on an Ethernet LAN. *Broadband* refers to xDSL (ADSL, HDSL, RADSL, etc.) and cable modem connections, etc.

⁴ Since many Internet users are charged for more than one type of connection, the number of users indicated here is greater than the actual number.

China's telecommunications industry has entered a new stage of development with the entry of new competitors and the break-up of the monopoly that existed from the days of the planned economy until 1998.

In 1998, the government created the Ministry of Information Industry (MII), marked a clear separation between politics and business and began restructuring the telecommunications industry. In February 1999, the State Council approved a plan to reorganize China Telecom, creating China Mobile, China Telecom and China Satellite Corporation as separate entities. In April 1999, China Netcom was established, and December 2000 saw founding of China Railcom Corp. At the national level, the telecommunications sector has a mix of monopoly, duopoly and limited-competition regimes.

In December 2001, the State Council issued the Telecommunications Reform Plan. The plan split China Telecom into two separate entities, one in the north and the other in the south. The company formed in the north was merged with China Netcom and Jitong Corp. to create the Chinese Network Communication Group, which provides service in provinces and cities in North and Northeast China, Henan and Shandong. The company formed in the south kept the name China Telecom, allowing it to benefit from the goodwill and invisible assets of the former company. China Telecom's territory spans provinces and cities in South, East and Northwest China.

Beginning on 16 May 2002, the telecommunications monopoly was officially changed to a duopoly regime with the incorporation of China Telecom and Chinese Network Communication Group (China Network). In 2003, the two telecommunications firms set off a wave of competition by establishing a large number of subsidiaries throughout China.

B. POLICIES TO SUPPORT SMES

The Chinese government's SME policy is designed to encourage SMEs to create more jobs at the local level, as expressed in the government's slogan, "small enterprises, high employment". At the beginning of the decade, China enacted the Small and Medium-Sized Enterprise Promotion Law, which it hoped would serve as a legal framework to favour SME development. The law's actual effect is unclear, however.

At present, although most of the government's preferential policies are not specifically focused on SMEs, SMEs may benefit from them more than other types of companies.

1. Export promotion

a. Export-duty refunds. Refunds of some value-added taxes paid on exports are one of the Chinese government's primary export-promotion policies. Refunds range from 9% to 17% for most manufactured goods. Until July 2004, all duty refunds were posted against the central government's revenues.

b. Simplification of export and import procedures for in-bond manufacturing. Since October 2001, the Ministry of Foreign Trade and Economic Cooperation (MOFTEC) has been using computer networks to track in-bond enterprises' imports and exports.

c. Streamlining of Customs procedures. The introduction of electronic Customs procedures simplifies the processing of Customs documents and applications for SMEs, by connecting government agencies to enterprises over an EDI system.

2. Trade facilitation

To promote foreign trade, the Chinese government relaxed restrictions on the kinds of enterprises eligible to take part in foreign trade operations. In particular, it lowered the threshold for SMEs to do so.

All domestic enterprises are now eligible to engage in foreign trade operations. In September 2003, the amount of registered capital that Chinese-owned enterprises are required to have in order to engage in such operations was reduced from 5 million yuan to 1 million yuan (from 3 million yuan to 500,000 yuan in the midwest). At the same time, agency responsible for reviewing and approving foreign-trade qualifications was authorized by the special government agency, instead of applying to a certification-issuing institution, and responsibility for review and approving registrations was transferred to local governments.

The entry into force of this policy has eliminated the stranglehold on foreign trade long enjoyed by a few firms, allowing SMEs to freely enter the international market.

3. FDI promotion

China's open-door FDI policy is one of the driving forces behind its economic growth. From 1979 to 1991, only US\$ 23.34 billion of FDI flowed into China. Since 1992, however, FDI has flooded the country, as total FDI between 1979 and 2003 amounted to nearly US\$ 500 billion.

The bulk of FDI has gone into China's manufacturing industry, which has received about 70% of FDI in most years. Since 1992, more and more FDI has flowed into the IT and IT-related industries, thereby increasing IT production capacity.

Table 16 shows the extent to which the development of China's ICT industry is dependent on joint ventures with foreign investors. In 2002, such joint ventures accounted for 64% of output, 65% of value added and 66% of profits in the electronics and telecommunications industry. In the computer and office-equipment industry, the corresponding figures were 87%, 80% and 85%. This underscores the fact that FDI flows into China have promoted the development of the ICT industry and become a key player in it.

TABLE 16
OUTPUT, VALUE ADDED AND PROFITS OF JOINT VENTURES IN CHINA'S ICT INDUSTRY
(billions of yuan)

Industry	1997	1998	1999	2000	2001	2002	As a percentage of industry total in 2002
<i>Electronics and telecommunications</i>							
1. Output	232.77	309.13	427.40	552.32	697.50	772.98	64%
2. Value added	43.63	52.15	75.56	93.28	107.01	126.84	65%
3. Profits	10.81	11.27	19.28	29.24	27.22	23.77	66%
<i>Computers</i>							
1. Output	62.30	81.70	112.75	186.49	245.44	385.14	87%
2. Value added	12.45	14.95	17.63	28.11	35.29	48.38	80%
3. Profits	4.60	2.27	3.78	6.25	6.17	9.97	85%

Source: National Bureau of Statistics of China (NBS), "2003 China statistical yearbook on high technology", Beijing, China Statistics Press, 2003.

Note: Output is expressed in constant 1990 prices.

4. Growth of small high-tech firm

Another important central-government strategy is the use of preferential policies to encourage the start-up of high-tech firms in industrial-development or export-oriented zones. New high-tech enterprises in various industrial development zones are exempt from income taxes for their first two years of operation. In addition, there is a temporary tax exemption on technology

transfers, consultations and related services for enterprises and institutions with annual net earnings of less than 300,000 yuan. These measures have led to the rapid expansion of small enterprises in the technological sector.

From 1998 to 2002, the output of new high-tech enterprises in development zones tripled, from 433.36 billion yuan to 1.294 trillion yuan, and exports nearly quadrupled, from US\$ 8.53 billion to US\$ 32.92 billion. The number of SMEs in these industrial zones increased from 16,907 to 28,338.

C. SPECIAL MEASURES TO BRIDGE THE DIGITAL DIVIDE AMONG COMPANIES

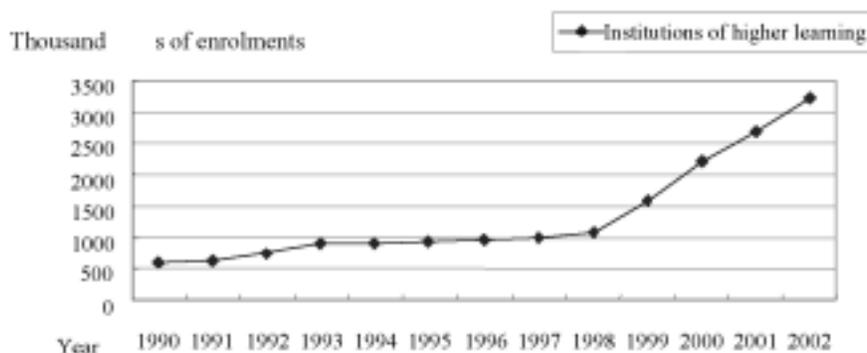
The term “digital divide” refers to the disparity of opportunities for different individuals, families, enterprises and regions using ITs and conducting business on the Internet. Overall Internet use by SMEs is not particularly high, as only 47% have Internet connections. The rapid growth of SMEs stems from concrete policy choices; policy support whether from the central or from local governments is still needed. However, since many policies have not been designed specifically for SMEs, special attention needs to be paid to some important issues.

1. Growth in the supply of human resources

Economic growth theory has begun to regard the accumulation of human capital as the most important factor in promoting economic growth and improving welfare. For this reason, enterprises’ technological capabilities are universally regarded as being largely determined by their employees’ educational level.

From 1996 to 2002, there was a 3% decline in the number of persons with no schooling, while those with a high school education rose one percentage point. China has improved the quality of its workforce by raising the educational level. Increased educational opportunities are undoubtedly an important starting point for narrowing the digital divide among firms of different sizes.

FIGURE 3
NEW ENROLMENTS IN INSTITUTIONS OF HIGHER LEARNING



Source: National Bureau of Statistics of China (NBS), “2003 China statistical yearbook”, Beijing, China Statistics Press, 2003.

More policies such as those discussed below may be urgently needed in the coming decade to raise workers’ ability to take advantage of IT.

First, the fact that schooling through the ninth grade has been compulsory since the early 1990s has led to higher enrolments. The number of high school students rose from 18.16 million in 1990 to 33.71 million in 2002. And since 1998, enrolment in institutions of higher learning has

greatly increased –at an annual average rate of more than 30%. Graduate school enrolments also rose quickly, nearly tripling in six years. This extensive training of human capital helps explain the strong surge in the number of high-tech and software firms.

The next step in this policy should be to bring about another large increase in enrolments through the relaxation of accreditation regulations for educational institutions, and in particular to gradually raise the proportion of the population with a high school education and make university education generally available.

Second, a policy to give primary and middle school students greater access to computer education has been implemented. Introductory courses in IT are part of the curricula of lower-level institutions, giving the coming generation of workers basic computer knowledge and skills.

2. Technical assistance

The most noteworthy aspect of the technology used by small enterprises in China is that they do not have advanced equipment. Many township and village enterprises (TVEs) and private enterprises –and, consequently, many small enterprises– use obsolete equipment discarded by companies in the cities, and some enterprises in the midwest use computers no longer needed by enterprises in the east.

Except in a few industries such as software, for SMEs to become more technologically competitive, they must invest more in capital goods. In addition, to use the Internet to do business, they also need to invest more in IT equipment, in particular. In any event, it is essential that SMEs receive assistance to allow them to upgrade the technology they use, including IT equipment.

In recent years, the State Science and Technology Commission has offered funding to allow SMEs to conduct technological development projects. They can also apply for special funding or bank financing for innovation projects. The central government has provided 2 billion yuan in subsidized loans to support SME technical innovation projects. This policy has been partially successful at raising SMEs' capacity to bring about technological innovation.

3. Financial-support packages

State commercial banks are the most important player in China's credit system, which lends to large and medium-sized enterprises, especially State-owned enterprises. SMEs have long had problems obtaining financing through the banking system.

The government has found it difficult to ensure that the State banking system change the distribution of lending among the different sectors. The government's leading policies in this regard are described below:

- SME credit-guarantee system.
- Establishment of credit departments for SMEs in major commercial banks.
- Establishment of SME stock exchanges.

4. SMEs development centres

The lack of government services limits SMEs to producing goods requiring a low level of technology. To address this limitation, the Chinese government is establishing SME development bureaus or centres at economic commissions at all levels of government. These agencies try to solve problems by working with industrial associations, technological-support centres and a variety of other institutions.

D. E-GOVERNMENT FOR SMES AND TRADE PROMOTION

E-government offers very clear benefits, such as increased efficiency, better services, greater transparency in policies and more honesty in government. The introduction of e-government is an important component in the transition to an information-based economy. By coming online, the Chinese government hopes to spearhead the adoption of IT applications, reduce administrative costs and increase the efficiency of daily operation on the Internet.

E-government is still in its initial stages of development in China. Like e-commerce, e-government is mainly used to issue public advisories and publicize government activities. According to the market survey, the main purpose of government websites is to provide information on the daily operations of different government offices; disseminate news, announcements, laws and regulations; and provide orientation on administrative issues. Less frequently, they allow users to download forms or apply for certifications or business licenses. Such activities account for only 0.2% of the services on government of websites.

Adequate e-customs procedures. E-customs procedures have successfully been implemented following the March 2001 introduction of China's E-Port system, intended to facilitate import and export procedures for enterprises, particularly for SMEs. The scope of E-Port's applications has been continuously expanded.

Administration of quota licenses. In 2001, MOFTEC finished networking the computers of 62 nationwide offices that issue licenses and verify electronic data. The purpose of this was to permit the verification of fabrics quotas with customs offices in the United States, the European Union, Canada and other countries.

E-payments and settlement system. By 2004, China had completed its e-payment and settlement system, modelled on the electronic data-collection system used by commercial banks and the clearing house used in urban areas. However, China's e-finance system is still in its infancy, and China does not yet have "virtual banks" to provide Internet-based banking services.

E. SPREAD OF PUBLIC KEY INFRASTRUCTURES

Public key infrastructure (PKI) is a security system that is modelled on the public key theory and that uses the technology derived from it. As such, it offers information security services for a wide range of network users and for networked computers.

China's national PKI system is mainly composed of the following organizations:

- The National PKI Coordination and Management Committee (NPCMC);
- National root certificate authorities (CAs);
- Industry and regional CAs;
- Subordinate certificate authorities (SCAs); and
- National bridge centre of CA (NBCA).

The National PKI Coordination and Management Committee (NPCMC) is responsible for issuing, implementing and enforcing PKI-related policies and approving CAs and subordinate certificate authorities (SCAs), certificate policies (CPs) and certification practice statements (CPS).

By the end of June 2004, about 80 CA centres had been established throughout the country, and these CA centres had issued more than 5 million electronic certificates. Electronic certificates were widely used in such sectors as finance, tax accounting, customs brokerage offices and industry. China's Electronic Signature Law, passed by the National People's Congress on 28 August 2004, entered into force in May 2005.

PKIs and CAs are only beginning to be introduced in China. The main problems preventing them from becoming more widely adopted are that the CAs are small, few licences have been

issued and the utilization rate is low. Also, CAs set up by local governments have their own procedures, which means that some CAs are mutually incompatible, creating “CA islands”.

In the long run, the continued improvement of PKIs does not depend primarily on technical applications but on the introduction, through the enactment of national laws, of a uniform operating environment for the CA market. The central government should promote PKI interconnectivity, including by encouraging cooperation between Chinese and international CAs and the increased use of PKIs in e-commerce.

F. POLICY RECOMMENDATIONS

The Chinese government’s new industrialization policy –consisting of “using digitization to usher in industrialization, while promoting digitization *in tandem with* industrialization” –has been a key factor in the spread of IT and the development of the IT industry.

As the transition to an information economy moves incessantly forward, government should adopt effective, proactive policies to narrow the information gap among enterprises of different sizes and promote the role of small and medium-sized enterprises in external trade. Policies such as those outlined below could prove beneficial:

- To further expand Internet infrastructure, governments at various levels should expand Internet access, particularly broadband access, and upgrade infrastructure for such new fields as e-commerce and e-government;
- The residual effects of the presence of monopolistic and oligopolistic players in the telecommunications sector need to be addressed as soon as possible. A telecommunications market characterized by an optimal level of competition could reduce the cost of online transactions for SMEs and subsequently promote higher e-commerce penetration rates;
- National SME-promotion institutions should be established and a general development plan should be formulated and implemented to support and protect SME interests and thereby foster competition;
- Raising the skills of human resources is the key to substantially narrowing the digital divide. Encouraging more young people to attend high school and university is the only way to create more demand for ICT products and to stimulate further expansion in the ICT industry. Raising the educational level should also create a larger number of highly skilled workers, thereby allowing SMEs to rely less on low-productivity, low-skilled labour;
- The introduction of e-government leads to higher efficiency in public administration and services and can also serve as a strong incentive for enterprises to use ICTs. The accelerated introduction of government e-procurement should strongly influence business behaviour. All enterprises, and especially SMEs, can raise sales and profits by taking part in e-procurement. Promoting e-government should also encourage the development of B2B and set an example for the effective, comprehensive operation of e-commerce; and
- The main reason for government to promote the development of e-commerce is to give institutional backing for and create an environment conducive to consumer trust in online commercial transactions. It is difficult to bring about a credit-based economy by asking people to abide by moral precepts or by admonitions made in the media. Common sense dictates that a credit-based economy must rest upon a legal foundation. China needs nationwide laws and regulations to ensure that e-commerce transactions are safe.

V. Conclusions and recommendation

The growth of the IT industry is predicated on higher aggregate demand in the economy. In China, enterprises that are intensive IT users as well as SMEs, because of their extremely large number, play an important role in economic development. As an increasing number of SMEs enhance their ability to use IT, the demand for IT products also rises, spurring the development of the IT industry.

The experiences of some Chinese SMEs in using IT to take better advantage of digitization in management and to stimulate exports, as well as some of the problems faced by SMEs in doing so, are summarized below.

1. **Maintaining a balance between hardware purchases and software development**

Business accounts for 66.2% of all computer-related sales in China. Although demand by SMEs is growing much faster than is demand by large companies, SMEs tend to emphasize hardware investment and neglect software development, limiting the range of IT products to which they have access.

If SMEs use IT products only for general business procedures and for information management without networking their computers, they fail to take full advantage of digitization and the possibilities offered by networking.

Statistics indicate that in 2002 sales of hardware, software and services represented 67.2%, 14.6% and 18.2% of total computer-related sales. Once an SME has acquired a certain number of IT products, it should make the transition from storing information on isolated computers to system integration using networking software. ERP and SCM, which integrate logistics, information-flow management and cash-flow management, are two important applications that can help enterprises better manage their information. ERP and SCM also help them manage their entire sales process, from taking orders through product assembly, thereby improving their ability to satisfy their customers' needs. Therefore, a proactive effort to improve SMEs' implementation of ERP and SCM is needed.

2. **Additional government efforts to encourage the transition to an information society**

The Chinese government is responsible for promoting the transition to digitization. Its role in improving infrastructure, encouraging that transition through e-government and fostering market competition cannot be filled by the private sector.

In recent years, the government has greatly increased its investment in infrastructure. From 1998 to 2002, 1.054 trillion yuan was invested in IT capital goods; the fibre-optic network increased from 1 million km to 2.25 million km; and the number of telephone lines rose from 7 per 100 persons to 16.8. In this short period, the country's Internet infrastructure has been greatly enhanced. However, China still lags behind industrialized countries in IT penetration among enterprises, households and the public sector. For example, in 2000, Singapore had 48.4 telephone lines per 100 persons and Japan had 65.3.

To promote lower prices and more efficiency in telecommunications services, more intense competition is needed. In addition, rather than using websites solely to disseminate information, government should make it easier for SMEs to do business through them. The spread of e-government can directly encourage the expansion of the domestic IT industry. Moreover, by conducting operations online, government can accelerate the spread of digitization among SMEs and boost their demand for IT-related products and services.

Obviously, the aim of regulations should be to ensure full market competition, and any policies not consistent with this goal should be modified.

3. Effect of SME-export-promotion policies

Some policies that have proven useful in promoting SME exports are listed below.

Clusters in special zones. These zones have all the infrastructure, including advanced telecommunications equipment, required by foreign investors to set up manufacturing bases. Several zones have evolved into industrial clusters. This allows the firms that belong to supply chains to be located closer to each other, reduces operating costs and enhances product export competitiveness. All but a few industrial zones consist of SMEs that produce mainly for one or several large companies, and most zones have a large number of SMEs. Subsidiaries of large foreign companies bring SMEs from their supply chains to set up factories in the zones. High-tech zones are characteristically composed of local SMEs that form new industrial clusters. Industrial-development zones have proven to be a successful export-promotion strategy.

Preferential export policy. The central government has begun to relax its policies regarding foreign-trade permits and tax refunds on exports. Since 2004, individuals have been allowed to engage in foreign trade, underscoring the more open foreign-trade policy. Another export-promotion policy allows enterprises to receive refunds on the value-added taxes they have paid on exports. The amount of the refunds varies according to the product. This policy has encouraged many SMEs, which by definition are not monopolists, to focus more on exporting in order to increase their profits.

E-customs. Online Customs processing streamlines procedures for SMEs. Export procedures are increasingly being handled online. Settlements and tax payments are also being handled online. This should improve the efficiency and transparency of the government-related procedures.

4. Elimination of institutional barriers in e-commerce

The main reason for the slow growth of B2B e-commerce in China is institutional – specifically, the lack of confidence and the inadequate payment system.

The growth of e-commerce –a new business model based on the Internet– is restricted by the availability of IT and networking equipment and by potential users' lack of confidence. Consumer confidence is not enhanced through admonitions for people to behave ethically but from the establishment of a reliable legal structure. The passage and dissemination of a law governing e-commerce transactions is a necessary condition for the expansion of online business.

At present, online payments through State-owned commercial banks are inefficient and expensive, which also restricts the expansion of e-commerce. To address this issue, domestic banks could be encouraged to adopt the online payment and settlement policies in effect at foreign banks.

5. Raising the skills of SME human resources

Raising the educational level of the workers employed by SMEs is essential for bridging the gap between foreign and Chinese companies and between large and small companies. The rapid adoption of IT stems from the fact that the new generation learns to use new technologies easily and quickly. The aim of policies should be to further raise the number of high school and college enrolments so that enterprises will have more highly skilled workers and thereby be in a position to adapt to the changes brought about by the IT revolution.

References

- China Association of Finance (n.d.), *Almanac of China's Finance & Banking*, various issues, Beijing, Editorial Commission of Finance Yearbook 2002-2004.
- China E-Commerce Yearbook Editorial Commission (n.d.), *China E-Commerce Yearbook*, 2000-2004, Beijing, China E-Commerce Yearbook Editorial Commission Publisher.
- CNNIC (China National Network Information Centre) (n.d.) "Statistical report on China Internet network development" (<http://www.cnnic.org.cn>).
- _____ (2003), "2002 China Internet development report", Beijing, Posts & Telecom Press 2003.
- Editorial Commission of Foreign Economic Relations & Trade Yearbook (n.d.) *Yearbook of China's Foreign Economic Relations and Trade*, 1998-2004, Beijing, Foreign Economic Relations & Trade Press.
- Li Dong (ed.) (2002), *Cases of Enterprise Digitization*, Beijing, Beijing University Press.
- MII (Ministry of Information Industry) (2004), "Data on national telephone users", *Wenhui Daily*, 8 October.
- NBS (National Bureau of Statistics of China) (n.d.), *China Industry Economy Statistical Yearbook*, 1994-2004, Beijing, China Statistics Press.
- _____ (n.d.), *China Statistical Yearbook*, 1990-2004, Beijing, State Statistical Press.
- _____ (n.d.), *China Statistical Yearbook on the High Technology Industry*, 1998-2004, Beijing, China Statistics Press.
- SIC/CAI (State Information Centre/China Association of Information) (n.d.) *China Information Yearbook*, 1999-2004, Beijing, China Information Yearbook Press.
- Zhejiang Statistical Bureau (n.d.), *Zhejiang Statistical Yearbook*, 1998-2004, Beijing, China Statistics Press.

JAPAN

Masatsugu Tsuji

I. Introduction

The “New Economy”, in Japan often referred to as the “Information Technology (IT) Revolution”, has transformed not only economic systems but all facets of social life, thereby creating an entirely new society. New business models based on the Internet, concurrent engineering and supply chain management (SCM) are coming into their own, replacing many traditional forms of commerce.

In recent years, Japan has lagged behind other nations in adopting IT, for well known reasons. Because the Japanese economy peaked in the mid-1980s, just before the take-off of IT, the engines of Japanese growth were not powered by the new technologies. Important examples are the employment structure, with its lifetime employment and seniority systems; the structure of industry, with a combination of large and small companies; the banking and manufacturing sectors; and Japan’s vaunted industrial policies, which targeted new business areas and nurtured them by encouraging collaboration between the public and private sectors.

In theory, these features of Japan’s economic system are based on long-term contractual relationships rather than market mechanisms. As is known, such relationships can lead to lower transaction and information costs than those prevalent in a system predominantly governed by market mechanisms. Economic agents can accumulate and share information through long-term relationships, primarily personal relationships. Japan’s success is due to the full exploitation of these economic relationships. IT, by contrast, allows information to be obtained and shared more efficiently. Thus, ingredients of Japan’s success in the 1980s became obstacles during the IT Revolution. The major pillars of the Japanese economy became weakened, which was one of the causes of Japan’s “Lost Decade” of the 1990s.

Japan’s success also derives from its small and medium-sized enterprises (SMEs), which, with their vast accumulated technologies, skills and know-how, have long been the foundation of Japan’s manufacturing sector. As this paper will show, SMEs contribute much more to the economy than do large companies. But SMEs are not exempt from the requirements imposed by the IT Revolution. These crucial firms have lagged behind in adopting IT and face serious problems due not only to the IT gap but also to Japan’s aging population. If Japan’s economy is to return to its dynamic growth and innovation and once again assume a role as a world leader, an effort must be made to ensure that its myriad SMEs catch up in the new IT-based economy.

This study focuses on IT use by SMEs and examines these firms’ current situation and the issues they face. Using the results of a survey and empirical analysis, it identifies the factors that encourage SMEs to adopt new technologies, and it makes policy recommendations on how to encourage SMEs in both regional and national networks to do so.

II. The current IT market and IT use by SMEs

1. Current use of IT by SMEs

This section examines IT use by SMEs in 2003. Ninety percent of SMEs already use PCs and 80% use e-mail. Most of the PCs owned by SMEs are on networks. Fifty percent of SMEs use the web to transmit and gather information. Other uses, such as intranets, online conferencing and schedule sharing are less common. The most widely implemented practice from 2001 to 2003 was IT training and education for employees, which grew 46.8% in that period.

In 2003, the most common computer management applications were accounting and sales software, including point of sale (POS) applications. This type of software had been introduced by about 60% of SMEs, followed by purchase management programs, by 33.9%, and inventory management programs, by 31.0%.

SMEs use information system applications less than they use management system applications. Of information system applications, task-sharing applications (28.7%), document-sharing applications (26.2%), and work-report applications (23.1%) are the most widely used.

TABLE 1
CURRENT SITUATION OF E-COMMERCE (ALL SECTORS EXCEPT PUBLIC SECTOR)

Total	Number of firms surveyed	1,617,600	—	—	100.00%
	Firms engaging in e-commerce	169,289			10.50%
	B2B	—	130,448	—	8.10%
	Only via the Internet			90,101	5.60%
	Only via media other than the Internet	—	—	30,635	1.90%
	Via the Internet and other media			9,712	0.60%
	B2C	—	64,549	—	4.00%
	Only via the Internet			56,297	3.50%
	Only via media other than the Internet	—	—	4,132	0.30%
	Via the Internet and other media			4,120	0.30%
Firms not engaging in e-commerce	1,448,311	—	—	89.50%	
SMEs	Number of firms surveyed	1,583,219			100.00%
	Firms engaging in e-commerce	160,319	—	—	10.10%
	B2B	123,820			7.80%
	Only via the Internet	—	—	86,579	5.50%
	Only via media other than the Internet			28,562	1.80%
	Via the Internet and other media	—	—	8,679	0.50%
	B2C	60,745			3.80%
	Only via the Internet			53,095	3.40%
	Only via media other than the Internet			3,961	0.30%
	Via the Internet and other media	—	—	3,689	0.20%
Firms not engaging in e-commerce	1,422,900			89.90%	
Large companies	Number of firms surveyed	34,381	—	—	100.00%
	Firms engaging in e-commerce	8,970			26.10%
	B2B	—	6,628	—	19.30%
	Only via the Internet			3,522	10.20%
	Only via media other than the Internet	—	—	2,073	6.00%
	Via the Internet and other media			1,033	3.00%
	B2C	—	3,804	—	11.10%
	Only via the Internet			3,202	9.30%
	Only via media other than the Internet	—	—	171	0.50%
	Via the Internet and other media			431	1.30%
Firms not engaging in e-commerce	25,411	—	—	73.90%	

Source: On the basis of Small and Medium Enterprise Agency, "Survey on the reality of IT utilization by SMEs", Ministry of Economy, Trade and Industry (METI), Tokyo, 2003.

2. E-commerce and SMEs

Although no definitive survey on e-commerce in Japan has been carried out, various institutions have published data on the topic. Table 1, which contains data from a 2001 Ministry of Internal Affairs and Communications (MIC) survey, summarizes current e-commerce use. The MIC surveyed more than 1.6 million companies, nearly 90% of which were SMEs. It found that about 10.5% of the firms in all categories engaged in e-commerce. For SMEs, the figure is 10.1%, while for large firms it is 26.1%. B2B transactions were conducted by 7.8% of SMEs, compared with 19.3% of large companies. In the case of B2C, the figures were 3.8% for SMEs, and 11.1% for large firms.

Giovannetti, Kagami and Tsuji (2003), after examining very different data, reported that B2B use for all categories of firms was 6.1% and B2C use was 0.6%. These figures are much lower than those previously reported. By comparison, 7.1% and 2.16% of United States firms engage in B2B and B2C.

2.1. B2B

Let us examine Japanese firms' objectives in carrying out B2B transactions. More than half (57.4%) of the firms reported that they used B2B for sales; 54.8%, for purchases; 18.2%, for distribution; and 21.8%, for after-sales services. These figures include both large companies and SMEs.

2.2. B2C

The primary objective of B2C transactions is for taking orders (82.2%), followed by distribution (19.2%), and after-sale services (27.3%). This implies that many firms are using B2C to build a new kind of relationship with their customers. As with B2B, these figures do not vary significantly between large and small firms.

3. Supply chain management as practised by SMEs

According to a survey by the Small and Medium Enterprise Agency, only one-third of SMEs in sectors in which SCM techniques are practised, such as manufacturing, wholesale and retail, view SCM as useful; moreover, fewer than 15% of manufacturing firms practise SCM techniques. This underscores that SCM techniques have not yet found wide acceptance among SMEs.

A breakdown of these data by firm size shows that only one-fourth of SMEs are familiar with the concept of SCM, and only 8.4% use SCM techniques. This figure is lower than half that of large firms. As noted above, SCM techniques are not widely practised in Japan, especially among SMEs (table 2).

TABLE 2
SIZE OF FIRMS THAT ARE FAMILIAR WITH AND HAVE ADOPTED
SCM TECHNIQUES
(March 2002)

Size of firms	Firms familiar with SCM techniques	Adoption of SCM techniques			
		Have fully implemented SCM techniques	Have partially implemented SCM techniques	Plan to implement SCM techniques	Are considering adopting SCM techniques
SMEs	24.8%	2.7%	5.7%	0.8%	4.6%
Large firms	49.4%	4.2%	11.3%	4.2%	7.1%

Source: On the basis of Small and Medium Enterprise Agency, "Research on the change of environments regarding efficiency of distribution networks", Ministry of Economy, Trade and Industry (METI), Tokyo, 2002.

III. SME development in the IT revolution

A. THE ROLE OF SMES IN THE JAPANESE ECONOMY

Although there are no official figures on the number of Japanese SMEs, the *White Paper on Small and Medium Enterprises in Japan* estimates that in 2001 over 1.5 million non-agricultural companies met the requirements for classification as SMEs, or about 99.2% of the 1.697 million total companies.

This section examines the role of SMEs in the various sectors of the Japanese economy. Although there are no uniform official data on SMEs, available data provide a general picture of the roles played by SMEs. SMEs contributed 57% of the value added to production in 2002, compared with 43% for large firms. This breakdown has remained stable in recent years. As for direct exports by the manufacturing sector, in 2000, SMEs' average share across all industries was 9.1%, while that of large firms was 20.6%. These are the only data available on exports. In most years, SME exports account for approximately one-half of those of large firms. But SMEs have a relatively stronger presence in sectors such as general machinery, electric machinery, and precision machinery, where Japanese firms have a technological advantage. In 2002, SMEs accounted for nearly 40% of all investment in the manufacturing sector. Data on the numbers of firms in various sectors shows that industry is overwhelmingly dominated by SMEs. Across all sectors, SMEs account for nearly 100% of total firms. As for employment, the percentages are different from those shown in the industry data. In mining, construction, groceries and real estate, SMEs account for a high percentage of employment. However, in public utilities, including electricity, gas, and water, SMEs employ only 12.4% of all workers, and in finance and insurance, 13.9%. To take advantage of economies of scale and network externalities, these sectors require huge investments in equipment and infrastructure. This inherent feature of these sectors restricts entry to large firms. Still, SMEs play a leading role in employment, as evidenced by the fact that they account for two-thirds of all industrial employment.

One current problem related to SMEs is the fact that there are fewer start-ups than close-downs. Moreover, since the difference between start-ups and close-downs is growing, the total number of SMEs is shrinking. The reasons for this are the prolonged stagnation caused by the burst of the bubble economy; the "hollowing out" of firms; and the lack of successors to inherit businesses because of Japan's aging population. These phenomena will be re-examined in the section on SME-related policies.

B. CASE STUDIES ON IT USE IN TWO SME CLUSTERS: HIGASHI-OSAKA AND OHTA WARD

1. Description of the selected SME clusters: "Horizontal" and "Vertical"

This section is based on field surveys, a mail survey and in-depth interviews conducted by the author in two of Japan's most prominent SME clusters, located in Higashi-Osaka city, Osaka Prefecture, and Ohta ward, in the metropolitan area of Tokyo.

These clusters were selected as the focus of the field study because they are the two largest SME clusters and they use highly specialized technologies and rely on regional networks, and they have undergirded Japan's entire *monotsukuri* (manufacturing) sector. The two regions, however, are in no way identical, and the differences between them are described below.

SMEs in Higashi-Osaka excel at manufacturing finished products in the machinery and metalwork industries. More than 100 SMEs in Higashi-Osaka manufacture unique products and control the largest shares of the markets for those products in Japan as well as abroad. The core sectors of Higashi-Osaka's SMEs include manufacturing of metal, plastic and electronic products, general machinery and printing and publishing. These SMEs tend to be more independent and less focused on acting as subcontractors than are their counterparts in Ohta ward. Higashi-Osaka's

manufacturing SMEs have built local networks through horizontal cooperation with producers of niche products and related peripheral products.

Most SMEs in Ohta ward specialize in metalworking and processing, and possess a high level of technical know-how. Ohta ward's SMEs have strong ties with the large companies that historically have congregated in the Tokyo metropolitan area. Although this collaboration has increased SMEs' competitiveness, it has also limited their options: SMEs in Ohta ward tend to passively accept their role as subcontractors.

Hence, the SMEs in Higashi-Osaka will be referred to in this paper as a "horizontal cluster", and those in Ohta ward, as a "vertical cluster".

2. IT usage in the two clusters

The author mailed questionnaires to 3,500 SMEs in June 2004, and received 691 responses, for a response ratio of 17.4%. At the same time in Ohta ward, the author selected and sent questionnaires to 3,396 SMEs in June 2004; 507 responses were received, for a response ratio of 14.9%.

More than half of the SMEs surveyed in Higashi-Osaka have less than ¥ 10 million in capital. Eighty percent have fewer than 50 employees and 60% have fewer than 20 employees. More than half of the SMEs are in the manufacturing sector, while 17.7% are wholesalers.

On the other hand, two-thirds of Ohta's SMEs have less than ¥ 10 million in capital. Ohta's SMEs are, overall, much smaller than those in Higashi-Osaka. More than half of Ohta's SMEs have fewer than 10 employees, and the average is 17.5. Some 91.9% of all SMEs that returned valid responses are involved in manufacturing.

As part of the field survey, questionnaires on e-commerce and SCM were sent to 6,900 SMEs in Ohta ward and Higashi-Osaka, and 1,198 valid replies were received. According to the responses received, 242 SMEs (25.4%) conduct transactions by means of B2B e-commerce, but only 91 (9.6%) resort to B2C. In addition, only six companies (0.5%) have adopted SCM techniques. Hence, the SCM system is not widely accepted in Japan's two largest SME clusters.

The survey results indicate that SMEs use information systems for the following purposes: accounting and financial control (712 companies, 59.4%); sales management (549 companies, 45.8%); payroll (525 companies, 43.8%); inventory management (401 companies, 33.5%); purchases management (373 companies, 31.1%); and production management (211 companies, 17.6%). Hence, SMEs have introduced IT systems primarily for internal management, whereas they still make scant use of new technologies, such as SCM or B2C, to interact with other companies.

Furthermore, the respondents emphasized the following problems preventing them from making greater use of IT: employees' lack of familiarity with IT (555 companies, 46.3%); lack of IT specialists (403 companies, 33.6%); inadequate leadership (356 companies, 29.7%); and management's failure to identify goals for IT use (316 companies, 26.4%). The issues raised provide important information for devising policies to encourage SMEs to adopt new technologies.

3. Comparison of IT usage in the two clusters

Next, let us contrast the two clusters. According to our survey data, we obtain the following facts regarding IT usage:

(a) On average, more than 90% of SMEs own PCs. The average number of PCs owned and connected to LAN in Higashi-Osaka are 19.1 and 17.0, while those in Ohta Ward are 8.8 and 7.5, respectively. In Ohta Ward, 14.2% of SMEs do not own PCs. Internet usage is at approximately 80% in pooled data, and in Higashi-Osaka it is 86%, while in Ohta ward, 70%. Sales realized by the Internet are increasing. These figures are rather smaller than those of other data on national average mentioned in Chapter II.

(b) The two clusters are similar in their uses of software which is primarily used for promoting productivity of routine works such as accounting, sales, payroll, inventory, and purchase management. The next most common use of software is as a tool for communications and decision-making. Higher-level software such as SFA (Sales Force Automation), CRM (Customer Relations Management), and SCM (Supply Chain Management) are less frequently used. The Internet is used for obtaining and sharing information, PR for the firms and their products, promotion of internal efficiency, and e-commerce such as net banking, B2B and B2C. The average share of sales through the Internet is more than 10%, while that of purchases is less than 10% (see table 3 and 4).

(c) According to table 5, most SMEs recognize IT's importance, responding that their IT usage is substantial. They expect IT to have a significant effect in the areas of promotion of internal efficiency, activation of communications, sharing of information, close collaboration with customers and business partners, faster decision-making, and business development.

(d) In contrast with their high expectations for IT's impact on their business, SMEs also reveal dissatisfactory points with regards to IT usage, which we group as follows: (i) human resources, which includes lack of IT specialists and leadership; (ii) funds for IT investment; and (iii) IT security. The largest obstacles revealed by our mail surveys are related to either human resources or funds. In the survey, approximately 50% of SMEs spent less than 1 million yen on IT in 2003. They expect and intend to use IT, but their IT investment remains low. Thus funds and human resources are crucial factors in considering concrete policy measures for promoting IT use by SMEs. This point is examined in detail by our in-depth interviews, which show that SMEs which successfully introduced and have been utilizing IT have been able to solve these problems, especially that of human resources (table 6).

(e) In addition to human resources and funding, other factors which hinder the IT usage of SMEs are obtained from in-depth interviews.

Introducing IT contributes to the attainment of quantitative objectives such as increasing sales and profits and controlling inventories. It also helps change employees' awareness of IT itself, provides direct access to customers and business partners throughout Japan and raises the prominence of the firm as well as its products. SMEs in Higashi-Osaka tend to restructure themselves by utilizing IT positively so as to respond more adaptively to competitive market environments; they view IT as a means of not only raising productivity of routine works but also that of non-routine works, as well as restructuring their businesses and increasing customer satisfaction. They are more aggressive in their IT introduction, in part because they need to be in order to survive in their more competitive environment.

All the firms interviewed agree that IT has advantages, such as contributing to efficiency and information sharing. Still, each market has its own ingrained business practices in sales and purchases. This is more marked in Ohta ward, where SMEs tend to specialize in made-to-order or custom-made manufacturing, areas in which IT is not easily implemented. These traditional practices make it difficult for IT to lead to tangible gains such as increased sales or profits.

TABLE 3
SOFTWARE USE BY SMES

	Combined total		Higashi-Osaka		Ohta ward	
	Firms	% of all Firms	Firms	% of all Firms	Firms	% of all Firms
1. Sales management (including POS and barcode applications)	549	45.8	375	54.3	174	34.3
2. Accounting	712	59.4	467	67.6	245	48.3
3. Payroll management	525	43.8	352	50.9	173	34.1
4. Purchases management	373	31.1	245	35.5	128	25.2
5. Inventory management	401	33.5	260	37.6	141	27.8
6. Design management (including CAD/CAM)	423	35.3	232	33.6	191	37.7
7. Production management	211	17.6	112	16.2	99	19.5
8. Logistics	100	8.3	73	10.6	27	5.3
9. Enterprise resource planning (EPR)	23	1.9	19	2.7	4	0.8
10. CRM	170	14.2	129	18.7	41	8.1
11. Groupware (office information-sharing systems)	197	16.4	141	20.4	56	11.0
12. SFA	46	3.8	31	4.5	15	3.0
13. SCM	6	0.5	4	0.6	2	0.4
14. Others	62	5.2	35	5.1	27	5.3
Not specified	223	18.6	79	11.4	144	28.4
Total	1198	100.0	691	100.0	507	100.0

Source: Prepared by the author.

TABLE 4
REASONS FOR USING THE INTERNET

	Combined total		Higashi-Osaka		Ohta ward	
	Firms	%	Firms	%	Firms	%
1. Gather or exchange information	817	85.8%	509	85.7%	308	86.0%
2. Promote company and/or products	434	45.6%	265	44.6%	169	47.2%
3. Banking	251	26.4%	149	25.1%	102	28.5%
4. Raise management efficiency	346	36.3%	222	37.4%	124	34.6%
5. B2B	242	25.4%	129	21.7%	113	31.6%
6. B2C	91	9.6%	57	9.6%	34	9.5%
7. Other	35	3.7%	16	2.7%	19	5.3%
Did not reply	23	2.4%	17	2.9%	6	1.7%
Total	952	100.0%	594	100.0%	358	100.0%

Source: Prepared by the author.

TABLE 5
EXPECTED BENEFITS FROM IT USE
(percent of firms)

	High expectation	Moderate expectation	Low expectation	No expectation	Did not reply
1) Increased profits	22.1	30.1	27	11.1	9.7
2) Higher productivity in routine tasks, such as administrative tasks	44.1	35.8	7.6	5.1	7.4
3) Higher productivity in non-routine tasks, such as project planning	15.6	27.2	28.4	13.4	15.4
4) Faster decision-making in management and business development	22.8	37.3	19.6	7.9	12.4
5) Restructuring the entire business process	14.2	32.0	27.3	10.3	16.3
6) Encouraging communication and sharing of information and knowledge	28.9	36.2	15.6	6.7	12.7
7) Closer cooperation with customers and business partners	27.7	37.7	18.8	5.4	10.5
8) Better understanding of customer needs	19.1	33.3	26.1	8.1	13.3
9) Enhanced customer satisfaction through improvements in services and products	17.8	34.0	24.5	9.9	13.8

Source: Prepared by the author.

TABLE 6
PROBLEMS ENCOUNTERED BY SMES IN USING IT
(number and percent of firms)

	Combined total		Higashi-Osaka		Ohta ward	
	Firms	%	Firms	%	Firms	%
1. Lack of leadership regarding IT use	356	29.7	223	32.3	133	26.2
2. Lack of concrete management objectives for IT use	316	26.4	193	27.9	123	24.3
3. Introduction of IT without restructuring of processes	243	20.3	144	20.8	99	19.5
4. Insufficient staff with adequate IT skills	403	33.6	247	35.7	156	30.8
5. Employees' lack of familiarity with IT	555	46.3	354	51.2	201	39.6
6. Employees' reluctance to use IT	111	9.3	69	10.0	42	8.3
7. Lack of IT consultants	329	27.5	206	29.8	123	24.3
8. Company's failure to instruct consultants on how to introduce IT	70	5.8	40	5.8	30	5.9
9. Company's failure to instruct suppliers (manu- facturers) on planning and introduction of IT	123	10.3	78	11.3	45	8.9
10. Lack of software to meet needs of company's business and processes	248	20.7	168	24.3	80	15.8
11. Company's inability to keep up with rapid development of IT	205	17.1	117	16.9	88	17.4
12. Attempt by business partners to adopt their own IT systems	172	14.4	98	14.2	74	14.6
13. Perception that IT investment does not translate into higher profits	281	23.5	170	24.6	111	21.9
14. High cost of IT investment	371	31.0	229	33.1	142	28.0
15. Concern with compromising information through introduction of IT	335	28.0	212	30.7	123	24.3
16. Concern with leakage of personal data through introduction of IT	187	15.6	104	15.1	83	16.4
17. Time required to introduce IT	141	11.8	79	11.4	62	12.2
18. Other	36	3.0	12	1.7	24	4.7
Did not specify	202	16.9	90	13.0	112	22.1
Total	1198	100.0%	691	100.0%	507	100.0%

Source: Prepared by the author.

4. Policy recommendations

According to table 7, SMEs in Higashi-Osaka favour government policies such as subsidies on IT investment (36.1%), the promotion of low-cost leases (35.1%) and IT seminars (32.6%). Financing and education are the two policies most often mentioned. SMEs with a firmer intention to use IT are stronger advocates of financial assistance for IT investment.

SMEs in Ohta would like government to implement policies to promote investment in IT, such as subsidies (31.0%), low-interest loans for computer equipment (29.4%), computer training (29.0%) and IT seminars (27.2%) –that is, they would like to see government support in the form of financing and human resource development.

This case study also shows that since many SMEs cannot afford to hire younger workers, they are unlikely to have IT leaders. Moreover, they do not want to resort to “head hunters” to find skilled IT specialists. They request assistance for IT training and seminars for their employees. They would also like government to provide examples of IT use, both successful and unsuccessful. Still, one firm went so far as to state that it did not expect any government support, since it believes that all IT-related issues should be dealt with by the private sector.

TABLE 7
IT-PROMOTION POLICES RECOMMENDED BY SMES

	Combined total		Higashi-Osaka		Ohta ward	
	Firms	%	Firms	%	Firms	%
1. IT seminars	391	32.6	253	36.6	138	27.2
2. PC training	344	28.7	197	28.5	147	29.0
3. Training in website development	212	17.7	120	17.4	92	18.1
4. Consultancy on IT promotion	267	22.3	176	25.5	91	17.9
5. Low-interest loans for IT	377	31.5	233	33.7	144	28.4
6. Affordable computer-equipment leases	421	35.1	272	39.4	149	29.4
7. Tax exemptions on IT investment	384	32.1	238	34.4	146	28.8
8. Grants and other financial support for IT investment-related projects	432	36.1	275	39.8	157	31.0
9. Support for opening new portals	37	3.1	18	2.6	19	3.7
10. Deregulation	202	16.9	125	18.1	77	15.2
11. Showcasing of small-business models that use IT	47	3.9	32	4.6	15	3.0
12. E-procurement, e-purchasing	86	7.2	50	7.2	36	7.1
13. Other	61	5.1	29	4.2	32	6.3
Did not specify	224	18.7	102	14.8	122	24.1
Total	1198	—	691	—	507	—

Source: Prepared by the author.

C. EMPIRICAL ANALYSIS OF FACTORS THAT ENCOURAGE IT USE, BASED ON SURVEY DATA

Based on the survey data for the two SME clusters, the author heuristically isolates and analyzes factors that encourage SMEs to adopt IT. To this end, indices of degree of IT use have been constructed and will be used for the analysis.

1. Factors that affect IT use and development

The factors that encourage IT use will first be identified and then they will be analyzed. The questionnaires asked SMEs about: (i) company characteristics; (ii) management orientation; (iii) business environment; and (iv) expected results from IT use.

Company characteristics include variables such as industrial category, amount of capital, and number of employees. Regarding management orientation, a detailed explanation is called for. The questionnaires contain ten items on managers' daily activities. Since there is some overlap between the ten questions, an attempt was made to isolate the variables through component analysis. In this manner, four variables, which account for 70.1% of the total responses, were isolated. The first of these includes questions to determine to what extent an SME is geared toward expansion. The second category, orientation to incentives, contains questions on management's performance vis-à-vis stakeholders and on any incentives it gives employees by relinquishing rights and responsibilities to them. The third variable includes questions on the extent to which firms learn from their mistakes and on whether top management considers employee suggestions. Since such courses of action are indicative of management's responsiveness, this factor is referred to as "orientation to adapting". The last variable, called "orientation to data use", contains questions on how firms make use of data for decision-making. As for business environment, seven variables were selected, including winning of new business partners, product characteristics and the effect of new entrants into the market.

Finally, since the introduction and use of IT depend on firms' expectations regarding their future business and management, nine variables were selected for the fourth category, including increased profits, promotion of higher productivity and timely decision-making.

TABLE 8
LIST OF VARIABLES

		Variables
Dependent Variables	Indices of IT development	<ol style="list-style-type: none"> 1. Number of PCs per employee 2. Number of PCs connected to a LAN, per employee 3. Software use 4. Internet use
Independent Variable	Company characteristics	<ol style="list-style-type: none"> 1. Industry 2. Capital 3. Number of regular employees 4. Number of part-time employees 5. Years in business 6. Generation of present
	Managerial orientation	<ol style="list-style-type: none"> 1. Expansion 2. Providing incentives 3. Adapting 4. Using data
	Business environment	<ol style="list-style-type: none"> 1. New business partners are won every year 2. Many repeat purchase orders from the same business partners 3. Company is free to set its own prices 4. Competition with rival companies has recently become more intense 5. There has been a recent increase in new entrants from other business segments 6. Company has increased its share of new products and services 7. In recent years, company has not been able to hire workers 30 years old or younger
	Expectation of IT usage	<ol style="list-style-type: none"> 1. Increase profits 2. Higher productivity in routine tasks, such as administrative tasks 3. Higher productivity of non-routine tasks, such as project planning 4. Faster decision-making in management and business development 5. Restructuring of the entire business process 6. Better communication, and accumulation and sharing of information 7. Closer cooperation with customers and business partners 8. Better understanding of customer's needs 9. Higher customer satisfaction through improvements in services and products
		Company's IT investment in preceding fiscal year.

Source: Prepared by the author.

2. Indices of IT development

IT utilization cannot be described with a single index, since various factors are involved, including size, industry, business practices, etc. For the surveys, the following indicators of IT use by SMEs were selected: (i) number of PCs owned; (ii) number of PCs connected to networks such as LANs; (iii) the extent to which software that contributes to the efficient utilization of managerial resources has been implemented; and (iv) Internet use. No explanation is required for (i) and (ii), since these indices are simple quantitative proxies for IT use: having more PCs is equivalent to using IT more intensively. Items (iii) and (iv) are more qualitative measures of IT use, since having a large number of computers does not necessarily mean using them efficiently. Initially, software packages –for example, for accounting and marketing management– are introduced to promote efficiency in internal tasks. These applications are generally used independently on each PC. At more advanced stages of IT, the various applications are no longer used separately but are interconnected and share databases. Item (iii) sheds more light on this. Subsequently, the PCs in one or several offices are connected to each other, generally with a groupware program. This use is covered by item (iv).

Regarding item (iii) in Q2 of our questionnaires, SMEs were asked if they used the software listed in table 9 below. One point was assigned for affirmative responses to questions 1-8, and 10 points for questions 9-13. The first eight questions are quite different from the last six in their description of IT use. Because the latter deal with more advanced and integrated uses, more points were assigned to them.

TABLE 9
QUESTIONS ON SOFTWARE

1.	Sales management (including POS and barcode)
2.	Accounting
3.	Payroll management
4.	Purchases management
5.	Inventories management
6.	Design management (including CAD/CAM)
7.	Production management
8.	Logistics
9.	EPR packages
10.	CRM
11.	Groupware
12.	SFA
13.	SCM
14.	Other

Source: Prepared by the author.

The index presented in (iv) above looks at Internet use in the same manner as does item (iii) of the questionnaire on software use. The corresponding questions are Q3-3, which are shown in table 10. One point was assigned for each affirmative response.

TABLE 10
QUESTIONS ON CURRENT INTERNET USE

1.	Create and manage the company's homepage or related web pages
2.	Employees' own personal e-mail accounts (number of addresses)
3.	Create and utilize electronic bulletin boards, and/or electronic meeting boards
4.	Create and utilizing utilize mailing lists of customers and business partners
5.	Establish a private domain name
6.	Other

Source: Prepared by the author.

3. Estimation models

The factors that determine the particular scores obtained by each SME will be examined below. To examine the validity of these factors, the following regression model was constructed:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_n X_{ni} + e_i,$$

where Y_i is the index of IT use; X_{ji} denotes variables such as the characteristics of the SMEs, amount of IT investment, expectations for IT use, etc.; β_j indicates the coefficients to be estimated; and e_i is the residual.

For the actual estimation, the following two models were estimated, in accordance with the index selected: (i) the software utilization model; and (ii) the Internet utilization model. These indices were explained in detail in the preceding section.

4. Summary of the estimations

These estimations show that various factors significantly affect IT use by SMEs. To shed light on the most significant factors, the results given in table 11 are summarized below:

In all estimations, a management orientation toward expanding is perceived as significant. This implies that SMEs tend to use technology to as a tool to seek new business through restructuring and to adjust to the transformation of the business environment.

The results of all relevant estimations on software use point to two variables as significant, namely, amount of capital and management's orientation toward using data. The importance placed on using data implies that SMEs adopt technology to enhance the skills of management. In the case of Higashi-Osaka, this is clearly the case, since SMEs there are horizontal and firms independently decide whether or not to introduce IT. In Ohta, where firms are vertically structured, further research is required to determine to what extent they introduce IT because of pressure from the large firms that contract them.

As for Internet use, in addition to an orientation to expanding, three variables are identified that are common to the three pooled estimations and to the two disaggregated estimations: the number of regular employees; a desire to restructure operations and orientation to providing incentives and the latter in the category of management orientation. The larger a firm is, the more difficulty it has in making decisions quickly and in responding to changes in the business environment. The Internet helps obviate these difficulties and raises employee morale by encouraging decentralized decision-making. In addition, large firms can afford to invest more money and human resources in IT.

It follows from the analysis thus far that the most important way to promote IT use among SMEs is encourage them to be forward-looking. Once they adopt such an outlook, they can determine the exact ways in which they will introduce and use IT, according to their specific goals.

TABLE 11
SUMMARY OF ESTIMATIONS

Independent Variables		Dependent Variables											
		Number of PCs per employee			Number of PCs connected to LAN, per employee			Internet use			Software use		
		Total	Higashi-Osaka	Ohta	Total	Higashi-Osaka	Ohta	Total	Higashi-Osaka	Ohta	Total	Higashi-Osaka	Ohta
Firm's characteristics	Capital	+ *	+ *					+ ***			+ ***	+ *	+ **
	Number of employees	- ***	- ***		- ***	- ***		+ ***	+ ***	+ **	+ ***		+ **
	Number of part-time employees	+ *			+ **					+ *			+ **
	Years in business			- **									
	Generation of present CEO										- *		- ***
	Manufacturing						- **						
	Wholesale	+ **			+ *			+ *	+ ***		+ ***	+ **	
	Retail											+ **	
	Information services							+ **	+ ***				
Real estate											+ *		
Expectation from IT use	Increased profits							+ **					
	Restructuring of the entire business process							+ ***	+ ***	+ ***	+ ***	+ ***	
	Higher productivity in routine tasks, such as administrative tasks			- **									
	Higher productivity in non-routine tasks, such as project planning								+ *				
	Faster decision-making in management and business development			+ **			+ **				+ **		+ **
	Encouraging of communication, and accumulation and sharing of information							+ **		+ **			
	Closer cooperation with customers and business partners								+ *				
Managerial orientation	Expansion	+ **	+ *	+ **	+ *	+ **	+ ***	+ ***	+ ***	+ **	+ *		+ **
	Providing incentives	- *						+ ***	+ *	+ ***	+ **	+ *	
	Adapting												
	Using data										+ ***	+ **	+ **
Business Environment	Winning of new business partners every year										+ *		
	Expansion in share of new products and services							+ ***		+ *			
	Recent increase in competition with rival companies												
	Recent increase in new entrants from other business fields										+ *		
IT investment in most recent fiscal year		+ **	+ ***		+ ***	+ ***						+ ***	
R ²		0.036	0.102	0.087	0.092	0.095	0.084	0.278	0.248	0.408	0.187	0.209	0.266

Note 1: “+” and “-” refer to estimated coefficient.

Note 2: ***, **, and * are significant at 10%, 5%, and 1%, respectively.

Note 3: estimated coefficients considered unrealistic have been omitted.

Source: Prepared by the author.

5. Problems of IT use identified based on empirical research

5.1. Classification of SMEs by development of IT

In the preceding analysis, four indices of degree of IT development by SMEs were defined. In this section, two of these indices –software use and Internet use– are used, firstly to classify SMEs into different categories. With the average for each index, SMEs were then divided into two categories. Those with the highest score are referred to as “developed”, while those with lower scores are termed “developing”. Hence, the two indices resulted in four classifications: developed (148 SMEs); software-oriented; network-oriented (126); and developing (340).

5.2. *Obstacles, and the degree of IT development*

Table 11 allows an examination of the kind of obstacles faced by SMEs in each category. Table 12 correlates the classifications described above and the particular problems inquired about in the surveys. Hence, in table 12, a positive (negative) sign indicates that an issue correlates to the category of developed (developing) in IT use. The obstacles for the developed group were identified as related to security, coordination with purchasers and sellers and funding for IT investment, while those for the developing group were lack of leadership, difficulty in keeping up with technological change, lack of confidence regarding return on investment and the length of time required to introduce new technologies.

TABLE 12
OBSTACLES AND STAGES OF IT DEVELOPMENT

Obstacles to IT use	Ranking
Lack of leadership regarding IT use	-0.150 **
Lack of management objectives for IT use	0.008 —
Introduction of IT without restructuring of processes	0.046 —
Insufficient staff with adequate IT skills	-0.003 —
Employees' lack of familiarity with IT	-0.064 —
Employees' reluctance to use IT	0.025 —
Lack of IT consultants	-0.068 —
Company's failure to instruct consultants on how to introduce IT	-0.026 —
Company's failure to instruct suppliers (manufacturers) on planning and introduction of IT	-0.009 —
Lack of software to meet needs of company's business and processes	0.016 —
Company's inability to keep up with rapid development of IT	-0.102 **
Attempt by business partners to adopt their own IT systems	0.130 **
Perception that IT investment does not translate into higher profits	-0.079 *
High cost of IT investment	0.076 *
Concern with compromising information through introduction of IT	0.143 **
Concern with leakage of personal data through introduction of IT	0.036 —
Time required to introduce IT	-0.094 *
Other	0.020 —

Note: ** and * are significant at 5% and 1%, respectively.

Source: Prepared by the author.

5.3. *Policies advantageous to IT use as suggested by empirical research*

The preceding section focused on issues that were brought up in the surveys. Using these results, this section analyzes what kinds of policies are required to encourage the adoption of new technologies.

Table 13 correlates firms' degree of IT development with the promotion policies they would like to be implemented. As was the case above, a positive (negative) coefficient indicates that a proposed policy is recommended by the developed (less developed) group. SMEs in the developed group focused on initiatives such as low-interest loans, tax exemptions and subsidies on IT investment along with a relaxing of several regulations; in other words, they advocated establishing an environment conducive to IT investment. By contrast, the developing group tended to prefer initiatives such as IT seminars and training in computer operation and homepage construction; these proposals can be summarized as "human resource development to encourage IT use".

TABLE 13
RECOMMENDED POLICIES AND STAGE OF IT DEVELOPMENT

Government IT policies recommended by company	Ranking
IT seminars	-0.099 **
PC training	-0.112 **
Training in website development	-0.123 **
Consultancy on IT promotion	-0.050 —
Low-interest loans for IT	0.091 *
Affordable computer-equipment leases	0.026 —
Tax exemptions on IT investment	0.241 **
Grants and other financial support for IT investment-related projects	0.110 **
Support for opening new portals	-0.012 —
Deregulation	0.112 **
Showcasing of small-business models that use IT	0.085 *
E-procurement, e-purchasing	0.016 —
Others	-0.018 —

Note: ** and * are significant at 5% and 1%, respectively.

Source: Prepared by the author.

D. CASE STUDY: DAN, AN SME SUPPLY CHAIN THAT PROMOTES EXPORTS

Although, as noted above, SMEs were once the primary engine of Japanese exports, large firms eventually took over this role. However, with the spread of IT, the pendulum appears to be swinging back. This section examines an example of an export-oriented SME that has used IT to help it construct its own international supply chain.

1. Profile of the firm

Dan, a sock manufacturer, wholesaler and retailer, was established in 1968. It sells through its own shops in London as well as in Japan. The company's head office is located in Yao City, a suburb of Osaka. Its total capital is approximately ¥ 333 million and it has 82 employees. (Since it has fewer than 100 employees, it is classified as an SME).

Sock manufacturers are divided into three types of firms: highly competitive national brands, specialized sock makers and SME sock makers. Dan's socks go for ¥ 850 to ¥ 900 at its retail shops. Since most of its customers –mainly schoolgirls– generally visit the store at monthly intervals, Dan typically changes its stock every month. Customer information is collected through the firm's POS system, which is directly connected to its distribution centre as well as to its suppliers (sock knitters). This business model requires Dan to specialize in a wide range of designs and colours although it produces relatively few of each item. Dan offers 500 items in 12 colours, for a total of 6,000 products. Management monitors sales at its shops and orders products on a weekly basis, so as to ensure that it can offer a full range of socks to appeal to its young customers. Unlike many Japanese SMEs that have outsourced production to countries such as China, Dan manufactures mainly in Japan.

2. Supply chain

Dan's president initially wanted to have factories located near the company's outlets, but this proved unfeasible. However, the company achieved a similar result by using IT. It built its own supply chain system to transmit customer information through a POS system in real time,

and to allow factories, distribution centres and marketing departments to receive and utilize this information for decision-making. Dan has 40 knitters under contract, seven of which produce exclusively for the company. These knitters have from 8 to 25 employees and are located close to the distribution centre –typically within a ten-minute drive. Sales information transmitted through the POS is received by knitters, allowing them to update their own production plans. Dan has installed counters on its suppliers' knitting machines, and production data are automatically transmitted to Dan's managers, allowing them to monitor the production process. The total cost of constructing the distribution network and the supply chain network was ¥ 1.350 billion, most of which was provided through government subsidies.

Dan's supply chain is vertically structured, with Dan at the top and the knitters below it. Dan cannot organize upstream networks, such as those that distribute thread, since codes and purchase units vary from one company to another, making it impossible for Dan's supply system to manage these transactions.

Dan has unique purchasing and ordering schemes. Rather than ordering socks from its knitters, Dan requires the knitters to determine the amount of products to bring to the distribution centre –that is, to decide on their own, using information in the POS system. If products go unsold, the knitters must absorb the losses. Thus, Dan's high degree of risk aversion regarding inventories precludes it from taking advantage of potential opportunities for large sales. After conducting a risk analysis, management chose to emphasize inventory management at the expense of potentially losing large orders. Although this marketing strategy could be criticized for being overly conservative, the company believes that it is a safe one for an SME.

3. Overseas shops and international supply chain

Dan is one of only three Japanese sock makers with overseas retail outlets. The company established Dan Socks, United Kingdom, in London in 2001 and opened its first shop in March 2002. It also sells socks through department stores such as Harrods. Dan's overseas marketing strategy is different from those of other Japanese companies, which tend to rely on large trading firms for overseas sales. By contrast, Dan directly manages its overseas business. Prior to opening its London shop, it learned important skills from trading firms, including how to carry out tasks internally as much as possible and thereby reduce costs.

The London shops are connected with the company's home offices by the Internet-based POS system. The King Street shop has IBM computers, and the one on Neal Street has Dell computers. Both systems report data such as number of items sold, time of each sale and customers' gender and age, and can automatically calculate the value-added tax. All data are also transmitted to knitters via Dan's home offices. If additional socks are needed in London, knitters can deliver them to the distribution centre on 24 hours' notice. Once the customs declarations for export to the United Kingdom have been completed, the products are sent to Kansai International Airport. Although Dan tried to find suitable knitters in the United Kingdom, their quality did not meet the company's standards. Due to British regulations that prohibit importing assembled machinery from Japan and other differences between the two countries such as voltage and safety standards, Dan gave up on its attempts to establish its own factory there. Thus, Dan ships all its products from Japan. The software for the POS system in the London shops was designed by six employees. Dan prefers to hire locally rather than outsource, despite the large cost differential. Although the ability to outsource to foreign manufacturers –one of the commonly cited advantages afforded by IT– purportedly allows firms to increase efficiency, such outsourcing also requires a substantial investment. Hence, Dan has found it more economical to subcontract to local companies in Japan.

IV. Government IT policies vis-à-vis SMEs

A. IT POLICIES WITHIN JAPAN’S OVERALL DEVELOPMENT STRATEGY

e-Japan strategy

The e-Japan strategy approved in January 2001 recognizes IT promotion as the most urgent issue for the Japanese economy. Its goal is a society in which IT is used to create knowledge through the transformation of existing socio-economic systems and customs and the restructuring of interest groups. The aim of this strategy is to make Japan among the countries that make the best use of IT, through: (a) the establishment of ultra high-speed Internet networks; (b) the promotion of e-commerce; (c) the development of e-government; and (d) training in IT.

The e-Japan strategy initially set specific goals such as the establishment of affordably priced ultra-fast Internet connections (running at speeds from 30 to 100Mbps) within five years available to users at any time.

As the basic infrastructure for broadband neared completion, the government launched its e-Japan strategy II in 2003, which encourages further uses for IT in various areas of the economy and for general purposes. The goal of E-Japan II is to use IT to make life in Japan healthier, safer, more interesting and more convenient. It also seeks to encourage the intensive application of IT in the following seven areas: medical services, food, lifestyle, SMEs financing, education, employment and labor, and public service.

B. POLICIES TO SUPPORT SMES

1. Export promotion

With the advance of economic globalization, even SMEs can set up factories overseas and establish ties with foreign firms. Policies have been put forth to help SMEs take advantage of these opportunities. Most noteworthy are the following initiatives to promote exports: (a) overseas market-research projects; (b) overseas tradeshow projects; (c) overseas export-promotion missions; and (d) overseas coordination projects.

2. Trade Facilitation

The Japanese economy, once known as an export powerhouse, is designed to export more than it imports. However, numerous regulations are being relaxed to promote imports and make it easier for foreign firms to enter the Japanese market. This underscores the imperative for Japan to raise imports and bring its foreign trade into equilibrium. Deregulation includes reforms in the retail, telecommunications and medical-supplies markets. Recently there has been a strong effort to use IT to boost imports. The following are typical of the steps taken: (i) 24-hour active port services; (ii) using IT to automate customs-clearance systems; (iii) streamlining the import process; and (iv) introduction of high-tech inspection machines.

3. FDI promotion

Foreign Direct Investment (FDI) refers to investment by which companies or individuals obtain a controlling interest or participate in the management of companies in foreign countries. Japan has a long tradition of making FDI in other countries, but recently it has also had to attract FDI. The reason is clear: Japan has experienced long-term stagnation since the burst of the bubble economy, in part because factories and jobs have been leaving the country –in what is known as a “hallowing out of the economy”. To reverse this trend, foreign companies must be invited to Japan.

There are other reasons for encouraging FDI in Japan. Foreign companies would help transform the Japanese economy, putting it on surer footing and making it more competitive. The introduction of new managerial talent, technologies and systems by foreign companies should help Japan attain global standards. Higher FDI inflows could be expected to increase employment, raise tax revenues of both central and local governments and revitalize and globalize regional economies. Local as well as central governments have gone to great lengths to attract foreign companies by relaxing regulations, providing information, offering tax breaks and other direct incentives and providing foreign managers with suitable living conditions.

Successful examples of FDI can be found in regions such as Yokohama city, Kanagawa prefecture; Toyohashi city, Aichi prefecture; and Kumamoto prefecture.

The ratio of FDI inflows to GDP in 2000 in major countries was as follows: United States, 27.9%; United Kingdom, 31.9%; Germany, 22.6%; and Japan, 1.1%. Following up on its initial deregulations, the government established the Japan Investment Council (JIC) to promote FDI within the country through the implementation of policies, including further deregulation as well as the provision of increased information and incentives. Other incentives that the JIC intends to launch to attract foreign companies to Japan would provide tax cuts and other forms of subsidies as well as consulting services, promote mergers and acquisitions (M&As), ensure a stricter enforcement of competition policy rules, restructure the distribution sector, establish English schools, medical facilities and other conditions amenable to foreign managers and increase transparency in government procurement.

4. Business promotion

Since the mid-1990s, various measures have been implemented to revitalize industries and the economy through the creation of new businesses. These policies were inspired in similar small-business promotion measures the United States. The Law to Promote Creative Activities by SMEs, the Law of New Business Promotion and the Special Law on the Revitalization of Industrial Power are some examples. These laws typically introduced novel measures such as direct subsidies, tax exemptions and the promotion of business matching, in addition to more traditional ones such as loans and loan guaranties for SMEs. The common purpose of these measures is to encourage the creation of new businesses in various industrial sectors. Some examples are listed below. The followings are examples: (i) practical skills for start-ups; (ii) legal support for start-ups; (iii) financial support; (iv) tax exemptions; (v) supports for marketing; (vi) support for R&D; (vii) business incubation; and (viii) dispatching specialists to venture companies.

C. SPECIAL MEASURES TO NARROW THE DIGITAL DIVIDE BETWEEN COMPANIES

1. Human resources

SMEs have had to surmount their lack of human resources to introduce and operate IT. Various entities, such as central and local governments, government agencies and industrial associations, have experimented with seminars and training courses to educate management and employees on how to learn about and implement IT. However, since classroom knowledge and technological know-how cannot always be immediately applied in the workplace, IT specialists are also being sent to firms and factories, to teach hands-on IT skills. In addition to basic IT training, the following measures are required to help IT specialists assist SMEs and disseminate a high level of technological know-how: (i) standardization of IT skills; (ii) cultivation of IT coordinators; (iii) cultivation of IT associates; and (iv) and cultivation of specialists in IT security.

2. Technical issues

Two projects have been created to address technology-related issues that affect SMEs. The first of these is the project to strengthen strategic technologies, whose aim is to elevate the international competitiveness of SMEs by supporting basic and strategic technological development.

The second is the project to give strategic support to and encourage investment in IT, which is intended to train IT coordinators who are specialists in both technology and management. By resorting to such coordinators, SMEs can greatly increase their degree of IT innovation. This project includes the following activities: (i) information-sharing meetings of SME owners; (ii) training of SME owners; (iii) consultancy for business planning; (iv) consultancy for IT investment; and (v) meetings to present the results of IT utilization.

3. Financial aspects

A lack of capital is one of the main obstacles preventing SMEs from using IT. The precarious financial situation of most SMEs means that they cannot quickly adopt new technologies; thus, they are forced to postpone investments solely because of financial constraints. The many programmes to provide financial assistance to SMEs are grouped into two categories: low-interest loans to SMEs, and allowances for investment expenditures be deducted from taxes. The first type of programmes consists of financial assistance through public financial institutions; loan-guarantee programmes; SME-loan programmes; programmes to lease machines and equipment to SMEs; programmes to allow SMEs to adopt strategic information equipment for data processing and other uses; and lending programmes for IT investment through public financial institutions. The second category of programmes gives SMEs tax breaks on general and IT investments.

4. Infocentres

Most SMEs lag behind in IT primarily because they lack capital and human resources. To address this situation, central and local governments have established centres that provide SMEs with information, such as on the creation of new support systems, technological advances, training, etc. These centres also provide them with technology consulting. Some representative examples of these initiatives are the e-Small Business Agency and the Network Project; portal sites such as J-Net 21; and the Techno-Knowledge Network, which provides information on technological advances.

D. E-GOVERNMENT INITIATIVES VIS-À-VIS SMES AND TRADE PROMOTION

1. Overall strategy and structure of e-government

The successful introduction of e-government procedures is one of the core objectives of the e-Japan strategy. The basic aim of e-government is to achieve efficiency, simplicity, reliability and transparency in government services, as well as to make government more accessible to the public through the use of technology in the public sector and amendments to rules concerning government contracts. These objectives can be summarized as the provision of efficient, transparent, secure and citizen-oriented administrative services, and efficient and useful public works projects.

2. Some applications

The government has introduced web pages with information on, for example, taxes, social security, social insurance, job openings and export- and import- procedures. Some examples are listed below:

a. *E-procurement*

To promote the use of e-applications, all government offices have been asked to devise and establish information systems that simplify application requirements so as to reduce paperwork and speed up applications processing. Information on online applications should be made available through a variety of media, including homepages, brochures, etc. Job candidates are also encouraged submit their applications online.

b. *Customs and other trade-related procedures*

Regarding customs, a preliminary Inspection System and an Instant Approval System have been introduced. Under the Preliminary Inspection System, before imports arrive in the country or before exports are taken to a bonded area, required documents can be submitted to the authorities for approval. The Instant Approval System allows goods approved through this procedure to be cleared as soon as they arrive, with no need for inspection. IT has been used to establish customs clearance systems such as the “24-hour open port”. Other examples include the Customs Procedure Execution System (CuPES), which accepts applications submitted electronically; NACCS; and the Port Electronic Data Interchange (EDI) System. The interconnection of these systems allows one-stop customs clearance.

c. *E-finance and e-payment*

Before putting the electronic tax system online, the National Tax Agency conducted trials with the electronic filing of individual and corporate returns, starting in November 2000. By June 2004, the system had been fully implemented. The trials thoroughly examined issues such as security, transparency and compatibility with existing software, and an analysis of how existing tax procedures would be adapted to the new system was conducted.

Development is underway of tax- and fee-payment systems utilizing the current Multipayment Network (MPN) to connect financial institutions with governmental agencies via leased circuits. Under this system, firms will request a password electronically and then pay taxes and fees by electronic transfers to a bank, which will use the MPN to forward the payment to the proper agency.

E. INSTITUTIONAL ISSUES

1. Standardization

EDI

In response to firms’ increasing need to exchange data, the Electronic Commerce Promotion Centre of the Japan Information Processing Development Corporation (JIPDEC) has begun introducing and managing standardized industry-wide codes. The standardized code system is composed of a six-digit company identification code plus a maximum of six more digits. Approximately 18,000 companies were registered as of February 2004. The spread of the Internet has led to increased use of online EDI.

Cryptography

Japan has not adopted standards for EDI cryptography. The Secure Sockets Layer (SSL) protocol, which enciphers certificates sent from one firm to another and which has been included in web browsers and web server products, has been used widely in Japan to guarantee security in communications.

In February 2003, the Cryptography Research and Evaluation Committees (CRYPTRECs), established by the Ministry of Internal Affairs and Communication (MIC) and the METI, recommended a list of encryption methods for e-government, which all ministries have since agreed

to use for making purchases. This list includes the United States government’s Triple-DES standard (a data encryption method that uses three keys instead of two), and the Advanced Encryption Standard (AES), which was adopted by the United States government as its next-generation standard.

2. Public key-enabled security services

Public key infrastructure

Public key infrastructure (PKI) is an authentication system that uses digital signatures to ensure smooth electronic transactions among economic agents. In April 2001, the Diet passed the Digital Signature and Authentication Law, giving documents with digital signatures the same legal status as those with handwritten signatures or official seals. In addition, to increase certainty regarding electronic authentication, as of June 2004 the government had authorized 21 authentication firms that satisfied government standards for equipment and facilities and personal identification methods.

Government public key infrastructure

Until now, companies or individuals sending applications to administrative offices, or government offices sending notices to private parties, have been required to affix signatures and/or seals to such documents. When such documents are sent over the Internet, a method is required to authenticate that the documents were issued by the companies and persons in question and to rule out falsification. To meet this need, a government public key infrastructure (GPKI) is being constructed. GPKI consists of a bridge certificate authority (BCA) registered with the MIC and with each ministry’s certificate authority (CA).

3. Intellectual property rights

In June 2002, an overarching strategy was devised to ensure that intellectual property rights are respected in Japan. The objective of this strategy is to revitalize Japanese industry by giving priority to digital content such as that contained in technologies, designs, brands, music and movies. Although Japan has a long tradition of manufacturing, the creation of intangible assets based on intellectual property rights should be emphasized in order to strengthen these industries. In line with this overall strategy, the Fundamental Law on the Intellectual Property Rights Strategy was passed in November 2002 and took effect in March 2003. It amended the Patent Law, Copyright Law, Anti-Trust Law and other laws.

V. Regional networks

A. EXISTING REGIONAL NETWORKS

For SMEs to expand, they must collaborate more closely with other regional firms, local governments and what are known in Japan as “national productivity organizations” (NPOs). In the age of the information society, taking advantage of such networks requires having access to the Internet. This section discusses nationwide activities intended to support regional SME networks. It first presents examples of the Ministry of Economy, Trade and Industry’s (METI) Small and Medium Enterprise Agency and of the IT Coordinators Association, the largest NPO in Japan, and then of networks of regional firms, local governments and NPOs. Finally, it discusses collaboration between industry, government and academia.

1. Nationwide networks

1.1. Government

METI's Small and Medium Enterprise Agency has taken various steps to support SMEs. This section discusses some activities related to regional networks.

Research and Development Consortium Project for Regional Revitalization

This project promotes R&D and marketing and distribution and the creation of new high-tech businesses as the foundation for regional industries, in order to encourage the establishment of networks of regional firms, governments and academic institutions.

Local Industry Revitalization Project

To revitalize local industry, this project subsidizes the development and marketing of new products, as well as human resources development.

R&D Assistance for the Creation of New Local Businesses

This project supports R&D activities aimed at exploring the possibility of entering new lines of business and creating new companies; such activities are undertaken by SMEs and venture companies that are essential to rekindle regional economies.

Regional Industrial Agglomeration Project

The regions considered "SME clusters" include the "castle towns" of large firms as well as industrial and technological clusters of general and specialized parts makers that supply Japanese manufacturers. SMEs in these regions are eligible for assistance such as low-interest loans, tax breaks and direct subsidies to allow them to conduct R&D on new products and to explore new marketing channels.

Government-sponsored search engines to support SMEs

One notable example of the many websites that support SMEs is J-Net21 (<http://j-net21.smrj.go.jp>); which provides a wide array of general information useful to SMEs.

1.2. IT Coordinator Associations

Although the construction of regional networks and websites requires technology, IT vendors are often unfamiliar with clients' managerial processes. Moreover, SMEs are often unfamiliar with relevant technologies and systems. The combination of these factors can lead SMEs to make misguided investments. Hence, there is a need for professionals with sufficient knowledge of and experience with both clients and IT vendors to help SME management make decisions related to IT investments. These professionals are referred to as "IT Coordinators", a title approved by the IT Coordinator Association, an NPO. METI collaborates with IT coordinators in the following ways: by helping SMEs apply for low-interest loans from IT coordinators who belong to government financial institutions; by hiring IT coordinators for seminars and other training activities; and by hiring IT coordinators to provide consultancy to SMEs in accordance with arrangements made by regional SME support centres.

2. Regional networks

2.1. Local government

Matching sites

One example of local government initiatives are websites created to bring sellers and purchasers together. Numerous local governments, related organizations and chambers of commerce have built websites to put SMEs in their regions in contact with buyers throughout Japan or even

abroad. Some illustrative examples are the Tokyo Metropolitan SME Promotion Corporation, the Mie Industry Supporting Centre (a system which is known as “Trade Matching Information”), the Siga Industry Support Plaza, the Kyoto Industry 21 Foundation (BP Net), the Hyogo SME Valorization Centre (Hyogo Trade Matching System), the Hiroshima Industrial Promotion Organization, the Ehime Industry Promotion Foundation (known as the “Ehime Firm Search System”), the Ohita Industrial Creation Organization and the Miyazaki Industrial Support Foundation (which is referred to as “i-matching”).

Case 1: Shoudan Jouzu

The Shoudan Jouzu (“Better Matching”) website is sponsored by iMedia, an Osaka-based organization established in October 2001. The purpose of the site is to match buyers and sellers of IT products so as to promote IT venture businesses. Approximately 3,500 SMEs have registered with this system. SMEs are automatically furnished with information on business transactions that potentially meet their needs. Buyers can receive quick replies to their purchase orders. The web page of each registered SME gives a history of its past matches and the relevant prices, which helps ensure the reliability of participating SMEs. Information is transmitted over the Internet in real time, which speeds up searches for matches. To make the site more useful, success stories of participating SMEs are posted, SMEs not familiar with computers and the Internet are given assistance with registration and free IT consultancy is offered.

Support for online shops

Many SMEs lack the expertise to build online stores or find it difficult to make their online stores profitable. Hence, various local governments and chambers of commerce teach them how to design home pages and manage online stores.

A case in point is the e-Merchant School, established in 2000 by the Kohchi Industry Promotion Centre. This school teaches SMEs how to raise sales and respond to client needs when initially operating an online store. It also teaches firms to promote sales by targeting potential customers in Japan through e-mail and e-zines. Online stores typically set monthly sales targets of about ¥ 1 million.

2.2. Firms

Group management of sales

In several regions, SMEs have formed groups and pooled their efforts in order to raise sales. This allows a member firm to make more sales than it could on its own. Moreover, by working with other group members and taking advantage of their specialized skills, an SME can comply with a clients’ request for complex samples and eventually fill orders for such products. Higashiosaka, one of the densest SME clusters in Japan, has the following groups: Soko, Yarimasse Higashiosaka, Rodan 21, Atumaro Group-FOMY, HIT and Soyumu.

Case 2: Kyoto Shisaku Net

Kyoto Shisaku Net (Kyoto Prototype Network), established in 2001, is a virtual group of ten Kyoto-based SMEs in the machine processing and metal sector. The group has built a B2B network and specializes in producing prototypes. By using the Internet, they have greatly reduced the time needed to comply with customer requests. In addition, this now allows customers to accept prototypes in the R&D stage.

Formation of SME supply chains

SMEs located in a single distribution network can form a supply chain so as to collaborate with each other and raise efficiency, thereby reducing inventories, rationalizing distribution and shortening lead times. Although it is generally large firms that take the initiative in the formation of supply chains, in the case described below the supply chain was formed by the SMEs themselves.

Case 3: Kagoshima Construction Market

The Kagoshima Construction Market has such a network. Established in 1998, it is composed of SMEs in the construction industry. The objective of the network is to put SMEs in this industry on surer financial footing and improve local economies. In addition, SMEs in this network have formed an independent IT-based network, which handles tasks related to design, construction, purchases and distribution for the construction of high quality houses.

This group of SMEs is using IT to bring down the cost of building traditional wooden houses. Such houses require complex, costly processes and the intervention of numerous firms and craftsmen, such as carpenters. The virtual network is attempting to restructure the tasks carried out by firms and craftsmen and establish a distribution supply chain. In general, the network operates as follows:

(a) The joint operation of CAD/CAM centres allows member firms to outsource tasks such as estimate formulation, cost management, material purchases and construction management, leaving them free to concentrate on their own area of expertise.

(b) By utilizing CAD, firms can quickly determine quantities and costs and submit them to customers.

(c) All needed materials for the different processes are promptly determined and ordered through the CAD centre, which delivers them to the right location at the right time (in much the same manner as Toyota's just-in-time system).

(d) In addition, customers and firms can use web cameras to monitor construction work from remote locations. Construction-related records are posted on member firms' websites, which enhances their reputation for trustworthiness.

2.3. National productivity organizations

NPOs have been established in various industries for varying purposes, including: to support ventures and start-ups; evaluate technologies and projects; introduce “angles” to invest in business ventures; and to evaluate and promote the distribution of intellectual property rights. NPOs cooperate among themselves and with related agencies and companies.

Case 4: Veteran no kai

One example of an NPO is Veteran No Kai (“veterans group”), established in 2001 to support SMEs. Its members are highly experienced, retired business people who provide consultancy and give seminars to, and exchange information with, venture businesses. Their exchanges with SMEs are often conducted over the Internet, using such media as e-mail and electronic blackboards.

A venture business seeking support will give a presentation at a group meeting. This allows information to be exchanged and public relations work to be done for promising business plans. Planning, development and management of local portals, knowledge management and e-commerce are generally the topics that most interest group members seeking consultancy services.

2.4. Cooperation among industry, government and academia

Listed below are some examples of networks that comprise all three organizations in a single region:

Iwate Network System (INS)

This is a network to allow people working in industry, government and academia to share knowledge about R&D in science and technology. The objective of Iwate Network System's (INS) is to promote science, technology and industry in Iwate Prefecture. Since 1987, it has been broadening the scope of its activities, and it now has 1,036 members, of which 540 are from industry, 293 from government and 203 from academia. It focuses on organizing research groups in the

fields of materials science, aerospace, electronics and multimedia, so as to promote new discoveries in these fields. There are now 36 such groups, and their core members are researchers at Iwate University. The groups also hold joint seminars twice a year for specialists from various fields and the general public to exchange information. The network has worked with Iwate University's Technology Licensing Office and the prefectural government's Industry Promotion Centre.

Exchanges between Tokyo Electronic University and industries in Saitama

Tokyo Electronic University's Faculty of Science and Technology is located in the city of Hatoyama, in Saitama prefecture. In 1990, it began an exchange project with the Saitama Industrial Club, which is made up of SMEs in the region. The project now teaches 150 seminars and holds monthly meetings. It also arranges joint research projects, coordinates business contracts among member companies from the region and disseminates information. Eight universities that have engineering faculties in Saitama maintain a liaison office at the Saitama Prefectural Industrial Technology Centre and support SMEs in the region.

B. NETWORKS UNDER DEVELOPMENT

This section discusses initiatives by the central government (mainly the METI), local governments and industry to stimulate regions and regional networks.

1. Government

METI's Small and Medium Enterprise Agency has initiated a cooperation programme to network SMEs with particularly useful or specialized technologies. Its objective is to support what is known as "soft and flexible collaboration", through which SMEs with special resources such as advanced technology, business expertise or intellectual propriety rights support each other by sharing these resources to create new products, open new lines of business and establish new marketing channels. The agency expects the project to create specific and high value-added products for SMEs, provide products to consumers by streamlining production and distribution processes and open up new markets. One example of the potential creation of new markets is the Micro Module Factory project proposed by Kyoto Shisaku Net (discussed in the preceding section). In Kyoto, venture businesses have converted houses into factories. Companies that belong to this network plan to produce equipment suited for these small factories. This would include the designing and manufacture of small, inexpensive processing machines and measuring instruments.

2. Local governments

Ease of use has rendered matching sites more powerful. For example, Virtual PIO, established in Ohta ward by the Tokyo city government, supports business matching. It is operated by the Ohta Industry Promotion Association, which has used software efficiently and economically for purposes such as conducting commercial negotiations, issuing orders and preparing estimates online. Electronic commercial negotiations are conducted primarily through the remote operation of Windows applications installed on a member company's host computer. Using a program named IP Collaboration, SMEs can access matching sites easily and securely.

3. Cooperation among industry, government and academia

Inspired by the success of Iwate's INS, the Kansai region has created a similar system, the Kansai Network System (KNS). A network of individuals who want to promote economic development in Kansai, KNS has sponsored activities such as online meetings of its members.

Following the enactment of the Law of Promotion of Technology Transfer from Universities (TLO), exchange and cooperation between universities and local firms has increased. In 2001, clustering became the core concept of these projects, as METI initiated the Industrial Cluster Project

while the Ministry of Education, Science and Technology launched the Intellectual Cluster Creation Project. These projects seek to promote cooperation between industry and academia. For example, 6,767 joint research projects were carried out between firms and national universities in 2002. (The figure was 9,255 if all universities are included.) The total cost of the projects was ¥ 21.6 billion. Nearly 800 venture businesses originated at universities in 2003. These figures are expected to increase in coming years.

C. POSSIBILITY OF INTERREGIONAL LINKAGES

To allow SMEs to find new business opportunities, their marketing activities should extend throughout Japan, rather than focusing solely on their local region. Some examples of how this might be done are given below.

1. National matching sites

Users of these sites can search for information about SMEs throughout Japan. Some examples in this category are the Small and Medium Enterprise Trade Network System (SMET), operated by the Ohta Industry Promotion Association; the Osaka Chamber of Commerce's "Business Mall"; and J-Net 21 (discussed above). SMET has more than 30,000 registered SMEs from industrial clusters all over Japan, including Kawaguchi, in Saitama prefecture, and Higashi-Osaka and Yao, in Osaka prefecture. Searches for registered SMEs can be conducted from anywhere in Japan.

2. Supply chain management

To meet the challenges of this age of rapid innovation, SMEs need to adopt SCM techniques and thereby break down the traditional structures of industrial groups. It is also important that they share the knowledge that they gain from successful websites with SMEs throughout the country.

An example is the Kagoshima Construction Market (discussed above), which comprises construction companies, architectural design offices and realtors related to the home construction sector. The original networks of this kind that existed in several regions eventually expanded, interconnecting 17 regional networks in, for example, Tokyo, Osaka and Kagoshima. Interregional SME networks are expected to play a larger role in various industries in the future.

VI. Final remarks

This paper has focused on present IT use by SMEs in Japan, through mail surveys and in-depth interviews in two of the country's largest SME clusters, Higashi-Osaka and Ohta ward. An attempt has been made to highlight the similarities and differences between the two clusters. This has made it possible to shed light on various facts and to provide insights not apparent from the secondary data published in various other reports.

Obstacles to IT use

This paper has also attempted to elucidate the real obstacles to IT use. Various publications have pointed to many, sometimes contradictory, issues. A survey was conducted by mail and through interviews to pinpoint factors that encourage the use of new technologies. The results of these surveys indicate that, although most SMEs recognize the need for IT and say they intend to use it more, their actual adoption of these technologies is less than optimal. Their reluctance to invest in IT stems primarily from a lack of qualified personnel and funds and from insufficient government efforts. The analysis given above weighs the importance of these various factors.

IT leadership

Since IT use is a function of a business's management and strategy, the decisions made by senior managers are crucial. Even if SMEs operated under optimal conditions –if they had IT specialists, sufficient money and government support– they would not be able to use new technologies to their advantage without correct decisions by their managers. The empirical study identified the following types of management outlooks that affect IT use: an orientation to expanding, to adapting, to using data and to providing incentives. Similar conclusions were reached by Tsuji and Choe (2004), who also tried to identify factors that encourage regional information policies, in the framework of an analysis of the demand for and supply of such policies. Using the same empirical methodology as the present study, these authors concluded that leadership shown by top local government officials is more crucial than the availability of funding.

The current study has sought to understand how top management determines what information technologies are to be used, and what kind of decision-making leads to greater IT use. In the interviews, informants often said that IT is “just a tool”, by which they meant that it is useful only for promoting internal efficiency or productivity in routine tasks. In contrast, the author believes that its prime function is to create entirely new business models. Ideally, IT completely transforms businesses, and the economy itself, through Schumpeterian creative destruction. As emphasized in Chapter V, most SMEs that successfully use IT create new business models based on that more intensive use of technology.

Traditional business practices

Japan's traditional business practices, most of which predate the information age, are another obstacle to the adoption of new technologies. Many of these practices have been held out by foreign governments as proof of Japan's closed economy. As mentioned in the discussion on Ohta ward, these practices constitute restrictions that prevent optimal IT use. IT can be used to bypass traditional distribution networks and to allow consumers and producers to contact each other directly or to allow retailers to purchase directly from producers and thereby cut costs. However, since this practice usually runs against tradition, wholesalers sometimes pressure producers not to sell to retailers that deal directly with producers. These impediments do not show up in research based on quantitative methods.

Costs of IT investment

Many respondents pointed to the high cost of IT investments. This indicates that they do not fully understand the long-term benefits of such investments and focus more on present costs than on future increases in profits. Still, it is true that IT investment is expensive in Japan. One reason is that software providers often buy foreign software and adapt it to local needs, which entails high customization costs. In addition, large companies have their own in-house software which they ask SMEs to use. The high costs of purchasing and customizing various software packages make SMEs reluctant to invest heavily in IT.

Considerations for Japanese IT policy

Like previous research projects, this one underscores the importance of policies to promote IT use by SMEs. Large sums of tax revenues have been spent on such promotional policies. As noted in Japan's official SME policy guideline, the government has deviated from the course it charted several years ago. Rather than supporting all SMEs indistinctly, it now focuses on those that intend to expand by dint of their own efforts. Not all IT-promotion policies have proven effective, although these policies still enjoy strong support. SMEs most frequently request support through education, such as seminars and on-hands training, although they often fail to understand the limits of such efforts. While most IT training in Japan focuses on techniques for using computers, building homepages and taking advantage of other web-related materials, SMEs stand to benefit more from learning to base business models on IT as well as from solutions tailored to their individual needs. Training of senior managers is also paramount, as noted above. Policies should target, and limited resources should focus on, firms that have proven themselves to be effective IT

users. Government's primary objective should be to create new firms and foster infant industries. For example, consultations on business restructuring should be stressed.

One respondent stated that a government IT policy is unnecessary. In a certain way, this is an insightful comment, since market competition is normally the most efficient mechanism for spreading new technologies. In Japan's economic system, however, this does not hold true, and SMEs continue to request government assistance. Japan's post-war success stems from the harmonious interaction of the public and private sectors, with government playing the role of providing funding and information, especially information for the coordination of a diverse array of private entities. This is one of the pillars of Japan's industrial policy. With regard to technology, the central government's most useful contribution is to coordinate such diverse local players as local governments, economic-promotion agencies, NPOs and private companies, and to encourage them to create and promote new ventures. Specifically, the central government can publicize and provide information on start-ups that have successfully used IT. As noted in Chapter V, there are many cases of successful business models built around IT. One reason SMEs are reluctant to invest in technology is that they place a premium on short-term, tangible results. Hence, giving them examples of success stories would surely serve as an incentive.

Toward successful IT use by SMEs

As stressed above, the Japanese economy has undergone a transformation from a tradition-based system to a more modern one. Traditional structures such as the employment system, industry, banking and the SME sector are in transition. It is difficult to say what an ideal economic system for Japan would look like, but at the very least, it would be more competitive, more market-oriented, more open and more attuned to a globalized world. These characteristics are exactly what IT offers the Japanese economy. In this sense, the spread of IT is creating a new Japanese economic system. SMEs able to grasp the essence of IT and create new business models have been started up all over Japan. With sound policies, their numbers will increase and they will become stronger. And SMEs that take advantage of such policies will thrive in the new information age.

References

- Berg, S., M. Pollitt and M. Tsuji (eds.) (2002), *Private Initiatives in Infrastructure: Priorities, Incentives, and Performance*, London, Edward Elgar.
- Giovannetti, E., M. Kagami and M. Tsuji (eds.) (2003), *The Internet Revolution: A Global Perspective*, Cambridge, Cambridge University Press.
- Japan Small and Medium Enterprise Management Consultants Association (2003), *Report of Research on SCM Business Models for SMEs* (in Japanese), Tokyo.
- Kagami, M. and M. Tsuji (2003), *Industrial Agglomeration: Facts and Lessons for Developing Countries*, Chiba, Japan, Institute of Development Economies (IDE).
- _____ (eds.) (2000), *Privatization, Deregulation and Economic Efficiency*, London, Edward Elgar.
- Kuchiki, M. and M. Tsuji (eds.) (2004), *Industrial Clusters in Asia: Competition and Coordination*, Institute of Development Economies (IDE).
- Kuroda, M. (ed.) (2004), *Supply Chain Management*, Tokyo, Asakura Shoten.
- Small and Medium Enterprise Agency (2004), “Project II for Promotion of IT Use by SMEs” (in Japanese), Tokyo, Ministry of Economy, Trade and Industry (METI).
- _____ (2001, 2002, 2003, 2004), “White paper on small and medium enterprises in Japan” (in Japanese), Tokyo, Ministry of Economy, Trade and Industry (METI).
- Tsuji, M. and I. Choe (2004), “An Ordered Probit Analysis of Factors Promoting a Regional Information Policy: The Case of Japanese Local Governments”, *Mathematics and Computers in Simulations*, vol. 64, No. 1, January.

REPUBLIC OF KOREA

Yoo Soo Hong

I. Introduction

One of the core components of the knowledge-based economy is the role of information technology (IT) as a facilitator of production, dissemination and utilization of knowledge. In this context, many economies have been promoting IT development as a priority national strategy. However, in addition to the international digital divide between developed and developing economies, there continue to be many types of digital divides within given economies. The digital divide between small- and medium-sized enterprises (SMEs) and large firms is one example of this. Even among SMEs, digital divides exist.

Within Asia, the Republic of Korea (hereafter Korea) has been hailed as a successful model economy in IT development. This does not mean, however, that Korean firms are exempt from the digital divides found elsewhere. The Korean government has been working assiduously to improve the environment and infrastructure so that SMEs can use IT more actively and effectively in their businesses. The Korean government has been successful in some of its policies and measures in this area, but the overall success of such efforts has not measured up to the resources the government has devoted to the task.

The purpose of this study is to review and analyze the use of IT by Korean SMEs, in order to identify what factors facilitate or hinder their attempts to digitize, thus providing guidance for the formulation of government policies and assisting the private sector's efforts in this area.

II. Present status of IT market and IT usage by SMEs

A. IT INDUSTRY AND MARKETS IN KOREA

Status of the Korean IT Industry

Korea's IT industry witnessed impressive growth in the 1990s. Production doubled from 88 trillion won in 1998 to 209 trillion won in 2003. The value added of the IT industry rose 30.4% in 1999 and 26.3% in 2000. The growth rate of the value added for the IT industry was only 3.2% in 2001 due to the economic downturn, but the pace picked up again in 2002 to approximately 25.9%. The IT industry has accounted for increasingly higher shares of GDP, rising from 8.6% in 1997 to 15.6% in 2003. The Korean IT industry has managed to overcome the limitations of the domestic market by finding growth opportunities in overseas markets. Approximately 40% of IT production is exported overseas. The total export volume of the IT industry was US\$ 57.8 billion in 2003, or roughly 30% of Korea's total exports for the year, indicating that IT has become one of the major growth engines for the Korean economy.

When examining the contribution of IT by analyzing growth factors according to production element, the industry's contribution to economic growth is found to have risen steadily from 6.2% in the late 1980s to 11.4% and 23.4% in the early and late 1990s, respectively. Moreover, despite the serious impact of the financial crisis in 1997, IT investment and IT industry productivity showed robust growth in the late 1990s, far surpassing the levels seen in the first half of the decade (see table 1).

TABLE 1
GROWTH IN IT INDUSTRY PRODUCTION AND ITS SHARE OF GDP
(1997-2003)

	1997	1998	1999	2000	2001	2002	2003
Production (trillion won)	76	88	115	145	150	189.1	208.8
Share of GDP (%)	8.6	9.3	11.2	13.1	12.9	14.9	15.6
Contribution to growth (%)	37.6	-23.8	32.8	46.8	44.3	30.4	41.5

Source: Korea Information Strategy and Development Institute (KISDI), 2003; National Computerization Agency, 2004.

This circumstance was made possible by the optimal combination of domestic-market expansion and increases in global IT demand. The domestic market expanded as a result of the rapid adoption of mobile communications services, high penetration of Internet access, and the proliferation of dot-com companies. Government policies further stimulated the advancement of the IT industry. Demand for IT was driven by deployment of high-speed information communication networks and public policies for wider access to information and the Internet. The introduction of competition into the communications services market encouraged more private investment in IT, lower prices, and improved quality, thus promoting expansion of the market.

IT-industry exports in Korea increased from US\$ 9.2 billion in 1990 to US\$ 38.5 billion in 2001. At the same time, imports increased from US\$ 7.5 billion in 1990 to US\$ 27.3 billion in 2001, recording a continuing surplus in the sector's trade balance. The IT industry's trade balance surplus has grown rapidly, especially after the economic lethargy of 1997, to US\$ 11.2 billion in 2001 from US\$ 9.4 billion in 1997. Major export items of the Korean IT industry include memory semiconductors, mobile telephones, monitors, liquid crystal displays (LCDs), personal computers (PCs) and satellite broadcast receivers, while major import items include non-memory semiconductors, transmission equipment and large computers. Since IT exports far exceeded imports, Korea has maintained a trade surplus in the sector.

Level of Informatization

The trends in, and level of, informatization (i.e. the use of information technology and services) in Korea can be appreciated by looking at the indicators summarized in table 2.

TABLE 2
INFORMATIZATION STATUS IN KOREA

Classification	1998	1999	2000	2001	2002	2003
Broadband Internet subscribers (1,000 households)	14	374	4,010	7,810	10,400	11,180
Internet users (1,000 people)	3,100	10,860	19,040	24,380	26,270	29,220
Internet usage rate (%)	-	22.4	44.7	56.6	59.4	65.5
Number of PCs (1,000 sets)	8,270	11,530	18,615	22,495	23,502	26,741
PC Penetration rate for total population (%)	-	24.7	39.6	47.5	49.3	55.8
Mobile phone subscribers (1,000 people)	-	23,443	26,816	29,046	32,342	33,592
Mobile phone subscribers per 100 inhabitants	-	50.29	57.05	61.35	67.89	70.09
<i>E-Com-merce</i>						
Transaction volume (billion won)	-	-	57,558	118,980	177,810	235,025
Rate (%)	-	-	4.5	9.1	12.8	16.5
Internet banking users (1,000 people)	-	1,230	4,090	11,310	17,710	22,754
Electronic signature users (1,000 people)	-	-	52	1,918	5,772	8,713
IT export (% to total exports)	-	27.8	29.7	25.6	28.5	29.5

Source: National Computerization Agency (NCA), 2004, *Informatization White Paper 2004*.

The number of PCs in use in 2003 was 26.7 million sets, and the penetration rate was 55.8%, representing a doubling during the past five years.

Since the first commercial service in 1994, the total number of Internet users in Korea has rapidly increased. As of 2003, 29.22 million people, or 65.5% of the population, were using the Internet. By June 2002, 40.7% of all businesses in Korea that employed more than five workers had a corporate network infrastructure. Seventy-one-point-one percent of all businesses had available Internet services within their vicinity.

As of December 2002, a mere four years after broadband Internet services were first introduced in Korea, approximately 1.06 million households had broadband access. Korea has the highest broadband penetration rate in the world. The number of broadband Internet subscribers was 11.2 million households and the household penetration rate was 73.1% in 2003. Ninety-eight percent of all towns and villages in Korea have access to broadband services.

Among the 314,000 firms in Korea, 62.7% used asymmetric digital subscriber line (ADSL)-based services to access the Internet as of July 2002, while 21.9% used leased lines. Larger firms tended to use leased lines and, overall, more firms are logging onto the Internet. Sixty-eight-point-one percent of all firms that have Internet access use services with average Internet connection speeds of more than 2 Mbps.

Among industrial sectors, the financial industry, with an 86.3% rate of installed network infrastructure, ranked first. Heavy industry's installation rate was 40.6%, the second highest. The agriculture sector had the lowest rate of 26.6%. Larger firms tend to install network infrastructure more than smaller firms. Firms with more than 1,000 employees showed an installation rate of approximately 99%, whereas firms with less than 10 employees registered 27%.

Companies having homepages, by industrial sector, is summarized in table 3. The heavy industry, chemical industry and financial sectors show high rates. The rate of homepages increases as the size of the firm increases.

TABLE 3
RATE OF COMPANIES WITH HOMEPAGES BY INDUSTRY (2003)
(percent)

	Ratio of companies with homepages	Ratio of companies in the networks of holding companies
Agricultural	19.7	11.7
Light industry	25.5	4.6
Heavy industry	34.0	4.2
Chemical industry	38.4	6.0
Construction	15.3	1.9
Distribution	19.5	14.0
Finance	30.6	53.6
Other Services	37.2	19.0

Source: NCA, 2003, *Survey on Informatization Statistics 2003*.

Korea's mobile communications services are represented by mobile phone services including personal communication services (PCS), cellular phone services (representing 98.7% of all mobile communications services), telecommunication relay service (TRS), wireless data communications and paging services. As of June 2004, the number of mobile phone subscribers was 36.24 million people or 75.2% of the population. The number of mobile Internet subscribers was 34.53 million people.

The size of Korea's mobile Internet market increased from 587.4 billion won in 2001 to 1.2 trillion won in 2002 and 2.1 trillion won in 2003. In 2003, this revenue represented 13.4% of total mobile communications service revenue. This explosive growth is due to continuous development of a variety of mobile content, as the network evolves to CDMA 2000-1x EV-DO.¹

B. E-BUSINESS

E-commerce

Table 4 shows the rate of e-commerce by industry, in descending order, indicating services, including communications, with high rates. According to table 5, larger firms, with more than 300 employees, utilize e-commerce much more than SMEs with less than 300 employees.

¹ CDMA: Code Division Multiple Access.
EV-DO: Evolution Data Only.

TABLE 4
IMPLEMENTATION RATE OF E-COMMERCE BY INDUSTRIAL SECTOR

Industry	Rate (%)
Communications	64.7
Education services	62.9
Electricity, gas & water supply	62.9
Public administration	62.5
Construction	42.0
Health & social work	31.3
Public repair & personal services	21.2
Wholesales & retail	18.0
Recreation, culture, & sports services	12.1
Business services	12.1
Hotels & restaurants	10.4
Real estate & leasing	9.8
Transportation	7.6
Manufacturing	6.9

Source: Korea Institute for Electronic Commerce, 2004, *e-Business White Paper 2004*.

TABLE 5
IMPLEMENTATION RATE OF E-COMMERCE BY NUMBER OF EMPLOYEES
(Unit: %)

System	Number of companies	Implement- ation of e-commerce	System		Network	
			Constructed by the company	Constructed by others	Open model	Closed model
Total	2,044	20.8	6.3	15.0	18.6	2.9
More than 300 employees	159	29.8	13.5	17.2	25.4	7.2
Under 300 employees	1,585	18.1	4.2	14.4	16.7	1.7

Source: Korea Institute for Electronic commerce, 2004, *e-Business White Paper 2004*.

The e-commerce market in Korea grew rapidly, reaching 50 trillion won in the first half of 2001. According to an OECD survey in 2001, 15% of Korean consumers are online buyers. The level of IT usage among SMEs in Korea, which represent 99.2% of companies in the country, is considered quite low. According to a report from Korea's National Computerization Agency (NCA) in 2001, the ratio of e-commerce to the total transactions of SMEs is approximately 10%, and the level of informatization among SMEs is also very low.

Korea's total e-commerce volume in 2003 was 235.025 trillion won, an increase of 57.215 trillion won, or 32.2%, over the previous year. In relation to national transaction volumes, e-commerce volume increased to 16.5% from 12.8% in 2002, indicating that e-commerce is expanding rapidly.

Business-to-business e-commerce (B2B) dominates, in terms of transaction amount, with 87.6% of the total in 2002 and 88.0% in 2003 (See table 6). In the case of SMEs, B2B dominates, as shown in table 7.

TABLE 6
E-COMMERCE BY TRANSACTION PARTNER
(Unit: billion won)

	2002		2003		Change over the previous year	Rate of Change (%)
	Volume	Composition (%)	Volume	Composition (%)		
Total	177,810	100.0	235,025	100.0	57,215	32.2
B2B	155,707	87.6	206,854	88.0	51,147	32.8
B2G	16,632	9.4	21,634	9.2	5,002	30.1
B2C	5,043	2.8	6,095	2.6	1,052	20.9
Others	427	0.2	442	0.2	15	3.5

Source: National Statistical Office, 2004, *Survey Reports on e-Commerce Statistics*.

TABLE 7
E-COMMERCE OF SMES (MANUFACTURING ONLY)

	Weighted number of companies using (%)	E-commerce sales (100 million won)				Percentage of total sales (%)
		Total	B2B	B2C	G2B	
2002	3.5	30,922	52.3	31.3	15.9	1.25
2003	4.0	37,535	59.3	25.9	14.8	1.40

Source: Small and Medium Business Administration (SMBA) and Korea Federation of Small and Medium Business (KFSMB), 2004, *Survey on Current State of SMEs 2003*.

The B2B volume for 2003 was 206.854 trillion won, a 32.8% increase over the previous year. Customer-led e-commerce was 150.688 trillion, 72.8% of all B2B transaction, a 33.1% increase over the previous year. Seller-led e-commerce was 48.766 trillion, representing an increase of 33.6%. Of this, cooperative transactions constituted 42.487 trillion, or 87.1% of all seller-led transactions. Broker-involved transactions amounted to 7.4 trillion won, a small proportion, at 3.6%, but steadily increasing. As shown by the statistics, customer-led transactions dominate the B2B market, but seller-led transactions are increasing. This indicates that the market-oriented transactions, such as e-market place, are steadily replacing transactions through the existing purchase line. There were 260 e-market sites, of which international trade-related sites numbered 37, followed by electronics at 32, machinery and industrial material at 31, and MRO (maintenance, repair, operation) at 24. Total volume was 7.4 trillion won, with MROs accounting for the greatest portion, with 2.182 trillion won.

The Korean B2C market grew at an astounding rate in 2002. In the 4th quarter of 2002, revenues in the B2C market reached 1.4 trillion won, a 75% increase compared to the previous year. The B2C market in 2002 had a 4% market share of the 122 trillion-won consumer retail market. The high growth rate of the B2C market and its increasing market share in the retail business give a major impact on the retail market.

The most popular category in B2C transactions was accessories (shoes, bags, wallets, purses, etc). Following, in second place, was music, and then books, clothes, home appliances and PC hardware, in that order. In terms of revenue, home appliances and PC hardware were the top categories in the B2C category. General e-retailers that sell a wide selection of products have taken market share away from small specialty e-retailers. These trends have emerged after revenues at leading general e-retailers posted a substantial increase while many specialty e-retailers expanded their product offerings.

Government-to-business e-commerce (G2B) is e-commerce activity between the government and the private sector, and consists primarily of government procurement, administration services, and the issuing of certified government papers. The government has expanded e-procurement in 2002 to achieve the goal of establishing e-Government. After the government completed construction of a G2B system and approved regulations governing the service, the G2B market has expanded in scope and scale.

The G2B market in Korea had revenues of 3.0 trillion won in the 4th quarter of 2001. As of the 4th quarter of 2002, the revenues in G2B transactions reached 6.2 trillion won. Since the Government e-Procurement System (GePS) went into operation, 33,109 contracts, out of a total of 34,773 government contracts, were open for bidding over a span of three months, starting in October 2002.

Among the commodities that were exchanged in G2B transactions, the purchasing of supplies amounted to 986 billion won, representing more than 46.4% of the entire G2B market. Miscellaneous purchases by the government grew from a 12.2% share in the 2nd quarter of 2001 to a 25.7% share of G2B transactions in the 4th quarter of 2002. The increasing share of miscellaneous purchases in G2B transactions indicates that the variety of goods and services that the government procures has increased.

III. Development of SMEs within the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMEs IN THE OVERALL ECONOMY

Status of SMEs in Korea

In Korea, SMEs are defined in terms of the number of employees in the firm. In manufacturing, companies with less than 300 employees are considered SMEs. There were approximately 3.2 million firms in the manufacturing sector in Korea in 2003, most of which were SMEs (table 8). In the same year, the manufacturing sector had 14.6 million employees, of which 88.2% were employed by SMEs (table 9).

TABLE 8
NUMBER OF FIRMS BY SIZE

	2001		2002		2003	
	Number (1,000)	Composition (%)	Number (1,000)	Composition (%)	Number (1,000)	Composition (%)
Total	3,046.5	100.0	3,132.0	100.0	3,187.1	100.0
1-4	2,576.7	84.6	2,635.4	84.1	2,681.5	84.1
5-99	456.5	15.0	485.3	15.5	494.3	15.5
100-299	8.9	0.3	8.8	0.3	8.9	0.3
More than 300	2.5	0.1	2.5	0.1	2.4	0.1

Source: National Statistical Office, 2004, *Survey Report on Basic Workplace Statistics*.

TABLE 9
NUMBER OF EMPLOYEES BY SIZE

	2001		2002		2003	
	Number (1,000)	Composi- tion (%)	Number (1,000)	Composi- tion (%)	Number (1,000)	Composi- tion (%)
Total	14,109.0	100.0	14,608.3	100.0	14,630	100.0
1-4	4,643.1	32.9	4,806.4	32.9	4,839.0	33.1
5-99	6,300.3	44.7	6,599.3	45.2	6,658.9	45.5
100-299	1,428.3	10.1	1,417.8	9.7	1,411.1	9.7
More than 300	1,738.0	12.3	1,784.9	12.2	1,721.7	11.8

Source: National Statistical Office, 2004, *Survey Report on Basic Workplace Statistics*.

A detail of statistics by industrial sector is shown in Table 10. SMEs dominate most industries, but this is less true in the agriculture, fisheries, electricity, financing and business service sectors.

TABLE 10
NUMBER AND EMPLOYMENT BY INDUSTRY (2002)

	Number of firms			Employment		
	Total (1,000 firms)	SME (1,000 firms)	Ratio of SME (%)	Total (1,000 persons)	Total (1,000 persons)	Ratio of SME (%)
Agriculture	0.5	0.5	98.2	4.7	3.8	80.6
Fisheries	0.1	0.1	98.5	4.6	3.5	77.1
Mining	1.9	1.9	99.8	17.5	15.2	86.5
Manufacturing	332.6	331.8	99.8	3,368.4	2,674.2	79.4
Electricity & water	0.3	0.3	98.3	7.3	6.0	82.6
Construction	78.3	78.0	99.9	689.7	629.6	91.3
Wholesale & retail	894.0	893.0	99.9	2,587.1	2,373.8	91.8
Hotels & restaurants	634.9	635.0	99.9	1,723.6	1,680.0	97.5
Transportation	306.0	306.0	100.0	798.1	727.1	91.1
Communications	4.6	5.0	99.2	57.0	39.7	69.7
Financing&insurance	10.5	10.0	95.6	160.4	56.2	35.1
Real estate & leasing	91.3	91.0	99.7	263.8	235.6	89.3
Business services	77.2	76.0	98.9	791.7	528.7	66.8
Education services	91.9	91.0	99.5	389.7	355.3	91.1
Health & social work	54.0	54.0	99.9	266.5	260.2	97.7
Recreation	115.0	115.0	99.8	289.4	258.9	89.5
Others	260.0	26.0	99.9	556.2	537.7	96.7
All	2,953.1	2,948.2	99.8	11,975.7	10,385.0	86.7

Source: National Statistical Office.

The gross output of SMEs reached 282 trillion won, or 49.1% of GDP, in 2002, while exports reached US\$ 68.3 billion, representing 42% of the nation's total exports (see table 11). Export volumes and percentage of total exports continued to increase.

TABLE 11
EXPORTS BY SMES
(Unit: US\$ million)

	2001			2002			2003		
	Amount	Change (%)	% of total	Amount	Change (%)	% of total	Amount	Change (%)	% of total
Total exports	150,439	-12.7	100.0	162,471	8.0	100.0	193,817	19.3	1100.0
SMEs	64,600	1.7	42.9	68,308	5.7	42.0	81,699	19.6	42.2
(Ventures)	(5,554)			(5,961)			(7,379)		
Large en-terprises	85,738	-21.1	57.0	94,053	9.7	57.9	112,015	19.1	57.7
Other	101	-20.5	0.1	110	8.9	0.1	103	-6.4	0.1

Source: Small and Medium Business Administration.

Venture Companies

Venture companies have been promoted by the government with special emphasis, since ventures were regarded as a strategic means of achieving both international competitiveness and job creation following the economic crisis of 1997. Three criteria define a venture, according to the government's requirements in providing incentives, as shown in table 12. Namely, the criteria are: companies that satisfy a certain share of venture capital investment; companies that satisfy certain level of R&D investment; companies that satisfy the possession of a new technology or patent. The total number of recognized ventures in 2003 was 7,702.

TABLE 12
NUMBER OF VENTURE COMPANIES BY TYPES

	2002		2003	
	Number of companies	Composition (%)	Number of companies	Composition (%)
Venture capital	1,124	12.8	718	9.3
R&D	1,325	15.1	1,483	19.3
New technology	6,329	72.1	5,501	71.4
Total	8,778	100.0	7,702	100.0

Source: Small and Medium Business Administration.

Investment in Informatization

The larger the firm, the larger was the amount of investment, as indicated by table 13. As shown in table 14, investment aimed at reducing labor costs was the highest, with 29.7%. Investment in hardware (H/W) and software (S/W) represented 25.6% and 22.0%, respectively.

TABLE 13
STATUS OF INFORMATIZATION INVESTMENT BY SIZE OF COMPANIES
(Unit: million won)

	2002	2003	Growth rate (%)
	Average amount of informatization investment	Average amount of informatization investment	
Under 300	323	343	4.8
300-1,000	1,534	1,504	-2.0
More than 1000	13,114	15,120	15.3

Source: Small and Medium Business Administration.

TABLE 14
STATUS OF INFORMATIZATION INVESTMENT BY AREA
(Unit: %)

	2002	2003	
	Composition (A)	Composition (B)	B-A
Hardware	29.0	25.6	-3.4
Software	21.1	22.0	0.9
Networks	14.3	15.2	0.9
Labour cost	29.4	29.7	0.3
Others	6.2	6.6	0.4

Source: Small and Medium Business Administration.

B. CASE STUDY ON USAGE OF E-COMMERCE AND SUPPLY CHAIN MANAGEMENT (SCM) IN SELECTED INDUSTRIES

For the case study, three patterns are discussed in this section. The first (Pattern One) deals with the partnerships between large firms and SMEs. The industry chosen for Pattern One is the IT equipment industry, where partnerships between large firms and SMEs are common. LG Electronics, and DiCON Co., Ltd. were selected for the firm-level case study.

The second pattern (Pattern Two) is characterized by networking among SMEs aimed at promoting exports and e-commerce. Two industries were chosen for Pattern Two: the textile/garment industry and the footwear industry, where networking among SMEs through industrial associations is strong. For the textile/garment industry, i-Textil Ltd., an export-oriented clothing manufacturer, was chosen for the firm-level case study. For the footwear industry, Tae Kwang Inc., a footwear manufacturer, was selected.

The third pattern (Pattern Three) deals with services for supporting international trade. Silkroad21, an e-Trade infrastructure operated by the Korea Trade-Investment Promotion Agency, and Tpage Global Co., an export-solutions provider, were selected for this category.

1. Pattern One: Partnership between Large Firms and SMEs

1) IT Equipment Industry and the case of LG Electronics

Collaboration between large firms and SMEs for digitization has been facilitated by special government policies. The most powerful of these are the collaborative informatization project, the Small Business Networking Project and the Industry B2B Networking Support Project.

The collaborative informatization project is intended to support SMEs and large firms through a supply network, and to support SMEs that plan to launch informatization collaboratively through e-marketplaces. In 2001, 4,000 firms were supported. In 2002 and 2003, 14,000 firms and 12,000 firms, respectively, were supported. The project is part of the 300,000 SMEs Informatization Support Project.

The Small Business Networking Project is designed to facilitate the supply of e-business service and IT education suitable for small business. During 2001 and 2002, a total of 240,000 small businesses benefited from this initiative.

The Industry B2B Networking Support Project was designed to establish model benchmarking B2B e-commerce projects among firms in selected industries, with plans to eventually extend this to all industries. From 2000 to 2003, a total of 40 industrial cooperatives were supported.

It has not yet been determined how many firms in the IT industry overall, or in the IT equipment industry, in particular, have benefited from these policies. However, due to their

familiarity with IT, it is presumed that a relatively high number of firms in this sector have benefited.

As the age of global Supply Chain Management (SCM) emerges, large manufacturers in Korea, such as Samsung Electronics, LG Electronics, and POSCO, have been establishing SCM systems to share information on a 24-hour-a-day basis regarding production, sales, shipments, logistics, etc., with partners throughout the world. In line with this scheme, world-famous SCM firms, such as i2Technology and EXE Technology, as well as IT companies such as Oracle, IBM and SAP, are actively penetrating the Korean market to capture the emerging demand. LG Electronics offers an interesting case in this respect. The company is establishing a logistics information system for its 72 overseas subsidiaries, coordinated through three business headquarters: Digital Display & Media, Digital Appliance and Telecommunications.

In 2000, the company introduced Exceed, a logistics information system of EXE Technology, to the White Home Electronics Centre at Changwon Factory. The system has been expanding to cover overseas logistics centers in Mexico, Texas, New Jersey, Australia and Panama. The company is introducing a B2B integration system for coordination with its 1,800 SME partners in domestic and overseas markets. In this regard, LG Electronics has implemented the “M-to-M (Machine-to-machine) Integration Project,” which has networked the parent company and SME partners since 2002. The company successfully completed the first phase of the pilot system that integrates three partners in the Changwon area. The SME partners built Enterprise Resource Planning (ERP) and connected it to the parent company. Through this system, information can be obtained regarding orders, production plans and warehouse stocking of the parent company, while at the same time providing the ability to wire information on available production capacity, inventory and performance to the parent company.

The SME partners that participated in the project were able to reduce the manufacturing lead time and enhance the ability to respond to orders through the information sharing system. They also reduced quality defects and errors by sharing product information, such as item names and standards and composition of parts.

LG Electronics expanded the project to 15 SME partners in 2003, with plans to expand to a total of 32 partners in 2004. It intends to complete the global production planning, procurement and implementation partnership environment with medium-sized enterprises, overseas subsidiaries and domestic subcontractors with access to the system. For this plan, the company will continue to obtain and implement new solutions, in order to optimise the operation of its supply network and SCM.

Samsung Electronics also is improving the existing Glonet system, which is an SCM process with some 3,000 online purchasing partners throughout the world, through a consortium that includes Samsung SDS, IBM-Korea and i2Technology-Korea.

2) *DiCON Co., Ltd.*

Since its establishment in 1990 as a computer systems design and development company, DiCON Co., Ltd. has grown rapidly and has now become a frontrunner in its field. DiCON has developed various technology-intensive, special-purpose computer systems. Among them is a touch screen LCD monitor, the first of its kind, both in the domestic market and abroad, that employs the company’s patented infrared touch screen technology and super twisted nematic (STN) LCD panel, which appeared in 1994. This product became the foundation for the company’s current thin film transistor (TFT) LCD monitor technology. Based on this technology, the company has continued to develop technological skills and new products, and has now become recognized for leading-edge technology skills and high-quality products.

The company’s capitalization is 2.2 billion won and as of February in 2002, it employed 72 employees. Its main products are business and industrial TFT LCD monitors, LCD TVs, LCD displays and LCD TV controllers and touch screens.

The company has been seeking to be a leading-edge company in the field of digital display systems, including various types of LCD monitors, multifunctional multimedia monitors, web-based terminals, as well as digital LCD TVs for home use and various kinds of industrial digital display systems.

DiCON Co., Ltd. is an LCD monitor manufacturer with over 100 customer sites. Sales volume was US\$ 9 million in 2003 and is expected to reach US\$ 30 million in 2004. The company began its LCD business with the development of LCD touch monitors in 1994. In 1997, the company developed 10.4-inch and 12-inch video graphics array (VGA)-class LCD monitors.

In 1998 the company developed 15-inch extended graphics array (XGA)-class LCD monitors. This historic development indicates that the company made substantial ongoing efforts in product development and market expansion. In 1999 the company developed 17- and 18-inch XGA-class LCD monitors and received the 'One million Export Award' from the government. LCD production is dominated by Japan, Korea and Taiwan. DiCON Co., Ltd. has a technological advantage in that it is the only company capable of producing monitor products with its own technology, as Samsung Electronics and LG Electronics do with their products.

The company exports to 30 global companies, including ones in Japan, China, Hong Kong (China) and Italy. It has approximately 50 domestic customers, including Samsung Electronics, Samsung SDS, Hyundai General Trading Company, Daewoo Telecommunications, Sejin Computer, Orion and Hansol.

2. Pattern Two: Cooperation and Networking among SMEs

1) *Textile/Garment Industry and the Case of i-Textil*

The Korea Federation of Textile Industries (KOFOTI) is playing a leading role in supporting Korean textile-related companies and acting as a bridge between local textile-related companies and foreign buyers.

In line with basic approaches involving rapid response to changes in the textile environment, competitive reinforcement of local Korean companies, strategic cooperation between enterprises and government, and concentrated support for export, management, technology and information, KOFOTI maintains an aggressive global marketing style, supports futuristic strategic industries, reinforces textile information networking, and supports international commercial relationships.

As an aggressive global marketing strategy, KOFOTI supports local companies' export and marketing activities. KOFOTI offers a wide range of financial assistance, such as loans and guarantees, as well as statistical surveys providing updated information on market trends, thus boosting domestic textile companies' efforts to move into new technologies and materials.

In addition, KOFOTI provides various types of supports and promotions that include trade information, dispatch of overseas market optimization teams, assistance for participation in international exhibitions, support for promising start-ups, and linking of overseas and domestic companies, along with support for PR activities.

KOFOTI operates a fashion information library to deliver the latest textile and fashion information, in addition to providing scholarships to university students. The federation also runs a textile and fashion personnel information centre to deal with the shortage of workers and to reduce recruitment costs.

The company i-Textil Ltd. was founded in 1972, under the name Searim Co., Ltd., which was changed to i-Textil Ltd. in 2000. The company's primary business is clothing manufacturing, with an emphasis on exports. The company is an international processing trade enterprise for clothing manufacture, and is primarily focussed on exports, with a 93% export rate. The company accepts orders domestically and produces the finished goods abroad. The government recognized the company through its "Award for the Best Vendor" and "Honour of Industrial Service Merit-Tin Tower." The company registered on the Korea Securities Dealers Automated Quotations (KOSDAQ) in 2000.

The original materials are supplied and exported by purchasing the original production machinery and subordinate resource material from domestic and foreign corporations, such as the Chonbang Textile Industry, Ilshin Spinning Co., Ltd., Daehan Spinning Co., Ltd., Magnolia, Maral, and Kaha. Domestically, the textile products (clothing fabrics for sewing machinery) are produced through domestic outsourcing and consignment of processing management, for each type of process, such as textile dyeing and processing, while the products, which are completed at foreign factories, are shipped and exported directly.

The company is constructing a Global ERP system in collaboration with a foreign, on-site corporation, providing a modern management system, as well as advancements in B2B e-commerce for knit products.

The company invested in BtexB Ltd. BtexB Ltd. is the first e-commerce VOTAL (vertical portal) specialized in trading knit textiles among companies. BtexB was created in the form of a consortium of off-line knit textile companies and online e-commerce solution companies, in order to enhance the competitiveness and efficiency of the knit industry.

Global market size of the knit industry is estimated at some 300 trillion won. However, with rapid changes in the international trade and distribution environment, customers consistently demand higher quality, faster delivery and lower prices. To address these changes, it is essential to utilize Internet technology, through the use of computers, information resources and communication technologies. Rapid advances in Internet technology have brought about fundamental changes in international trade and distribution systems and compelled the knit industry to shorten its decision-making process and increase flexibility, in order to respond to the new environment.

BtexB Co., Ltd. is a venue in which all members of the knit industry can exchange information and knowledge and share their methods for purchasing and for handling raw materials and shipping facilities. As a result, the knit industry is able to reduce costs and expand the market, thus avoiding wasteful competition while securing constructive competitiveness. BtexB Co., Ltd. is a professional B2B e-commerce company aimed at fostering the development of the knit industry.

2) *Footwear Industry and the Case of Tae Kwang Ind. Co.*

Tae Kwang Ind. Co., Ltd. is a shoe manufacturing company located at Andong Industrial Complex in Gimhae city. Tae Kwang Ind. specializes in OEM systems, manufacturing 15 million pairs of shoes annually, with the entirety of production for export consisting of sports shoes for NIKE. The headquarter in Gimhae is the venue for research and development (R&D) activities as well as for sample production, while mass-production is carried out at a total of 24 production lines operated in China and Viet Nam. Last year, the company reached over 400 billion won in sales supplying shoes on an original equipment manufacturer (OEM) basis.

In corporate rankings, the company is ranked third after Pouchen and Pentai of Taiwan, among a total of more than 50 worldwide companies engaged in OEM business for NIKE. Tae Kwang Ind. was also the first to launch the “NOS” work process innovation project in 2000, a program designed by NIKE. “NOS” is an abbreviation for the Latin “Novus Ordo Seclorum,” meaning the start of a new order.

The development centre is divided into a project team, a mold team and a development team, all of which are integrated via an online cooperation system. The project team performs the role of managing the product development process, including receiving new design sketch data from NIKE, created using three-dimensional computer-augmented design (CAD), confirming orders and requesting material purchases, etc. Once the project team delivers the design data from NIKE to the mold and development teams, the mold team designs the shoe’s sole, while the development team designs the shoe’s uppers using PCs. During this process, both teams create primary samples. Complete data are frequently being checked by NIKE Korea, stationed in Busan, through the online cooperation system. This process is applied in identical fashion to all 5 stages in the sample manufacturing process, until the sample data are transmitted to overseas production factories.

In the past, orders were received via fax, material purchase requests were individually prepared in writing for authorisation, and samples from each stage were hand-delivered to NIKE Korea for approval. However, the establishment of the online cooperation system has drastically reduced the time and cost involved in the process.

Tae Kwang Ind. discarded the traditional method of shoe manufacturing in 2000 and established “TRUST,” a computer-based composite manufacturing system to manage entire processes from order reception to product forwarding, via collaboration between the headquarter in Korea and local overseas factories. TRUST encompasses entire systems, including ERP, product data management (PDM) and knowledge management system (KMS).

TRUST was launched in 2001 by creating a connection between the Korea headquarter and the factory in Viet Nam. It was also implemented in the factory in China. Thus, the online production system linking the headquarters in Korea with two overseas factories was completed. Once parts information required in product development is automatically created in PDM via connection with EPR and PDM, the information is then delivered to ERP to carry out material purchasing.

Next, Tae Kwang Ind. introduced the “Project Link” in 2002 to aid headquarters in efficiently managing product development projects carried out at the development centre. The product lifecycle management (PLM) solution development company, PTC Korea, has supplied the PLM solution, “Win7 Project Link 6.2” to Tae Kwang Ind., and has completed implementation of the cooperation system. Tae Kwang Ind. began setting up the cooperation system in December 2002. The goal was to provide a link in the supply chain management (SCM) system, connecting the current client company (NIKE), through the online cooperation system, with overseas production factories in China and Viet Nam, while at the same time reducing time and costs associated with product development, etc. Currently relying on Korean staff totalling more than 340 employees, Tae Kwang Ind. has been using this system as of July 1, 2003. In the near future, use of the system will be extended to local workers in overseas factories.

The company is planning to establish a system to enable real-time cooperation in the future, not only for the affiliated companies in Korea, but also for those connected to the two overseas factories. Through the establishment of such a digital manufacturing system, the volume of inventory has been cut more than twofold. Moreover, although NIKE is allowing 9 months from the stage that involves passing on new product designs to the OEM company, to delivery of goods, Tae Kwang Ind. is able to begin making deliveries in a mere 4 months. This has been the result of dramatic improvement in the work process through combining the latest IT technology with traditional manufacturing business methods.

The company has founded an IT company called “Shoetech” to promote sales and export of its digital shoe manufacturing and cooperation system, with the goal of providing know-how to shoe manufacturing companies in Korea and overseas that deliver goods to NIKE on an OEM basis. The competitive power of the shoe manufacturing business depended, in the past, on reducing labor costs and maximizing the number of pairs of shoes produced in a day. Now, however, it depends on who is able to produce shoes that satisfy customers’ tastes and get them to market faster than the competitors. In order to reduce the time to market, digital manufacturing infrastructure, related to ERP and PDM, must be instituted.

3. Pattern Three: Support Services. Cases of Tpage and Handysoft.

1) *Support Services and Silkroad21*

Silkroad21 was devised by the Ministry of Commerce, Industry, and Energy (MOCIE) as part of a five-year plan to stimulate e-Trade and e-commerce from 2000 to 2004. The project was managed by the Korea Trade-Investment Promotion Agency (KOTRA) and sponsored by the Small & Medium Industry Promotion Corporation (SMIPC), the Korea International Trade Association (KITA), the Korea Trade Network (KTNET) and other organizations.

The objective of Silkroad21 was to establish a national infrastructure for electronic commerce enabling access to all trade-related information currently dispersed among the different organizations mentioned above, as well as among regional governments, general trading companies and private firms.

The power of Silkroad21 is its ability to integrate all Korean trade-related information from numerous major buyers and sellers. These can now perform a one-stop search to access all selling and buying offers posted on the Korean market, as well as other trade-related information, such as a comprehensive list of companies, products, etc.

With the launch of Silkroad21's website (www.silkroad21.com) in December 2002, Korean importers and exporters were able to easily conduct transactions using this B2B portal. Foreign visitors to the site could also access global trade information, since Silkroad21 serves as a gateway to other Korean electronic trade sites.

With strategic alliances, and affiliations with influential trade organizations and sites around the world, Silkroad21 established itself as a market leader and as one of the most comprehensive trade infrastructures available.

With a powerful search function, Silkroad21 provided access to integrated information, in partnership with trade-related organizations and other leading agencies.

Buyers and sellers can log on to www.silkroad21.com to buy and sell goods in the following categories: agricultural and food; automotive and vehicles; beauty and household; chemical and plastics; computers and telecommunications; electrical and electronics; environment; glass and optical; machinery and equipment; medical and health; minerals; sports and leisure; stationery and gifts; textiles and leather; wood and furniture, and others. Visitors to the site may also access a currency converter, transportation schedules, country reports, a Korean exhibition calendar and more.

On February 1, 2005, KOTRA integrated two previous e-Trade sites, Silkroad21 (www.silkroad21.com) and Kobo (www.kobo.net), which it had managed, and created Buykorea (www.buykorea.org), an upgraded B2B e-marketplace for SMEs. The e-Trade portal is part of the "e-Trade Korea" project, a national initiative to place Korea at the centre of a global e-Trade hub.

For more convenient use, the portal improved features that included a powerful search engine, an electronic catalogue containing production information and three-dimensional product images, and foreign market and trade-related information provided by KOTRA's 105 overseas offices.

KOTRA also added a cyber marketing menu to Buykorea.org, by which companies could upload corporate and product information to promote their services and products, whereas existing e-Trade or e-business websites only allow people to view trade-related information.

Notably, the new e-Trade portal not only enables foreign companies to search for Korean buyers and suppliers, as well as product information, but also provides the capability to hold real-time video trade consultations via the Internet.

The new website has eliminated all temporal and spatial restraints and eased the cost burdens that Korean SMEs incurred in having to pay for expensive airfare when extending invitations to foreign buyers. Both one-on-one and multiparty video consultations are possible using the new website. Users are also able to store video conferencing records for future reference. Buykorea.org will serve as a cornerstone for Korea's development into the world's eighth largest trading power by 2008, achieving US\$ 400 billion in exports. KOTRA aims to transform Buykorea.org into a total one-stop service e-Trade portal by adding online financing services that will enable member firms to sign export contacts and settle payments online.

2) *Tpage Global Co., Ltd.*

Tpage Global was established in 1996 as an e-commerce skills development company for Korean firms, and expanded its operation in 1999 by introducing Tpage.com, which offers international business-to-business trading sites. Tpage.com provides a full-solution package for global traders to execute an entire transaction via the website, procure the necessary financing and arrange shipments. Tpage successfully exhibited in the 1998 Internet Trade Expo, and in 1999 was cited by the government as an outstanding venture company. Tpage.com employs a total of 50 people.

The “Tsearch” search engine is an initiative of Tpage, specializing in subjects relating to international trade. The site has proven to be highly popular with traders worldwide, who frequently use the site’s “Auto Multi Posting” system to post offers to buy or sell. Tsearch provides traders with a simple, hassle-free posting procedure. Completed offers are automatically transferred and posted to all other trading websites. In addition, Tsearch’s “Offer Meta Search” provides a vast amount of information on suppliers or buyers, listed internationally and immediately available to traders through a simultaneous search of all other trading websites, thus generating a huge volume of trade leads.

One of the Tpage’s services is its “Internet Business Consulting,” which provides businesses with a total solution for their Web trading needs. Other services include home-page development, e-commerce tool development, Internet trade marketing service, web promotion service, and directory information for companies seeking to market via the Internet. Tpage represents companies wishing to market their products internationally, providing information on possible partners, the competition and their products. As the B2B Internet market grows, Tpage stands ready to provide vital services that will enable participant companies to grow along with this vital new trading medium.

Tpage’s target market is international traders and, through Tpage.com, its ultimate aim is to make B2B dealings simpler and more efficient. Tpage’s global plan is two-fold. First, its approach is to provide a full range of solutions that will allow a user to find trade leads, qualify them, secure payment and handle all factoring and shipping through the proprietary and streamlined back-end process. Second, the company is using the Tpage business model to form joint ventures worldwide with established, powerful, local conglomerates.

Tpage’s gross sales at the end of the third quarter of 2000 amounted to US\$ 5 million, of which the major share was from the company’s cyber trading solution business. Year 2000 January-to-September overseas sales stood at US\$ 700,000, and a further US\$ 1.5 million was expected to be generated by the end of this year. In addition to the cash flow represented by these figures, the volume of contracts exceeded \$ 5 million by year’s end.

Tpage exports solutions widely, but primarily to clients in the United States, Europe and Asia. To match increasing demand, the Tpage trade team is recruiting more international trade expertise.

The company’s line of business is a B2B portal site, equipped with an expert trade search engine, which can search information on firms worldwide in the shortest possible time using a classification system. The company provides a Meta Buyer search function that searches buyers throughout the world, along with an Auto Multi Posting function that can register one-shot inputs in the world’s major trade sites. In addition to these, Tpage.com has several functions such as business directory searching, cyber booth, electronic catalogue automatic generator, Expo Exhibition Place, My Tpage (individual integrated trade management), business community, etc.

Tpage.com offers information in various languages, including English, Korean, Chinese, Spanish, Japanese, French, Portuguese and German.

C. PROBLEMS SMES FACE IN PARTICIPATING IN THE TRADE-ORIENTED VALUE CHAIN

Since the Korean economy has developed with a dual structure, with a small number of powerful large companies coexisting with numerous weaker SMEs, the latter do not have sufficient manpower or organizational capability to participate in the informatization process. SMEs lack experience in e-commerce. Moreover, inter-firm e-commerce is limited, due to non-technology factors such as low transparency and lack of infrastructure. In addition, there is currently an insufficient level of standardization.

Challenges facing SMEs are summarized as follows:

1) *Chronic labor shortage*

SMEs have long suffered from labor shortages, in terms of both the quantity and quality of applicants. The smaller a company's size, the fewer workers with college degrees it has. Moreover, employees of such companies frequently change jobs, making it difficult for the firms to accumulate technologies. The labor shortage problem is partly attributable to the poorer working conditions of SMEs.

2) *Less-competitive technology*

SMEs generally lack technological competitiveness. This makes it difficult for SMEs attempting to enhance competitiveness and upgrade their business structures. In addition, SMEs are not making sufficient investment in R&D, forcing large companies to depend heavily on other countries for essential parts, material and key technologies. Although there is a high level of adoption and installation of IT facilities, the utilization of this infrastructure is low, due to insufficient manpower and mindset.

3) *Insufficient cooperation between SMEs and large companies*

In many cases, the relationship between domestic SMEs and large companies is lopsided, since the former act merely as subcontractors supplying parts to the latter. Moreover, SMEs are under continued pressure from large companies to cut unit costs.

What makes cooperation between SMEs and large companies more difficult is the nationwide absence of even a single cluster in which large companies, SMEs, universities and research institutes interact jointly in synergetic ways. Thus, companies, especially SMEs, lack opportunities to develop intellectual property.

4) *Lack of international mindset and management skills to cope with overseas investment*

A number of factors, including the labour shortages cited above, are pushing SMEs to move their operations out of the country. Overseas investments by these companies have increased sharply since the mid-1990s, amounting to a record US\$ 2.9 billion in 2000. In the first half of 2002, SMEs' overseas investments (US\$ 840 million) surpassed even those of large companies (US\$ 780 million).

SMEs experience numerous constraints in efforts to participate in e-Trade. Some of these are as follows:

- 1) Since SMEs do not have sufficient internal digital manpower capability, they must rely on outsourcing when making investments in information systems;
- 2) SMEs tend to passively implement B2B or e-commerce, following the example of large customer companies. This may limit the firm's business opportunities with other large firms;

- 3) Many SME managers or chief executive officers (CEOs) do not understand digital-based management and technologies; and
- 4) Korean SMEs lack experience in electronic transactions and international trade.

According to a survey by KOTRA in 2003, 31.1% of SMEs were using e-Trade, whereas 40.5% of large firms were using e-Trade. The main reason cited for not using e-Trade was “No particular need,” accounting for 44.2% of all respondents. Insufficient IT infrastructure was given as the next-most common reason, with 23.5%, and the shortage of experts was cited in 19.1% of responses. SMEs and large firms indicated similar reasons. However, SMEs pointed to the shortage of experts as the reason more often than did larger firms, whereas a greater number of larger firms than SMEs pointed to insufficient infrastructure as the reason.

E-Trade was most effective for foreign marketing (30.0%). SMEs and large firms showed similar evaluations, with 30.2% and 28.1%, respectively. Finding trade partners (29.3%), simplification of trade procedures (22.9%) and trade information (19.5%) were important advantages of e-Trade. To SMEs, finding trade partners was more important than for larger firms, whereas the other two advantages were relatively more important to larger firms than to SMEs.

The most urgent task cited for promoting e-Trade was establishing a one-stop e-Trade service system (41.3%). Larger firms cited this more often than did SMEs.

IV. Government policies designed for SMEs, IT, and international trade

A. IT POLICIES IN THE COUNTRY’S OVERALL DEVELOPMENT STRATEGY

Korea’s current IT policy is designed to strengthen the overall competitiveness of industries through informatization, advance B2B e-commerce and create a safe and reliable online business environment.

The Korean government enacted the Framework Act on Informatization Promotion in August 1995, established the first Master Plan for Informatization Promotion in June 1996, and established a national organization for planning and implementation of the goals outlined in the Master Plan. The plan presented 10 key projects for the realization of an advanced information society by the year 2010.

In March 1999, the government established Cyber Korea 21 as the blueprint for the new information society of the 21st century, in an attempt to overcome the 1997 financial crisis and transform the Korean economy into a knowledge-based economy.

In 2001, the Korean government established e-Korea Vision 2006 as the blueprint for the direction Korea would pursue over the next five years, to become a global IT leader in the 21st century. The Vision’s objectives are:

- To maximize the ability of all citizens to utilize information and communication technologies in order to actively participate in the information society;
- To strengthen global competitiveness of the economy by promoting informatization in all industries;
- To realize a smart government structure with high transparency and productivity through informatization efforts;
- To facilitate continued economic growth by promoting the IT industry and advancing the information infrastructure, and
- To become a leader in the global information society by taking a major role in international cooperation.

The promotion of informatization was intended to focus on qualitative accomplishments, such as increased productivity, through legal and institutional reforms and innovations in business processes throughout society. Thus, the government focused on upgrading the information infrastructure, supporting venture start-ups, R&D and human resource development, as well as legal and institutional reforms to provide a foundation on which new industries can be created.

The plan was designed to strengthen the competitiveness of all industries, through the informatization process. To this end, the government focused on enhancing the level of competitiveness and the value added of informatization to all industries, including the textile, electronics, construction, financial, health care, and distribution industries. Moreover, small businesses were to be encouraged to actively participate in the digital economy.

Companies were to be encouraged to adopt ICTs throughout the value chain, with the primary aim of enhancing the efficiency of business activities. In addition, the government would provide support for B2B in each industry. To stimulate activity in B2B, the government recognized the need to improve logistics and online payment systems. Furthermore, to enhance the efficiency of international trade, the government planned to develop a paperless e-Trade system.

With the development of the authentication system for e-commerce and the availability of high-quality information online, the government planned to provide the necessary aid to construct reliable cyber markets, ensuring that e-consumers would be protected, by strengthening consumer education initiatives and systematizing dispute resolution procedures.

The Ministry of Information and Communication (MIC) is in charge of planning and implementing national informatization policies. The National Computerization Agency oversees the national information and communication network.

Policy on informatization of businesses is implemented in accordance with the Industry Informatization Promotion Plan. The Ministry of Commerce, Industry and Energy (MOCIE) plays the central role in the Industry Informatization Promotion Plan, in cooperation with MOIC and the Small and Medium Business Administration (SMBA).

MOCIE is undertaking three major projects for the national informatization strategy: promoting e-commerce among industries; building e-commerce infrastructure; and globalising e-commerce. The National Computerization Agency and the Korea Association of Information and Telecommunication are sub-divisions within the MIC.

SME informatization policy is coordinated by SMBA, which oversees the SME Informatization Promotion Committee. This committee prepares comprehensive plans to support informatization of SMEs, coordinates the participating organizations and evaluates their performance. There are Informatization Councils for each of the six key areas (in table 15). Twelve local SME Informatization Councils, governed by the local SMBAs, prepare concrete strategies for SME informatization and carry out projects in their local areas, in consultation with related local organizations.

The Small Business Corporation (SBC) supports projects related to the development of SMEs, including SME digitization, providing consulting services on informatization management, training of informatization professionals, support for e-commerce and for operating informatization machinery and tools, and exhibition and training centers. The Korea Information Management Institute for Small and Medium Enterprises (KIMI) supports SME management innovation and productivity improvement. Its activities include: digitizing production information of SMEs, building IT infrastructure in SME-concentrated areas, constructing IT networks for industry associations, building informatization management systems, providing IT education to employees in SMEs and developing e-Business models for small enterprises. The SBC and the KIMI are sub-divisions within the SMBA.

B. Policies in Support of SMEs

An outline of the Small and Medium Business Administration’s 2002 policy on SMEs includes:

- Strengthening SMEs’ potential for technological innovation: Provision of assistance to 2,000 “Inno-Biz (businesses with sufficient potential for technological innovation)” companies, through establishment of a support system for each stage of their growth.
- Promoting the digitization of SMEs: Establishing an infrastructure of systematic support for information-based management of SMEs.
- Laying the foundation for re-launching venture firms: Fostering an environment conducive to attracting investment and expanding trust in the government’s venture policies.
- Assisting SMEs in achieving stable and self-reliant management: Timely supply of policy funds to ease the possible financial burden, while expanding loan guarantees.
- Supporting the marketing activities of SMEs: Encouraging public institutions to purchase SMEs’ products and assisting SMEs to strengthen their export capabilities.

The MOCIE is committed to incorporating e-business in the six key industries. It intends to build a B2B network in the six key areas, while at the same time expanding it to other industries (see tables 15 and 16).

TABLE 15
STATUS OF E-COMMERCE DEVELOPMENT IN SIX KEY INDUSTRIES
(Unit: %)

	e-Commerce Progress/Stage		Core Tasks
	2000	2003	
Electronics	8.5 (Early Growth)	30.3 (Entrenched)	– Sharing standardization – Cooperating with leading firms
Automobiles	2.4 (Beginning)	14.0 (Growing)	– Building industry-wide network (KNX) – Enhancing competitiveness of parts industry
Shipbuilding	2.5 (Expanding)	15 (Early entrenched)	– Building collaborative system for design & production industries – Establish a culture of inter-company collaboration
Steel	2.3 (Beginning)	14 (Growing)	– Led by Pohang Steel and Iron Company (POSCO) – Early establishment of e-commerce system
Machinery	2.0 (Beginning)	12.5 (Growing)	– Standardization of classifications and codes – Digitization of parts industry
Textiles	2.0 (Beginning)	15 (Early entrenched)	– Establish digital transactions – Build co-infrastructure

Source: MOCIE

TABLE 16
INFORMATIZATION PROJECTS OF MINISTRY OF COMMERCE,
INDUSTRY AND ENERGY

	Major Project Features	Organization
Supporting SME informatization	Supports informatization of SMEs (informatization of work unit, distribution of ERP, building SCM, support building of e-learning)	Small Business Corporation
E-commerce promotion project	Develops and distributes e-commerce standards, nurtures e-commerce workforce, and carries out statistical reports and analysis	Korea Institute for Electronic Commerce
Building a digital industry area	Digitalizes national industrial area to provide comprehensive online administrative services to resident companies	Korea Industrial Complex Corp.
Building B2B network	Develops e-commerce model appropriate to each company	Korea CALS/EC Association
Operating e-commerce support centre	Designates 40 ECRCs nationwide, nurtures workforce and provides consulting and technological support, develops and distributes technologies for e-commerce	Electronic Commerce Resource Centre (ECRC)

Source: MOCIE

The SME-support policies of the Small and Medium Business Administration (SMBA) are directed toward:

- Building a comprehensive technology support system through joint efforts by industry, academia and research institutes, aimed at strengthening the technological competitiveness of SMEs;
- Creating a climate conducive to growth of venture businesses, and expanding the productive investment base for venture companies;
- Promoting expansion of credit and loans to enhance the liquidity of SMEs;
- Efficiently resolving the manpower shortage of SMEs by expanding training opportunities for production workers, efficiently introducing foreign resources, improving the work environment of SMEs, etc.;
- Establishing measures to improve credibility of SME products and expand their distribution, in order to promote SME exports and increase domestic demand for their products;
- Supporting the start-up and management stabilization of small businesses and women-owned enterprises;
- Expanding the information base and electronic commerce of SMEs;
- Innovating the process for efficient restructuring of SMEs and supporting the merger and acquisition (M&A) of SMEs and venture businesses; and
- Facilitating international cooperation activities, including trade, investment and domestic and overseas technology transfer.

The SMBA promotes informatization projects primarily for manufacturing industries. The SMBA's support for SME informatization is summarized in table 17.

TABLE 17
PROJECTS OF THE SMALL AND MEDIUM BUSINESS ADMINISTRATION

Main Points	
Digitizing production information of SMEs	Supports informatization utilizing workplace computers and IT
Supporting SME informatization innovation consortium	Supports consulting service by forming a consortium with universities, system integration (SI) companies and related organizations
Building IT infrastructure in SME-concentrated areas	Supports building informatization infrastructure for regional information hub in SME-concentrated areas
Building IT infrastructure for industry association	Builds e-commerce infrastructure for association-centered community
Training for obtaining informatization management system certificates	Directs process of obtaining informatization management system certificate, in order to transform management into informatization management
Operating informatization support group	Operates informatization support group in order to solve SME informatization problems
Surveying current status of SME informatization	Conducts research on the current state of SME informatization, in order to gauge the level of SME informatization
Supporting total information management providers (TIMPs) (dedicated to innovative informatization of SMEs)	Seeks SMEs with informatization success to disseminate experience to other SMEs
Developing standardized model of work process	Expands and distributes standardized work process for all industries
IT education for SMEs	Provides informatization education for SME workers and CEOs

Source: SMBA.

1) *Export Promotion*

In order to boost the mid- and long-term competitiveness of exporting SMEs, the SMBA is conducting activities to promote strategic export products, based on extensive market research by country and region. To that end, the aim is to develop “global” products by providing package support for technology development, overseas marketing, and export financing for companies producing these strategic export products.

The SMBA is also working toward expanding the export base for SMEs and providing active assistance in their overseas marketing efforts. Examples include practical training on trade, provision of export consulting to export companies, as well as the selection of ten export management companies for transfer of know-how on areas such as negotiations with overseas companies, execution of export contracts, and shipping, directed at companies that have recently begun to export.

The SMBA’s work in this field also includes increased support for opening up new overseas markets. This takes the form of expanding opportunities for cooperatives and organizations dealing with parts, materials and machinery, areas with good export potential, to attend overseas exhibitions. It includes initiatives to dispatch talented human resources from SMEs to countries overseas to develop their expertise as trade professionals through on-site training in the local market. In addition, road shows are held to provide assistance to companies likely to enter overseas markets, providing them instruction in quality inspection and other procedures.

As a step toward consolidating the base for cyber trade among SMEs, the ASEAN+3 SME Network was launched in March 2003, laying the groundwork for stronger cooperation among the member countries. In addition, efforts to construct an Integrated System on International Procurement have been pursued, in order to provide international bidding information and facilitate the establishment of an online bidding system.

2) *Trade Facilitation*

SMBA and SBC have combined to designate 38 overseas assistance centers to provide comprehensive trade-related services, such as market surveys and investment guidance, to Korea's venture enterprises. The centers are in established markets such as China (12 locations), United States (6), Japan (4), and Germany and Russia (3 each), as well as in newly emerging markets such as Brazil, Kenya and India.

E-Trade is trade in goods and services carried out internationally by electronic and information-intensive means, using IT, including via Internet. E-Trade is a core strategy for enhancing national competitiveness through structural innovation of trade, which is the backbone of the Korean economy.

The aim is for Korea to achieve a leading e-Trade position in the 21st century through “e-Trade Korea,” by offering the venue and services for all enterprises to trade efficiently and effectively using the Internet, which provides access anytime, anywhere.

The main strategies of “e-Trade Korea” can be summarized as follows:

- Strategy 1: Construction of Internet-based e-Trade Infrastructure

Develop “single window” system, e-payment and e-banking systems, and the electronic invoice presentation and payment (EIPP) system.

- Strategy 2: Establish the Base for e-Trade Utilization by SMEs

Promote e-general trading companies for assisting in searches and in matching trade partners, consulting, contracting, transactions, etc., on behalf of SMEs. Develop “Silkroad21” as Korea's formal national trade site.

- Strategy 3: Establish Global e-Trade Network

Make Korea Trade Network (KTNET) a focal point for Korea. Apply the results and experiences of the Korea-Japan e-Trade Network to Pan Asia E-Commerce Alliance (PAA).

- Strategy 4: Reform of Laws and Institutions for e-Trade-Friendly Business Environment

Create an effective e-Trade process through comprehensive business process reengineering (BPR), and establishing a system for electronic circulation of bill of lading (B/L) and insurance securities. Remove legal and institutional bottlenecks in e-document circulation.

- Strategy 5: Establishing Efficient Organizational System for the Implementation of e-Trade Strategy

An “E-trade Committee” was established recently under the Prime Minister, as a public-private joint coordinating organization. The committee consists of relevant ministers, along with representatives of related industrial associations and private organizations. Under the committee, an “e-Trade Working Group” has been formed to implement projects, divided up according to industry and based on the functional processes involved.

The role of e-Trade intermediaries is important to the successful implementation of the strategy. However, most of these are SMEs and have problems securing the necessary budget and resource, as indicated in table 18.

TABLE 18
BOTTLENECKS FOR E-TRADE PROMOTION BY INTERMEDIARIES
(Unit: %)

	Total	Intermediaries			Other
		Finding partners	Finance	Logistics/ Customs	
Shortage in budget	38.6	66.7	25.0	30.7	38.9
Insufficient recognition of managers	22.9	11.1	41.7	23.1	19.4
Insufficient IT environment and manpower	10.0	11.1	-	23.1	8.3
Legal and regulatory barriers	28.5	11.1	33.3	23.1	33.3

Source: KOTRA, 2002.

3) *FDI Promotion*

After the financial crisis in 1997, the government initiated tax reduction measures for high-tech businesses, businesses in foreign investment zones, and service businesses to cope with the economic recession. Rent reduction policy is also underway in industrial complexes for foreign companies, at 25 national industrial complexes, and in foreign investment zones. M&A activities have been permitted since May 1998.

Along with such measures, certain limitations on foreign investment in the telecommunication services markets were lifted. Currently, there are no ceilings on foreign ownership of special and value-added telecommunication service providers. And the ceiling on single-person ownership of facilities-based service providers has been abolished, except as regards Korea Telecom. Foreign aggregate ownership, of up to 49%, of facilities-based service providers is allowed. Acquisition by a non-telecom company is now also permitted. There is no foreign ownership ceiling on IT equipment and software businesses.

4) *Business Promotion*

The government will encourage major industries, such as machinery and electronics, to develop information databases of the industries, along with integrated industrial information search systems. The government will also encourage SMEs to organize associations for community-type B2B e-commerce on a small scale to stimulate e-commerce of SMEs and to build the infrastructure necessary for the informatization of SMEs.

– Creating the Climate for Promotion of Venture Business

One of the key components of the venture business support policies is the establishment of a solid base for fostering venture companies. This includes efforts to step up the functions of private sector institutions, including the Korea Venture Business Association, and to build a network among venture business-related organizations. Additionally, in order to facilitate the active M&A of venture companies, measures have been taken to improve relevant laws and regulations, including the Commercial Law, the Tax Law, and the Securities Exchange Act.

Another important aspect of these policies focuses on expanding the basic infrastructure for investment in venture businesses and improving the investment climate. To this end, the SMBA is initiating a variety of programs to build a foundation for the stable growth of venture capital.

To help facilitate the start-up of venture companies, SMBA is seeking to improve the regulations regarding their establishment and to build a system of information sharing. Moreover, start-up exhibitions are being held and assistance is being provided to academic business start-up associations. Measures are also being taken to develop business incubators (BIs) into Post-BIs.

In an effort to foster the regional venture business, “districts for promotion of venture business development” have been designated. Furthermore, to encourage and facilitate the entry of Korean venture companies into overseas markets, Overseas Venture Business Support Centers

have been established, while support programs are being utilized to assist companies in entering overseas procurement markets. Additionally, support is being provided for local marketing of products by operating logistics warehouses and after-sale service centers.

- Solidifying the Base for Establishment and Stable Management of Small Enterprises

The specific measures taken to this end include: assistance, by small merchants and industrialists, in the start-up of small businesses, and provision of consulting through the 60 Small Business Development Centers nationwide; simplification of procedures for small enterprises to establish factories, along with stronger financial support; operation of a commercial lease protection program for small business owners doing business on leased properties; support for start-ups by minorities, including the handicapped, the elderly and ex-convicts; and promotion of the traditional culture industry by providing PR support and assisting with the industry's participation in international exhibitions.

- Enhancing the Information Capabilities of SMEs

The SMBA is operating the Total Information Management Providers (TIMPs) program, to assist SMEs in their efforts to build and operate efficient information systems. Additionally, information consortia have been formed around the professional IT organizations in each of the different regions. Information business process standards, by industry sector, and analytic indicators of the effects of investment in information, have also been developed.

Efforts are also under way to build a stronger foundation for information-based management of SMEs, including support for construction of information infrastructure by region and industry in areas of high SME concentration; support for construction of e-commerce systems at SMEs; provision of information technology training to employees of SMEs; and recognition and dissemination of best-practice cases involving SME informatization, by holding SME information conferences and organizing observation visits to best-practice SMEs. Additionally, assistance is being provided in building information systems for SME production sites, while there continues to be monitoring of the factors that undermine the informatization efforts.

C. SPECIAL MEASURES TO CORRECT THE 'DIGITAL DIVIDE' BETWEEN COMPANIES

The Act to Eliminate the Digital Divide (2002) defines digital divide as the difference in access to telecommunication services because of economic, regional, and social conditions, or difference in the opportunities to utilize telecommunication services. In 2003, the Korea Agency for Digital Opportunity and Promotion was designated as the organization charged with overseeing the elimination of the national digital divide. The institute introduced a five-year plan to eliminate the digital divide. This includes policies and measures aimed at:

- Enhancing information accessibility by those excluded from information use
- Supporting technology and content development for reducing the digital divide
- Educating people in the use of information
- Increasing social awareness of the digital divide
- Promoting the productive use of information and preventing its misuse
- Fostering international cooperation

The problems of SMEs include insufficient budget for informatization and for SME solutions, inadequate IT manpower and weak business structure.

1. Human Resources

With the emergence of new IT businesses and the steering of traditional industries into the IT sector, the demand for skilled labor is increasing rapidly. There is currently a shortage of

approximately 40,000 skilled workers in the IT industry. This labor shortage is expected to reach as high as 140,000 workers by 2005. To overcome current and future shortages, the government has invested in support for education in the information and communication area, establishment of a technical high school specializing in software development, and basic research in related subjects.

To help resolve manpower shortages among SMEs, the SMBA is moving forward with efforts to build a structure to provide manpower support to SMEs. These efforts include enactment of the Act on Special Measures for Human Resources Support to SMEs, slated for the latter half of this year, as well as the distribution of advanced human resources (HR) management manuals and recognition and expansion of companies with good HR practices.

2. Technical Aspects

As part of its efforts to expand the infrastructure for supporting the technology innovation of SMEs, the SMBA is working to establish a government-level SME Technology Innovation Promotion Plan, and is gathering SME technology-related statistics on items such as technology development resources, technology development investment, technology competitiveness, and technology development performance. Additionally, included in the framework for support is the promotion of international technology cooperation by SMEs through joint technology development efforts with foreign universities and research institutes, as well as the intensive promotion of innovative businesses (“Inno-Biz Program”) and an active search for strategic technologies for SMEs.

Due to high costs and low returns, telecommunications service providers are unwilling to expand broadband networks to rural areas. To solve this problem, the government provides an incentive to service providers so that remote regions, such as rural areas, islands and mountainous regions, will have access to information comparable to that found in larger cities.

3. Financial Aspects

As of 2003, in order to improve SMEs’ access to capital, the SMBA is coordinating a 2.8 trillion-won policy fund. Fund assistance to SMEs by the SMBA takes the form of either loans or investment. The details of such assistance activities are entrusted to the Small Business Corporation (SBC).

To create an environment for stable funding of SMEs, efforts are being made to simplify the procedures for SMEs to obtain policy-fund assistance. At the same time, efforts are underway to expand financial assistance for special purposes, such as export and technology development. In addition, financial institutions are being encouraged to extend loans or credit based on their own credit evaluation, rather than relying on the presence of collateral.

Providing credit guarantees to SMEs is another important means of financial support. In order to increase the benefits of this mechanism, SMBA plans to build up a guarantee fund amounting to 40 trillion won, while simplifying the screening process and promoting advancement of the credit-guarantee infrastructure by establishing a cyber guarantee system.

The government has assumed the role of leading investor in newly formed venture investment funds to facilitate the supply of funds. Currently, the government agencies involved in venture investment funds include the SMBA, the Ministry of Information and Communication, and numerous other central government ministries and regional government offices.

4. Infocenters

The government is now supporting the establishment of free Internet facilities at community centers for low-income areas and remote regions, such as islands. At the end of 2002, almost all towns and villages had at least one center offering free Internet access.

As part of efforts to stimulate digital management by SMEs, SMBA has decided to support ASP (Application Service Provider) types of e-business solution projects, following the selection

of four small business consortiums. The four business consortiums selected by SMBA are: Korea Agriculture & Food Trade Cooperative (KAFTC); Korea Crafts Artist Association (KCAA); Korea Association of Advertising Specialty Suppliers (KAASS); and Korea Fashion Textile Association (KFTA).

SMBA's support package for e-business, specialized by sector, includes partial financing for development of solutions, publicity for related business sectors and firms, and guides to system utilization.

D. E-GOVERNMENT AIMED AT SMES AND TRADE PROMOTION

1. Overall Strategy/Structure of e-Government

In November 2002, the e-government project was officially launched. Through a government-wide consensus, 11 e-government initiatives were established in 2000 and were completed within two years. E-government services allow citizens to apply for government services and access personal records stored in the government database, all via the Internet.

Government records of resident registration, real estate, vehicle registration, private businesses, and personal taxes are vital to individual citizens. The Government for Citizens (G-for-C) System integrates these government records into an information sharing system and combines various Internet-based government agencies into a single window e-government system. The G-for-C system interconnects the database networks residing in the Ministry of Government Administration and Home Affairs (MOGAHA), Supreme Court of KOREA, Ministry of Construction and Transportation (MOCT) and other government agencies that store independent government records.

The Home Tax Service (HTS) system, via the Internet, allows taxpayers to file tax returns, receive e-bills, and process e-payments from their homes via the Internet. With the establishment of the Government e-Procurement Service (GePS), procurement processes involving bidding, contract agreements, and payment for services or supplies take place online in real-time. At the same time, the National Finance Information System (NAFIS) offers real-time financial information to high-level government officials by interconnecting the independent financial systems residing in each public agency.

2. Some Applications

a. E-procurement

Informatization of government procurement services through the introduction of online services enhanced the productivity and transparency of these services by reducing the time required to process documents (from more than 2 days to less than 30 minutes).

b. Customs and other trade-related procedures

Informatization of customs services has shortened the processing time (for exports, from more than a day to less than two minutes; for imports, from more than two days to less than two and a half hours), and has reduced logistics costs by at least 500 billion won per year.

c. E-finance and/or e-payment

Electronic payment markets for online purchases are growing rapidly. The electronic payment business became a 16.68 trillion-won market in 2002, posting a 31% increase over 2001. In 2003, the business is projected to grow to 24.71 trillion won. The most common electronic payment method is the use of credit cards. Other electronic payment methods are Internet Secure Payment (ISP), which is based on e-commerce authentication, wire transfers, payment over mobile phones, e-money, and the use of membership card points to purchase goods online.

As of September 2002, the number of subscribers who had signed onto Internet banking services reached 16.94 million. Most banks lowered their fees for bank wire transfers for people using this service on the bank's websites. This strategy has attracted many subscribers and banks have since introduced new banking services such as the electronic bill presentment and payment (EBPP) service, loan services via the Internet, integrated balance statements for people with several bank accounts, bank wire transfers via the Internet, and e-Customer Relationship Management (e-CRM) services. Approximately 17.71 million people had signed onto Internet banking services offered by the post office and by each of the domestic banks, Citibank and HSBC, as of the end of December 2002.

E. INSTITUTIONAL ISSUES

1. Standardisation, such as Codes for EDI and Cryptography

The government has promoted the establishment of standards regarding networking between industries, IT-related industries, banking, distribution, transportation, and manufacturing industries. The government will lead the development of standard-setting for next-generation core technologies in five strategic e-business services: SCM, CRM, ASP, EBPP, and e-market place. While reflecting the trends of international standards in the development of these technologies, the government will promote outstanding domestic technology as an international standard.

2. Key Public Infrastructures

The development of network equipment technology for high-speed information infrastructure is divided into the HAN/B-ISDN and MPLS projects. The HAN/B-ISDN project concerns the development and marketing of asynchronous transfer mode (ATM) optical transmission equipment, which is a critical component of the high-speed information network. The government invested 685 billion won during the decade from 1992 to 2001 in these projects. The MPLS is a project that deals with the development and marketing of multi-protocol label switch (MPLS) technology to obtain functional improvement of the Internet ATM exchange. This project was injected with investments of 225.55 billion won from 1999 to 2001.

3. Intellectual Property Rights (IPRs)

The computer Program Deliberation and Mediation Committee (PDMC) plays a central role in the protection of software IPRs. According to a survey by PDMC in 2004, the use rate of (legal) genuine software products is 80% in Korea. The problem lies not in the law or institutional arrangements, since Korea has many different IPR-related laws and protection systems. Rather, it is the application of the laws that poses the problem, with people's mindset representing the most vital factor.

4. Others

In the Internet banking sector, certificate authentication is widely used to verify transactions. The establishment of the e-Government in November 2002 has also helped the spread of certification authentication among Internet users, since without an authentication code many transactions are impossible. In addition, since the government has made the use of certificate authentication part of its policy in countering financial fraud, more people are using authentication codes.

In January 2001, the Korean government passed the Act to Promote the Utilization of Information and Communication Network and Data Protection, aimed at protecting critical communication infrastructure and computer systems operated by key national industries –such as finance, telecommunications, transportation and energy– from computer hacking and virus attacks.

V. Conclusions and recommendations

The most significant policy of the Korean government in support of digitization and e-commerce among SMEs is the “Thirty Thousand SME Informatization” Project, which was launched in 2001 to strengthen competitiveness and innovation among SMEs through the use of IT. Over the last three years, the government invested 11 billion won to support informatization of more than 30,000 SMEs. As a result, many SMEs have seen cost reductions and productivity gains. Combining IT with traditional industries helped SMEs to increase their competitiveness in relation to large domestic firms and foreign competitors in countries such as China. The project also helped SMEs develop better cooperative networks with large firms and among themselves.

The case studies in this report suggest several conclusions and lessons, which are summarized as follows:

First, utilizing IT infrastructure and government support programs, many SMEs in Korea have attempted to solve problems and eliminate barriers to digitization of their businesses. The most important factors in success are the firms’ own motivation and initiative.

Second, hardware is only one aspect of the success. The culture and atmosphere of cooperation is equally important for successful e-Business or e-Trade. This culture cannot be developed solely by the government, but must be fostered through social institutions, education and the business environment.

Third, the portfolio and investment strategy of firms represents an important element. SMEs normally do not have a well-formulated strategy, and lack sufficient investment resources for informatization. In a period when the IT boom has been dissipating, it is even more difficult to invest in IT. Government supports are often wasted on choosing the wrong targets, due to a lack of information.

The task of providing SMEs with the capabilities to use IT to enhance their businesses, as well as for trade, remains largely unfinished. This involves:

- Development of medium- and long-term technology for combining IT with traditional industries;
- Promotion of product development utilizing IT;
- Promotion of e-Trade; and
- Training manpower for IT applications.

Despite the proactive policies of the government and the efforts of related organizations and firms, e-Trade in Korea has not yet been developed sufficiently. Weak areas are found in: low utilization of the e-general trading companies; low profitability of e-Trade service providers; low level of digitization (particularly among SMEs); and insufficient infrastructure.

Since e-Trade is part of e-business more generally, firms must have the mindset for e-business and for overall development of e-business in order for e-Trade to develop. Above all, Korea needs to establish more efficient e-business infrastructure. In particular, SMEs need to actively utilize available support measures and policies. However, at present they lack the capacity to do so. Thus, the role of the e-general trading company should be strengthened.

Though Korea’s progress in e-Trade development has not yet reached optimal levels, the accomplishments to date often seem impressive to outside observers. The active role of the Korean government in e-Trade development, through various policy measures, confirms the crucial role of government, particularly in regard to constructing needed infrastructure and establishing the appropriate legal arrangements.

References

- Korea International Trade Association. June 2002. *Cases of IT-zation of Traditional Industries and Policy Implications: Focusing on Exporters*.
- Ministry of Information and Communication, ROK. 2002. *IT Korea 2002*, Republic of Korea.
- Ministry of Information and Communication, ROK. 2002. *e-Korea Vision 2006*.
- Small and Medium Business Administration, ROK. 2003. *White Paper 2003*.
- National Computerization Agency, Ministry of Information and Communication, ROK. 2000. *White Paper Internet Korea 2000*.
- National Computerization Agency, Ministry of Information and Communication, ROK. 2002. *White Paper Internet Korea 2002*.
- National Computerization Agency, Ministry of Information and Communication, ROK. 2003. *White Paper Internet Korea 2003*.
- Small and Medium Business Administration, ROK. 2002. *SMEs Policy in Korea 2002*.
- Small and Medium Business Administration, ROK. 2003. *The 21st Century with Strong & Innovative SMEs*.
- Ministry of Commerce, Industry and Energy and Korea Institute for e-Commerce. 2004. *e-Business White Paper 2004*.

SINGAPORE

Wong Poh Kam

Annette Singh

I. Introduction

The IT revolution played a prominent role in the rapid industrialization of Singapore (Wong & Singh 2002). Government efforts at providing infrastructure, investment incentives, education and training incentives, and setting an example by itself being a lead user of IT, helped Singapore to achieve a high level of IT diffusion. This is particularly evident in the public sector and in large companies; however, SMEs tend to lag somewhat in their knowledge and adoption of IT.

This report discusses the trends of IT usage by local SMEs in Singapore, and uses case studies to highlight the number of SMEs that are potentially willing to invest substantial resources in appropriate IT. Policy measures taken by the government to assist SMEs in their business and IT development are also discussed.

II. Present situation of IT market and IT usage by SMEs

A. MARKET ESTIMATES

The Singapore market for computer hardware has grown fairly consistently from US\$ 1.2 billion in 1988 to its current size of US \$ 5.7 billion (table 1). The only two periods in which we see negative growth in the market were the two recessions: 1998 (the Asian financial crisis) and the recent recession in 2001. Both of the downturns were quite severe, with growth contracting by about one third each time.

IT penetration in Singapore households and businesses is high. Further growth in the market, then, will come mainly from existing users upgrading or extending their IT, rather than from new users. This is especially true of the private sector, where there is a high level of usage of basic information technologies, but companies have been much slower to adopt newer forms of technology. The level of e-commerce, as measured by proportion of sales revenue, is also high compared to other countries in the region. There is scope for growth in e-commerce in Singapore, but it will mainly come from B2B e-commerce, given that Singapore's small size and shopping convenience lowers consumers' desire and perceived need for shopping online.

B. PENETRATION OF IT AND E-COMMERCE BY SMEs

In this study, we adopt the same definition for SMEs as that used by the Singapore government, that is those firms having a net fixed asset investment of less than \$ 15 million and fewer than 200 employees. Since our interest is confined to local entities, we have an additional condition that they must have more than 30% local ownership.

TABLE 1
MARKET SIZE FOR COMPUTER EQUIPMENT IN SINGAPORE, 1998-2002

	US\$ million	CAGR (%)
1988	1,244	n.a.
1989	1,846	48.4
1990	2,210	19.7
1991	2,582	16.8
1992	2,872	11.2
1993	3,471	20.9
1994	4,090	17.8
1995	5,504	34.6
1996	6,794	23.4
1997	7,614	12.1
1998	5,274	-30.7
1999	6,377	20.9
2000	8,002	25.5
2001	5,355	-33.1
2002	5,730	7.0
Growth rate 1988-1995	23.7	
Growth rate 1995-2002	0.6	

Source: Yearbook of World Electronics Data 1990-2004, Elsevier.

Usage of basic forms of IT

IDA's (Infocomm Development Authority of Singapore) survey of infocomm usage in business in 2002 showed, not surprisingly, that SMEs tend to lag behind large companies in their adoption and knowledge of IT, especially in the more advanced forms of IT. This is true when comparing SMEs to both local and foreign large companies, although the difference is usually more pronounced with the latter (NUS 2003).

However, for the most common forms of IT (PCs, workstations and laptops, for example), SME usage levels (84%) are almost equivalent to large companies. Similarly, a high proportion of employees (three quarters) in SMEs have access to computers.

ICT usage sophistication and diversity

An indication of the diversity of IT usage by SMEs and the sophistication of the level of technology readiness in SMEs is given by the Index of Infocomm Sophistication. The Index measures the extent to which organizations deploy a range of technologies: intranet, extranet, company computer networks (e.g. local area networks [LAN], wide area networks [WAN]), wireless application protocol (WAP), EDI/web-enabled EDI (electronic data interchange), virtual private network and smart card technology. The higher the Index (i.e. the closer it is to 7), the more sophisticated the level of technology readiness and the more diversified the company's use of IT.

SMEs¹ in Singapore have a relatively low level of IT sophistication, having a Sophistication Index of 1.1, significantly lower than local and foreign large companies (2.5 and 2.8 respectively). There is also limited scope for growth in usage of these technologies amongst SMEs, with only about 5% planning to adopt any of them within the next year.

¹ For the rest of section II.B, figures will refer to companies that already use IT, unless otherwise stated.

IT expenditure

The average SME spent an average of \$ 32,000 on IT in 2002, much lower than the spending of local large companies (\$ 1.2 million) and foreign large companies (\$ 856,000). It should be noted that this lower level of spending is not merely because SMEs are smaller in size and so have fewer resources to spend on IT. The average foreign SMEs spent \$ 74,000 on ICT in 2002, more than double that of local SMEs. The bulk of SME's ICT budgets are spent on hardware and software. Very little is spent on external infocomm services and infocomm manpower.

Motivations and benefits of IT usage

From the SMEs' perspective, there are multiple factors that would motivate them to use IT. All the potential benefits are considered to have almost equal importance: reducing costs, gaining access to customers; improving customer service and increasing efficiency by streamlining internal business processes and improving productivity.

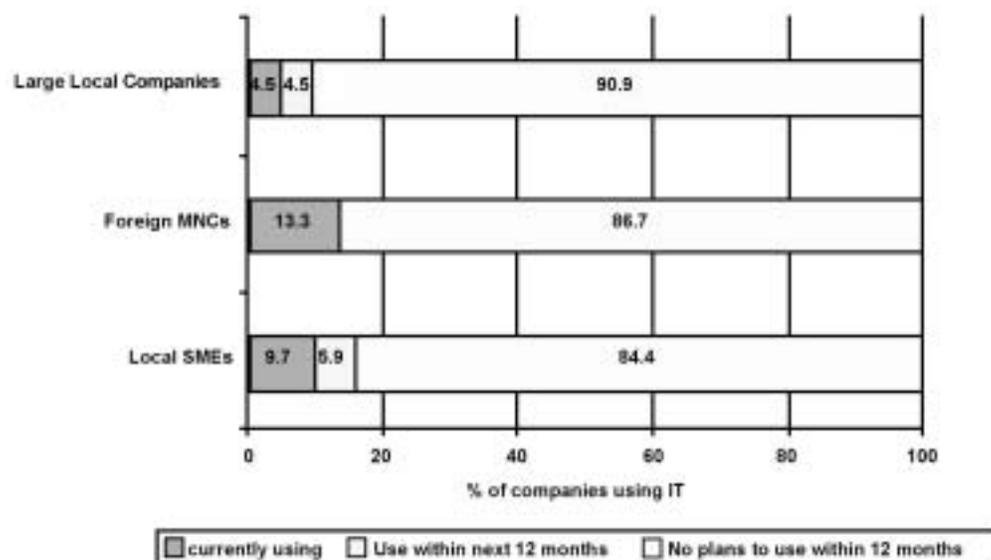
However, the most important factor SMEs consider in the adoption of new information technology is its affordability, along with a conviction that the new technology will benefit the company. The need for financial assistance specifically targeting SMEs is reflected in the fact that the availability of such assistance is rated as significantly more important by SMEs than by local large companies.

Usage of ASPs and web services

Absolute levels of ASP (application service provider) usage by SMEs is somewhat low, with only 10% currently making use of them, and the vast majority having no plans to do so within the next 12 months (figure 1). However, SMEs are among those with the highest potential growth for ASPs, with 6% planning to use ASPs within a year.

The greatest benefits for SMEs in using ASPs are gaining access to the latest technologies and upgrades and obtaining cost savings. This points to a potentially important role for ASPs in helping SMEs stay abreast of technology. The advantage that firms gain from subscribing to ASPs is particularly relevant for SMEs, which have fewer resources available to keep up to date with

FIGURE 1
USAGE OF ASPs BY FIRM STATUS



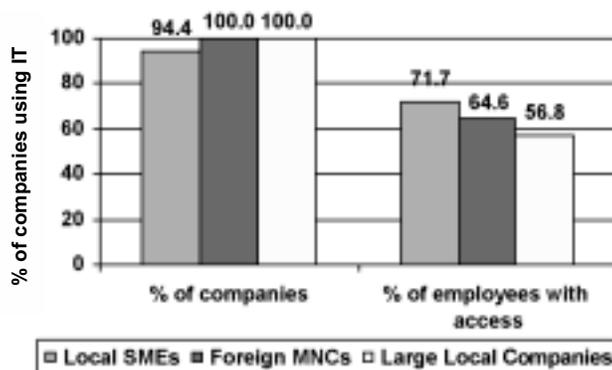
Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*

changes in technology and to procure and implement them. This is reflected in the fact that SMEs rated this benefit of using ASP as significantly higher than did large companies.

Usage of the internet and e-commerce

The overwhelming majority of SMEs (94%) use the internet, and 72% of employees have access to the internet (figure 2). For those companies that already use the internet, or plan to do so, the key motivating benefits are gaining access to information and improved communications. SMEs also see the internet as a means to raise their profile, rating more effective marketing and higher visibility as significantly more important benefits than did large local companies.

FIGURE 2
INTERNET PENETRATION IN SINGAPORE BY FIRM STATUS

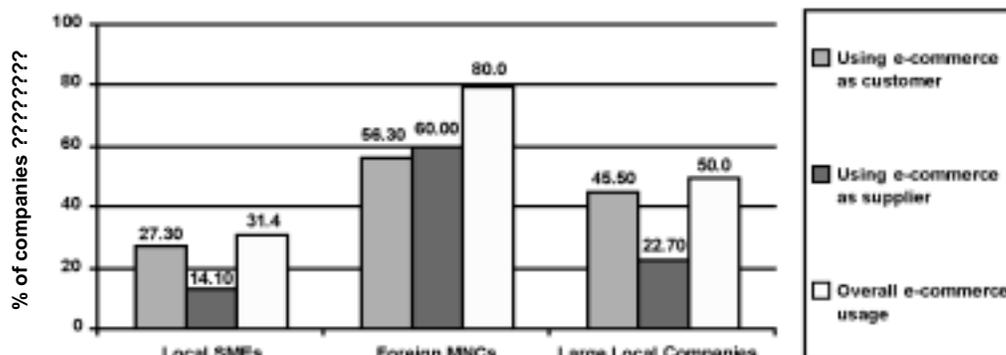


Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*

The most common forms of internet use by SMEs are information search (98% of SMEs with internet access), e-mail (99.9%) and exchanging electronic files (88%). A smaller proportion also uses the internet for purposes such as advertising/marketing, providing information on their own websites, and accessing supplier databases.

SMEs engage in e-commerce much less than large companies, and those that do engage in e-commerce are more likely to use it for buying rather than for selling. SMEs with internet access using e-commerce as customers account for 27.3% of the total, but only 14% use e-commerce as suppliers (figure 3).

FIGURE 3
E-COMMERCE USAGE BY FIRM STATUS

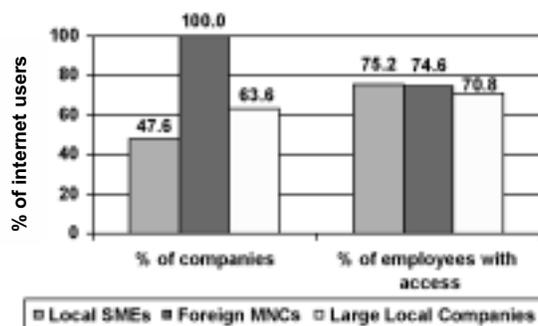


Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*

Usage of broadband technologies

Almost half (48%) of Singapore’s internet-using SMEs have broadband access (figure 4). SME broadband users are most likely to use broadband for fairly simple uses, such as online research and internal communications (about 50% of SME users). Using broadband as a platform to deliver content, for marketing/promotion, and to access multimedia applications and collaborative tools such as file sharing is also relatively common.

**FIGURE 4
BROADBAND PENETRATION IN SINGAPORE BY FIRM STATUS**



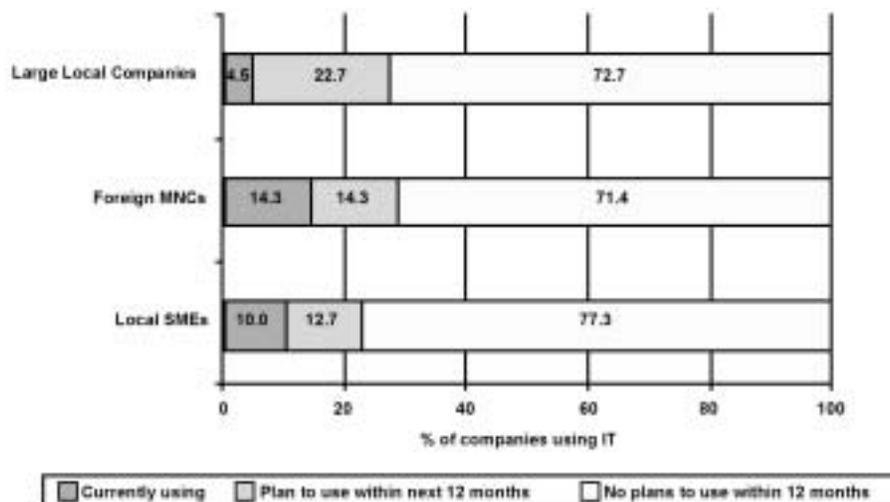
Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*

Increased productivity is the most commonly cited benefit of broadband services for SMEs (81% of those with broadband access). Lower cost and overheads and faster turnaround and time to market are also widely perceived benefits. Reliability and stability are the most important considerations for SMEs when deciding whether to adopt broadband services and applications, followed by affordability.

Usage of wireless technologies

Only a minority of SMEs (10%) currently use wireless LAN, and three quarters have no plans to do so in the next year (figure 5). Nevertheless, they do see it as having wide potential/actual applications in their organizations, in functions ranging from admin/HR to operations/logistics and R&D.

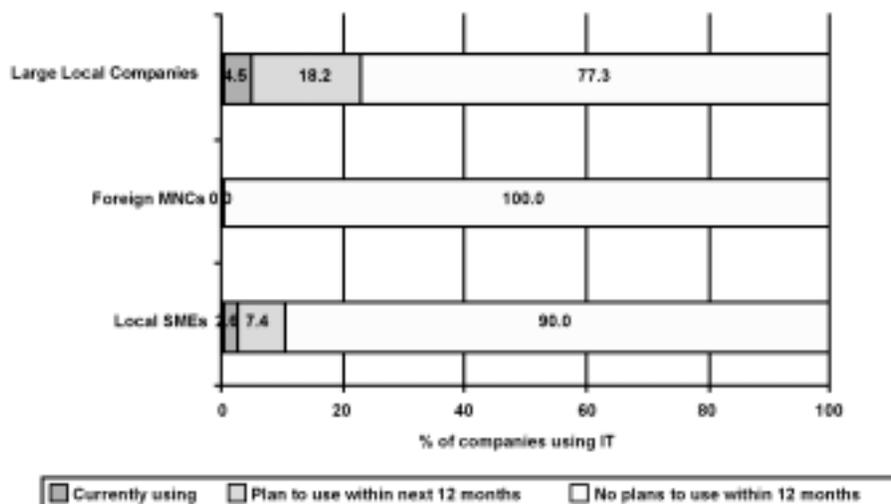
**FIGURE 5
USAGE OF WIRELESS LAN BY FIRM STATUS**



Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*

Usage of GPRS is even less common than wireless LAN (used by 3% of SMEs) (figure 6). As with the other advanced forms of IT, there is some growth potential, with another 7% planning to use GPRS within the following 12 months.

FIGURE 6
USAGE OF GPRS BY FIRM STATUS



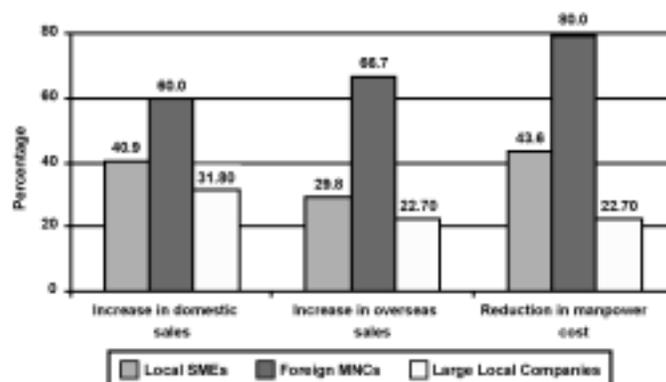
Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*.

Cost concerns are not uppermost in preventing SMEs from adopting wireless technologies, but rather their concerns over the compatibility of technologies with their organization. Acceptance of the new technology by their workforce and changes needed to existing business procedures and workflows were cited as the most important barriers preventing SMEs from implementing wireless technologies.

Impact of IT usage

Only a minority of SMEs reports reaping tangible benefits from IT usage. Forty-one percent of SMEs using IT had an increase in domestic sales, 30% reported an increase in overseas sales and 44% reported a reduction in their manpower costs (figure 7).

FIGURE 7
PROPORTION OF COMPANIES CITING TANGIBLE BENEFITS OF IT USAGE BY FIRM STATUS

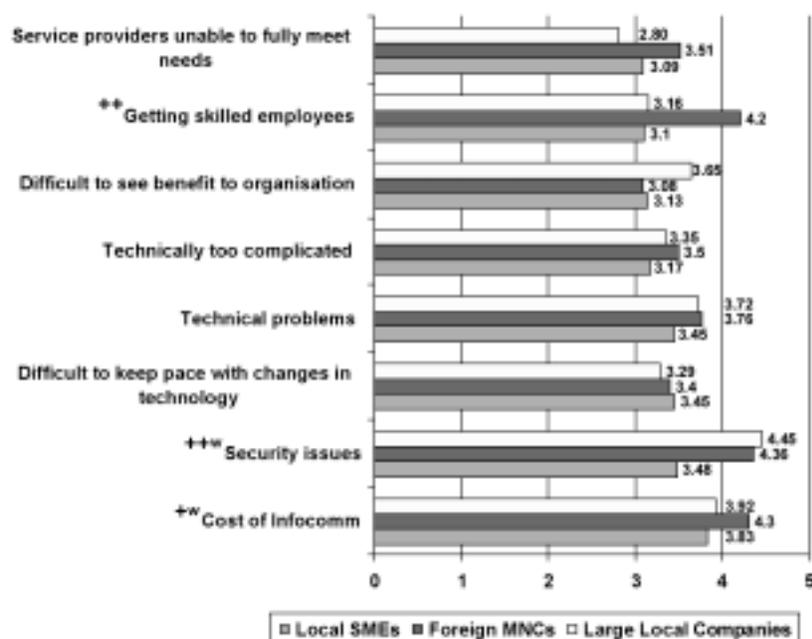


Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*.

Perceptions and attitudes towards IT

As expected, SMEs (including IT users and non-users) cite costs as their main concern about using IT (figure 8). Security issues, technical problems (such as systems breakdowns) and the difficulty of keeping pace with changes in technology are also important concerns. Given that costs are their overriding concern, it is not surprising that SMEs see financial grants and assistance as the most effective measure for encouraging the use of IT technologies, followed by assistance in skills and knowledge acquisition (figure 9).

**FIGURE 8
PERCEPTIONS OF ISSUES PERTAINING TO IT USAGE
BY FIRM STATUS**



+ ANOVA: Difference is significant at 5% level.

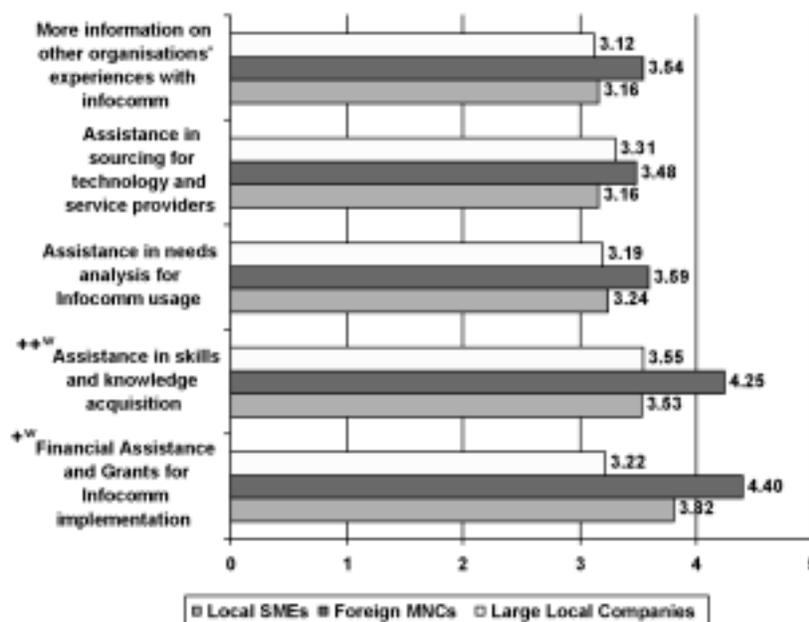
++ ANOVA: Difference is significant at 1% level.

w Welch ANOVA test statistic has been used.

Note: Mean score calculated on a 5-point scale where 1 = not at all concerned and 5 = extremely concerned.

Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*.

FIGURE 9
EFFECTIVENESS OF MEASURES TO ENCOURAGE IT USAGE BY FIRM STATUS



++ ANOVA: Difference is significant at 1% level.

^w Welch ANOVA test statistic has been used.

Note: Mean score calculated on a 5-point scale where 1 = not at all effective and 5 = extremely effective.

Source: Calculated from *Annual Survey of Infocomm Usage in Business 2002*.

Summary and conclusion

As with the private sector as a whole, IT penetration in Singapore's SMEs is fairly high, especially in basic IT such as computer and internet usage. Thus, further IT development among Singapore SMEs would largely take the form of helping current users to deepen their technological capabilities. They should be encouraged to use network technologies such as extranet and web-enabled EDI to more efficiently integrate and co-ordinate their supply chain activities with business partners. Similarly, those that are already using these established technologies could be encouraged to upgrade to newer technologies such as virtual private networks or smart card technologies. This is especially important given the link between the degree of globalization (defined as the share of exports in total sales) and the sophistication of IT used, suggesting that one way to facilitate SMEs' expansion into overseas markets is to increase the sophistication of their IT usage (NUS 2003).

Some specific technologies discussed in this report are ASPs, e-commerce, broadband services and wireless technologies. As mentioned above, ASPs are a useful resource for SMEs to keep themselves technologically updated. Since a key barrier to the use of ASPs is lack of knowledge about ASPs, SMEs need to be educated on the capabilities and potential of ASPs and Web Services to help businesses manage their applications and systems integration (NUS 2003).

Given the positive relationship between the scope of e-commerce activities and the globalization of businesses, SMEs should be actively encouraged to engage in, and further develop, their EC activities (NUS 2003). There is substantial scope for growth in this area, with less than one third of SMEs currently using e-commerce.

Very few SMEs use wireless technologies such as GPRS and wireless LAN technologies. In order to increase the adoption of wireless technologies amongst SMEs, their concerns over the compatibility of these technologies with their organizations needs to be addressed.

SMEs need not only to extend the range of IT they use, but also to more fully exploit the technologies they already have. Existing IT is commonly used for simple operations, such as using the internet mainly for information searches, e-mail or exchanging files, rather than incorporating it into production/distribution processes. However, it is not mere technological accumulation that leads to tangible benefits such as increased sales and cost reductions, but rather using that technology (NUS 2003). It is possible that one reason SMEs are not benefiting more from the IT they have already implemented is because they are not using it to their full capability. Thus it is important for SMEs to be able to make full use of the technologies they already have.

This will require various forms of assistance: education to know which forms of IT would best meet the needs for organization and how to fully exploit them; financial assistance to acquire the technology; and technical assistance to integrate them with their existing systems.

Although SMEs give their employees wide exposure to IT relative to large companies, they spend comparatively little on IT manpower development. Most of their IT budgets are spent on hardware and software. SMEs also need financial and technical assistance to maintain their ICT manpower training and skills upgrading. This is especially critical given that there was a decrease in the proportion of IT budgets spent on Singapore IT manpower between 2000 and 2002, particularly for small organizations (NUS 2003).

III. SME development in the IT revolution

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMEs IN THE OVERALL ECONOMY

Although the Singapore economy is largely dependent on leveraging on MNCs, local SMEs are also an important part of the Singapore economy. They comprise 92% of total establishments, employ 51% of the workforce and generate 34% of the total value added. However, their productivity is only about half that of the non-SME establishments (SPRING website).

Singapore SMEs have structural weaknesses which result in poor productivity. These include:

- Weak entrepreneurial culture;
- Insufficient management know-how and professionalism;
- Shortage of professional and technical manpower;
- Insufficient use of technology;
- Outmoded, unproductive methods of operation;
- Limited ability to tap economies of scale, and
- Small domestic market.

It is important that SMEs overcome these weaknesses in order to survive, especially since they face competition from more productive large companies, both local enterprises and foreign MNCs, as well as the global market.

B. CASE STUDIES ON E-COMMERCE AND SUPPLY CHAIN MANAGEMENT (SCM) IN SELECTED INDUSTRIES

1. RichLand Logistics Services

Company profile

RichLand Logistics Services was founded in February 1992 by Mr Lim Chwee Kim, and has experienced remarkable success over the last decade. It has generated profits every year of its

operation, resulting in profit margins of 9%-10% (The Edge Singapore 2004). RichLand's turnover was S\$ 32.2 million in 2003, almost double that of 2000 (S\$ 16.1 million) (Annual Report 2003). The company has two principal activities: transportation management; and airport cargo terminal handling and supply chain services (Company prospectus). The bulk of RichLand's turnover comes from transportation management services (75.6% in 2003).

Technologies introduced, purpose of IT usage and its impact

RichLand puts great emphasis on its use of IT. Technology is seen as one of the key elements of its success, enhancing its ability to provide value-added logistics services to its customers (The Edge Singapore 2004, Company prospectus).

Transportation Management System

RichLand launched its Transportation Management System (TMS) in July 2001. The TMS is a web-based system which allows users to take orders, schedule traffic, bill and track cargo. All orders are handled through the central system and are sent to drivers through hand-held electronic devices (handphones or personal digital assistants [PDAs]). Delivery teams also use these devices to update information on the delivery status of their cargo, which is then transmitted to a central database. Customers can use the RichLand website to track their cargo delivery status online, while an EDI B2B e-commerce system allows the delivery status to be transmitted to customers' systems. Initially, the TMS used an SMS platform to transmit information, but this was updated to a GPRS system (The Edge Singapore 2004, Company prospectus, Lim 2004). The two main objectives of the TMS - to satisfy customers' needs for instant information and to improve internal efficiency – have largely been met.

Customer Feedback Management System

The Customer Feedback Management System (CFMS) was developed to centralize feedback from customers and allow the company to respond in a timely manner. The system captures comments from customers, and the data are used to generate monthly reports so that the performance of each operation can be evaluated. Company industrial engineers regularly analyse the problems and formulate solutions in response (Company prospectus, Lim 2004).

Inbound Management System and Wireless Warehouse Management System

In 2002, RichLand further extended its IT capabilities with its Inbound Management System (IMS) and Wireless Warehouse Management System (WWMS). The IMS allows users to capture shipping information electronically and use it for permit declarations, thus saving time and minimizing errors by reducing manual data entry.

The WWMS is also a GPRS-based system, used to manage inventory at FTZ warehouses.² It processes information scanned from bar codes on the cargo, allowing real time updating of information relating to the movement of goods, and giving the company and its customers much more accurate information concerning their cargo (The Edge Singapore 2004, Company prospectus).

Summary of IT usage and future challenges

From the above account, it can be seen that RichLand has made substantial investments in IT infrastructure and web-based applications, which it has harnessed for a more efficient and effective distribution system. The use of its wireless, web-enabled real-time track and trace system gives greater flexibility and more accurate data regarding cargo movements, so that at any given time, the company and its customers know exactly where their cargo is. It has also reduced response time, minimized data entry errors, and reduced reliance on paper documentation (Company prospectus, The Edge Singapore 2004).

² FTZ Warehouses are warehouses in an area within Changi Air Freight Centre where goods are held duty-free until cleared by Customs.

As the company embarks on its regional expansion plans, it will face still more IT challenges. Expanding overseas will require an expansion of its current local network to incorporate overseas operations. In addition, the TMS is designed for transportation within Singapore, where distances are short. Once the company expands regionally into larger countries, it will have to incorporate long-haul distribution into its system.

Challenges for SMEs in introducing and utilizing IT

The biggest challenge RichLand faced with regard to adopting its IT systems was staff acceptance and adaptation. Having become used to manual processes, employees were reluctant to move to a computerized system.

RichLand's adoption and exploitation of IT is also constrained by the nature of its industry and by the IT sophistication of its customers. Initially, the company wanted to use the TMS to optimize job planning, but found that staff preferred to do planning manually, especially given the many last-minute changes inherent in the transportation industry. Furthermore, if customers do not want to computerize their own systems, RichLand cannot fully exploit its own IT. For example, although the TMS can transmit cargo information to clients' systems via EDI whenever the RichLand system is updated, few customers make use of this service.

Lessons learned from the case

The RichLand case offers some insights and lessons that can be learned for IT usage in SMEs:

1. The company must see the need for IT, recognizing its relevance to the industry, and its ability to give the company an edge over its competitors. RichLand took steps to adopt an IT system as a way of giving better service to customers and differentiating themselves from competitors, and so became the first local logistics company to have such a system.
2. The success of IT use in a company depends not only on the physical infrastructure, but also on the people. Adequate attention must be paid to training staff and addressing their concerns in using IT (Company prospectus).
3. SMEs face external constraints that limit or discourage their IT usage. These can be due to the nature of the industry, or the IT sophistication of their suppliers and/or buyers. One example of this is the labour-intensive transportation management industry, where most small companies do not have the critical mass to be able to implement sophisticated IT systems. Furthermore, if suppliers and buyers do not have a high level of IT usage, there is little incentive for SMEs to adopt their own systems.

2. Uniseal Waterproofing

Company profile

Uniseal Waterproofing was incorporated in 1998 and has since become one of the leading waterproofing companies in Singapore. Providing roofing and waterproofing solutions to residential and commercial properties remains its core business, but the company also provides services for new buildings. Uniseal also has an active R&D division, and through its efforts has pioneered waterproofing treatment for tiled roofs (Computerworld 2003, Company website, Choo 2004).

Although it is a small company, with a staff count of about 30 people in Singapore, Uniseal has successfully expanded overseas. It established operations in Malaysia in 2002, and then in India and the Philippines in 2004. Its expansion is continuing, with the company looking into establishing operations in Thailand.

Technologies introduced, purpose of IT usage and its impact

One of Uniseal's key business strategies is providing good customer service, through which it gains subsequent referrals. As such, Uniseal's IT systems are aimed at enhancing customer service as well as streamlining operations.

Wireless Sales Force Automation System

The Wireless Sales Force Automation System was implemented in order to improve customer service, reduce response time, track stock, and improve overall company productivity and profitability. It gives staff instant access to information regarding customers and available warehouse stock. Salespeople onsite use PDAs to access job details and create maintenance service orders and sales orders and submit them wirelessly to the office. The system also allows the staff to monitor the availability of stock at any point in time. Uniseal's wireless system has also helped it to improve its closing rates, attract customers and reduce delays in billing and quotations (Choo 2004, Computerworld 2003).

Wireless Project Tracking System

Uniseal's Wireless Project Tracking system was implemented to improve the company's project management, specifically, to facilitate monitoring project schedules, manpower allocation and costing. The system allows project managers and supervisors to use PDAs to retrieve real-time project information and submit updates on project progress and resource usage. The Wireless Project Tracking System gives the company more accurate information that can be used for analysis and decision-making. It has also improved payment tracking and reduced administration and processing costs (Computerworld 2003, Choo 2004).

Customer Relationship Management (CRM) module

Uniseal implemented a CRM system in 2004. The system, which is not wireless, tracks information on customers and potential customers regarding enquiries, problems faced and service provided. Data from the CRM is analysed to identify weaknesses and recurrent problems, and to determine their causes.

Summary of IT usage and future challenges

Uniseal's desire to be a leading waterproofing company has prompted it to undertake substantial investment in IT compared to other companies in the Singapore construction industry. Its wireless IT system has given it greater access to data and project information, allowing managers to make more informed decisions, and improving analysis of pricing changes and promotions. Perhaps one of its key benefits has been improving product availability by enabling faster analysis and recognition of changes in demand (Computerworld 2003).

As with RichLand Logistics, the biggest challenge Uniseal faced in implementing its IT systems was acceptance by staff. Company employees initially preferred using the old system and were reluctant to take the time to learn how to use the new system and become comfortable with it.

Unlike RichLand, however, Uniseal is heavily dependent on its IT consultant. Lacking its own IT department and IT-trained staff, Uniseal would not on its own know what technologies are available or how they can help its business. This heavy dependence has worked well in Uniseal's case because its consultant has a good understanding of its business and the technologies that would be most relevant for it. At the same time, the company maintains the final decision over what is implemented, as the consultant may be keen to install system upgrades or new systems that the company is not ready for, not having fully adjusted to the systems it already has.

Future IT plans for Uniseal involve upgrading its current system with new features. These include finding a way to compress image files so that photos can also be submitted from job sites using PDAs, further reducing delays in producing quotations, and –subject to budgetary constraints– converting the current CRM system to a wireless module.

Lessons learned from the case

The Uniseal case offers some insights and lessons that can be learned for IT usage in SMEs:

1. The relationship between SMEs and their IT consultants is important, because external consultants can play a key role in SMEs' IT adoption. SMEs often lack knowledge of the forms of IT available to them and how they can be harnessed for their businesses. It is thus important that the consultant should have a good understanding of the company's industry, business and culture, including staff familiarity with IT.
2. At the same time, SMEs cannot cede control over the IT implemented to their consultant, as consultants may advise them to implement systems that they are not ready for, or that are not necessary. SMEs themselves are in the best position to decide how effective their IT systems are in improving company productivity and profitability, and how much of their resources are available to adapt to another system (Choo 2004).

IV. Government policies designed for SMEs, IT, and international trade

A. POLICIES TO SUPPORT SMEs

1. Overall policy direction for SMEs and entrepreneurship in Singapore

The government's policy drives to promote SMEs and entrepreneurship in Singapore can be basically divided into three target groups. The first covers SMEs directly; the second targets local enterprises with high growth potential ("Promising Local Enterprises") and a chance to be nurtured into globally competitive multinational enterprises in the future; and the third is aimed at high-tech start-ups in knowledge-based, emerging sectors which carry a high risk but hold promise for significant growth through innovation and intellectual property.

SME 21: Promoting SMEs

(Source: www.spring.gov.sg, Wong et al 2004)

The main policy plan for the support of SMEs is outlined in the SME 21 master plan, a ten-year strategic plan which was launched in January 2000. The aim of SME 21 is to build up the capabilities of SMEs in order to enhance their contribution to Singapore's competitiveness and economic growth.

The plan outlines three major targets to achieve by the year 2010:

- To double productivity gains in the retail sector from S\$ 28,000 to S\$ 56,000.
- To triple the number of local SMEs with sales turnover of S\$ 10 million and above from 2,000 to 6,000.
- To quadruple the number of local SMEs with e-commerce transactions from 8,000 to 32,000.

In order to accomplish this, the government has formulated a three-pronged approach comprising promotional strategies at the enterprise-level, sector-level, and other broad-based programmes. The Standards, Productivity and Innovation Board (SPRING) has been designated as the lead agency to implement the SME 21 Plan.

The Promising Local Enterprises (PLE) Programme: Promoting High Growth Firms

(Source: www.sedb.com, Wong et al 2004)

Introduced in 1995, the Promising Local Enterprises (PLE) programme aims to nurture strong local enterprises to become Asian MNCs. The Economic Development Board (EDB) is the lead agency to implement this initiative. PLEs are identified as those with strong core capabilities, growth-orientated management and the capacity and critical mass to grow. Under the PLE programme, EDB works with PLEs to develop new capabilities, identify and facilitate strategic alliances and provide growth capital to groom them into world-class enterprises. The programme has set the target of producing 100 PLEs with at least S\$ 100 million sales turnover by 2005.

The Technopreneurship 21 (T21) Initiative: Promoting High-Tech Entrepreneurship:

(Source: www.sedb.com and press reports; Wong et al 2004)

Announced by the Government in April 1999, Technopreneurship 21 (T21) is an initiative involving high-level government and private-sector efforts to prepare and lay the foundation for the successful development of a high-tech entrepreneurship sector in Singapore. It covers four areas critical for the development of technopreneurship: education, financing, regulations and facilities.

The government has also institutionalized the review of rules and regulations with the formation of the Pro-Enterprise Panel (PEP) in August 2000. PEP conducts activities such as evaluating suggestions from business and conducts an annual survey of regulatory agencies' pro-enterprise orientation. As of July 2004 PEP had received more than 1,200 suggestions from business, of which about half were accepted.

The T21 initiative provides a number of initiatives and measures to stimulate and support entrepreneurship. These include the Technopreneur Investment Incentive (TII), now expanded and renamed the Entrepreneur Investment Incentive (EII), the Directors and Advisors for Technopreneurial Enterprises (DATE) programme and the Startup Enterprise Development Scheme (SEEDS).

Economic Review Committee: Entrepreneurship and Internationalization Sub-Committee

(Sources: Entrepreneurship and International Sub-Committee of the Economic Review Committee at MTI website: www.mti.gov.sg and press reports)

The Economic Review Committee (ERC), set up in December 2001 to devise the future direction of Singapore, built on and expanded the plans for entrepreneurship outlined in T21. The Entrepreneurship and Internationalization Sub-Committee (EISC) was established as part of the ERC to recommend ways to strengthen entrepreneurship and innovation in Singapore, and to foster the growth and internationalization of Singapore-based companies.

The EISC formulated a framework of six elements to accomplish this:

- Culture: Creating opportunities for young people to develop entrepreneurial instincts and understanding.
- Capabilities: Enterprise capabilities need to be developed at both individual and industry levels. At the individual level, greater flexibility will allow freer movement of talent between the public and private sector. At the industry level, greater collaboration will allow enterprises to leverage each other's strengths to venture abroad.
- Conditions: This element addresses the regulatory landscape as well as the government's role in business. Government should take an enterprise-friendly approach to regulation and economic management.
- Connections: While Singapore has done well in terms of developing the hard structure for global connectivity, such as its transportation capabilities, much can

be improved in terms of soft infrastructure. Specific recommendations include the positioning of International Enterprises Singapore (IE Singapore) as a champion of internationalization.

- Capital: The EISC identified gaps in enterprise financing, specifically in equity financing for start-up enterprises and debt financing for emerging enterprises. Mechanisms were recommended to address these gaps.
- Catalyst: The EISC also recommended a package of incentives and changes to tax regulations to channel more capital towards enterprise.

2. Organizations involved in supporting SMEs and entrepreneurship in Singapore

Establishment of Action Community for Entrepreneurship

(Source: www.ace.org.sg)

The Action Community for Entrepreneurship (ACE) was launched in May 2003 as a public-private sector collaborative effort, and has been working with the government to implement the T21 initiatives. As a pro-enterprise movement that aims to create a more business-friendly environment in Singapore, ACE provides opportunities for networking between entrepreneurs, angels, venture capitalists, bankers, lawyers and other professionals. It also engages in educational efforts to increase awareness of entrepreneurship and to encourage more entrepreneurial thinking among Singaporeans.

SPRING Singapore (Standards, Productivity and Innovation Board)

(Source: <http://www.spring.com>)

Formerly the Singapore Productivity & Standards Board (PSB), SPRING's mission is to enhance the competitiveness of enterprises for a vibrant Singapore economy, and it is the main government agency responsible for implementing the SME21 initiative. As such, it provides assistance to SMEs on product and process development, testing and evaluation.

Infocommunications Development Authority (IDA)

(Source: www.ida.gov.sg)

The IDA is Singapore's lead government agency driving the Infocomm 21 Initiative. Besides regulating the local telecommunications and e-commerce practices, it also administers various schemes to promote computerization and Internet applications in local enterprises.

International Enterprise Singapore (IE Singapore)

(Source: <http://www.iesingapore.gov.sg>)

A recognition that in order to maintain its competitiveness Singapore had to expand beyond its investment-driven, electronics-dominated export base, led to the restructuring of the Singapore Trade and Development Board (TDB) to International Enterprise Singapore (IE Singapore) in 2002. IE Singapore's mission is to help Singapore-based companies who are willing and able to grow and internationalize successfully. It also promotes Singapore as an SME hub by attracting enterprises from other countries, so that they can collaborate with International Singapore Companies to venture into the region.

3. Specific programs supporting entrepreneurship in Singapore

Entrepreneur Investment Incentive – EII

(Sources: Wong et al 2004 and http://www.sedb.com/edbcorp/sg/en_uk/index/startups/financing/enterprise_investment.html and <http://www.spring.gov.sg/portal/products/assist/edf/EII.html>)

The Entrepreneur Investment Incentive scheme provides investors in innovative and high growth start-ups with loss insurance to facilitate capital funding for entrepreneurs in the initial phase of growth. The scheme is jointly administered by EDB, which is responsible for technology start-ups, and SPRING Singapore, which oversees non-technology start-ups. Qualified start-ups can issue Certificates to their investors for up to a maximum investment of S\$ 3 million. Investors with valid certificates are entitled to deduct their loss amount against their taxable income. Applications from overseas start-ups are evaluated on a case-by-case basis, provided that there is a significant link for Singapore to receive economic spin-offs arising from the operation.

Business Angel Fund (BAF) Co-Investment Scheme and Venture Investment Support for Start-ups (VISS)

(Sources: https://venus.edb.gov.sg/deals/start_ups_companies.html and <http://www.tifventures.com/direct-viss.phtml> and Wong et al 2004)

The BAF's co-investment scheme was designed to encourage Business Angel investments as a means to stimulate technopreneurship activities in Singapore. The fund helped business angels to diversify their portfolio by leveraging on the Government's fund, while enjoying high returns through investing in this high-growth industry.

After the cessation of the BAF, the Venture Investment Support for Start-ups (VISS) program was introduced. VISS is a S\$ 50m co-investment program that directly co-invests into companies in their early stages, based in or linked to Singapore, that are promising and strategic. It is managed by TIF Ventures Pte Ltd, which invests in companies with a minimum leverage factor of \$ 1 VISS investment for every \$ 2 of private investment. The investment amount will not be more than S\$ 500K, and TIF Ventures will not become the largest single shareholder in the company. To date, the VISS fund has been invested in over 25 local and foreign technology start-ups.

Directors and Advisors for Technopreneurial Enterprises (DATE)

(Source: http://www.sedb.com/edbcorp/sg/en_uk/index/startups/technopreneurship/directors_and_advisors.html)

Start-ups and emerging enterprises (SUEs), if left alone, may find it difficult to attract experienced and credible Directors onto their Board. The Directors and Advisors for Technopreneurial Enterprises (DATE) Programme facilitates mutual partnerships by bringing together technopreneurial SUEs with seasoned businesspeople (Advisors) who possess the skills, contacts or insights to develop the SUE further. Advisors can serve on the Board of Directors of these SUEs, and may become actively involved in their management and operation. This allows the top management of SUEs to acquire useful business management tips through the personal experiences shared by their Advisors, so that they will be better prepared to direct their companies.

Startup Enterprise Development Scheme (SEEDS) and SPRING SEEDS

(Source: http://www.sedb.com/edbcorp/sg/en_uk/index/startups/financing/startup_enterprise.html, Wong et al 2004, Khin 2004a)

The Startup Enterprise Development Scheme (SEEDS) is a S\$ 50 million fund administered by the EDB with the objective of fostering entrepreneurship and innovation activities in Singapore through matching financing by the Government. The scheme provides equity financing for start-ups in the seed stage of enterprise formation. Every private dollar raised from third party investor(s) by the company will be matched by EDB, up to a maximum sum of S\$ 300,000. The minimum

investment by the third party investor(s) is S\$ 75,000, and both EDB and the third party investors take equity stakes in the company in proportion to their investments.

In 2004, the SEEDS program was extended to SPRING SEEDS. Another S\$ 10 million, administered by SPRING, was set aside to fund non-technology start-ups (Khin 2004b)

Patent Application Fund Plus (PAF PLUS)

(Source: www.ipos.gov.sg, <http://www.sedb.com/>)

Administered by EDB, the PAF PLUS is a financial assistance scheme designed to help applicants defray the cost of patent applications. It is specifically targeted to individuals and SMEs, and has the aim of promoting greater innovation and awareness of patenting amongst inventors, startups and SMEs. It is designed to encourage inventors to patent their inventions, and encourage greater commercialization activities to extract value from patents

B. SPECIAL MEASURES TO CORRECT THE 'DIGITAL DIVIDE' AMONG COMPANIES

Local Enterprise Technical Assistance Scheme (LETAS)

(Source: <http://www.spring.gov.sg/portal/products/assist/edf/letas.html> and http://www.spring.gov.sg/portal/products/assist/edf/repositioning_LETAS.html)

The main scheme that has been specifically designed to assist local SMEs upgrade their IT is the Local Enterprise Technical Assistance Scheme (LETAS). Launched in 1982, LETAS initially helped local enterprises defray the cost incurred in modernizing and upgrading their operations through the engagement of an external expert for a limited period of time. SMEs could apply for assistance under LETAS to defray the cost of engaging IT consultants for IT implementation and e-commerce projects.

In 2004, LETAS was repositioned to take account of the individual needs of different SMEs. Thus, there are now three tiers of assistance given to SMEs under LETAS:

1. Broad-based Assistance

SPRING Singapore provides broad-based assistance, such as professional advice on financial management and business planning, through Enterprise Development Centres (EDCs), which are set up jointly with the key industry associations, and chambers of commerce. These are especially aimed at smaller enterprises or startups.

2. Focused Assistance

Mature SMEs may have more complex upgrading needs that require the engagement of external consultants. Thus, they receive focused assistance through the co-funding of upgrading projects.

3. Enhanced Assistance

The Enterprise Capability Development Scheme (ECADS) provides enhanced assistance to cater to SMEs that are growing rapidly and seeking to break into new overseas markets. The scheme aims to encourage developmental activities within these enterprises.

Infocomm Local Industry Upgrading Programme (iLIUP)

(Source: Business Times (2001) and <http://www.ida.gov.sg/idaweb/marketing/infopage.jsp?infopagecategory=factsheet:marketing&versionid=8&infopageid=1772>)

Started in 1995, the Infocomm Local Industry Upgrading Programme (iLIUP) promotes partnerships between Singapore IT enterprises and MNCs. Through the partnership, Singaporean

enterprises gain access to the MNCs' technologies and technical expertise, thus reducing development costs and the time-to-market for their products. They are also able to leverage on the MNCs' international marketing networks and distribution expertise, enhancing their ability to penetrate global ICT markets. On their part, MNCs increase their local market share by adapting their technologies for locally developed products and services.

C. E-GOVERNMENT AIMED AT SMES AND TRADE PROMOTION

Singapore is known for its early adoption of eGovernment. In 1989, then Singapore Trade Development Board implemented TradeNet, the world's first electronic, nationwide, paperless trade facilitation and documentation system. In the Annual Global IT Report, an examination of the sub-indices of NRI reveals that Singapore received top ranking for government usage and readiness (1st for both). The high ranking of Singapore's e-government services has been corroborated by a number of other surveys (Wong 2004).

National E-government plans

(Source: <http://www.egov.gov.sg/PlansandStrategies/NationalICTPlans/> and <http://www.egov.gov.sg/PlansandStrategies/e-GovernmentPlans/>)

Civil Service Computerisation Programme (1980-1999)

The first e-Government plan was the Civil Service Computerisation Programme (CSCP), conceived with the aim of turning the Singaporean Government into a world-class exploiter of IT. It marked the beginning of computerization in the public sector that focused on improving internal operational efficiencies through the automation of traditional work functions and reducing paperwork. The CSCP extended from 1980-1999.

E-Government Action Plan (2000-2003)

The vision of the e-Government Action Plan was to be a leading eGovernment to better serve Singapore and Singaporeans in the new knowledge-based economy. S\$ 1.5 billion was committed to this plan, which focused on developing three aspects of eGovernment (Government to Citizens, Government to Business and Government to Employees) through five strategic thrusts and six programs:

1. Government to Citizens (G2C)

Individuals can interact online with the Government on a wide range of matters.

2. Government to Businesses (G2B)

Online transactions between business and the government became the norm. The first step in this was the G2B Portal, which gives local and international businesses access to a range of G2B information and services. Other services include the online filing of forms in a manner that is both faster and easier, for transactions such as registering a new business entity or reporting of changes to business particulars.

The government also implemented an integrated, end-to-end online procurement system for the public sector known as the Government Electronic Business (GeBIZ). Local and international suppliers can research or participate in business opportunities with the Government in a more efficient, transparent and secure environment.

3. Government to Employees (G2E)

In order to ensure that government employees have the skills needed to use e-Government, the InfoComm Education Programme (IEP) was launched, teaching employees new ICT skills and competencies, and how to use them to revamp internal processes and external service delivery.

E-Government Action Plan II (2003 - 2006)

The second e-Government Action Plan (eGAP II) focuses on building the foundations put in place during the first action plan, leveraging existing ICT to ensure that individuals and businesses can derive real benefits from them (Accenture 2004). The three planned outcomes of eGAPII are:

1. Delighted customers

The Plan aims to delight users of eGovernment, both individuals and businesses, with convenient and easy-to-use e-services. eGAPII aims to further improve existing e-services and encourage greater usage of government e-services. Its goals for 2006 are to:

- Implement 12 more cross-agency integrated e-services;
- Have 90 percent of the Government’s customers use e-services at least once a year; and
- Have 90 percent of these users be satisfied with the overall quality of e-services.

2. Connected Citizens

ICT will be exploited to explain public policies and their rationale online, and to provide a channel for feedback on policy formulation and review. For those who wish to volunteer in community service, a centralized portal providing information on community services will be available. Internet-enabling technologies will be used to form new virtual communities, or to support existing ones.

3. Networked Government

The Plan also aims to create a networked government. In order to do this, the government will have to enhance ICT management and governance capabilities across the entire public service, and leverage on common architectures and infrastructures to promote cross-agency collaboration and optimize resource allocation. A government-wide policy on data protection has been implemented to ensure the privacy rights of users.

In order to achieve these targets, the government plans to invest S\$ 1.3 billion over the next three years to upgrade infrastructure, develop capabilities and further improve electronic public services. Part of this includes S\$ 30 million per year which IDA intends to invest in seed pilots and trials that will develop capabilities in areas such as mobile services, web services and portals, wired and wireless network infrastructure (Accenture 2004).

V. Conclusion and recommendations

IT usage among Singapore’s SMEs is fairly high, especially in basic IT such as computer and internet usage. However, they have been much slower to adopt new, cutting-edge technologies. There is substantial room for growth in various forms of IT, including network, wireless and e-commerce technologies.

SMEs in Singapore need not only to extend the range of IT they use, but also to exploit more fully the technologies they already have. Existing technology is commonly used for simple operations, preventing SMEs from extracting the full benefits of their IT.

The case studies show that SMEs can derive great benefits from appropriate use of IT. One key element for such success is a conviction that IT is needed for their business, and a willingness to invest resources. Others include paying adequate attention to helping employees learn to use technology and convincing them of its benefits, and working closely with a consultant who understands the SME’s industry, business and culture.

They also highlight some of the problems faced by SMEs, especially those in industries that are not highly computerized. A lack of partners with whom they can transact electronically

reduces companies' motivation to invest in their own IT resources. Thus one of the main barriers to SMEs' adoption of IT is a lack of perceived need. One means to overcome this problem is to help those already using IT to fully realize their capabilities, so that they can serve as models for others.

The government has put in place a fairly comprehensive set of policies to assist SMEs in all areas, including their technological development, and its eGovernment infrastructure is among the most advanced in the world. However, public policy in Singapore still tends to be geared towards MNCs and to high-tech start-ups. SMEs operating in low-technology industries receive less policy attention and yet can also derive great benefit from upgrading their IT resources, particularly with e-commerce, which can help them to expand their markets beyond the limited market available in Singapore.

Some of the forms of assistance needed by SMEs include education to know which forms of IT would best meet the needs of their organization and how to fully exploit them; financial assistance to acquire the technology; and technical assistance to integrate them with their existing systems. Finally, they need assistance in manpower development.

References

- Accenture (2004). eGovernment Leadership: High Performance, Maximum Value. Downloaded from <http://www.egov.gov.sg/NR/rdonlyres/B739B208-F894-4C28-9C00-8C01040423D5/3042/AccentureeGovernmentLeadershipStudy.pdf>
- Business Times. (2001). “iLIUP scheme to get another \$ 8m from IDA”, *Business Times*, 6 October 2001.
- Choo, M. Personal interview. 8 October 2004.
- Clancy, H. (2003). “Two Microsoft partners receive best in show recognition”, *CRN*, 11 October 2003, downloaded from <http://www.crn.com/sections/breakingnews/breakingnews.jhtml?articleId=45117&requestid=90294>.
- Computerworld. (2003). “Uniseal embarks on a wireless journey”, *Computerworld*, 5-11 December 2003.
- Infocomm Development Authority (IDA). (undated). *Smart Moves for Wireless Solutions*. Singapore: IDA.
- Infocomm Development Authority (IDA). (2002). *Quarterly E-Commerce Survey Singapore Q1 - Q3 2001*. Downloaded from IDA website, [http://www.ida.gov.sg/idaweb/doc/download/1761/Quarterly_EC_Survey_\(6Mar02\).pdf](http://www.ida.gov.sg/idaweb/doc/download/1761/Quarterly_EC_Survey_(6Mar02).pdf)
- Infocomm Development Authority (IDA). (2004). *Executive Summary for Annual Survey on Infocomm Usage in Households and by Individuals for 2003*. Downloaded from IDA website, [http://www.ida.gov.sg/idaweb/doc/download/12908/HH_Executive_Summary_\(Final\)_14062004.doc](http://www.ida.gov.sg/idaweb/doc/download/12908/HH_Executive_Summary_(Final)_14062004.doc)
- International Enterprise Singapore (IE Singapore). (2003). *Annual Report 2002/2003*. Singapore: IE Singapore.
- Khin, N. (2004a). “Finding the funds to startup”, *Business Times*, 11 October 2004.
- Khin, N. (2004b). “Non-tech start-ups get helping hand”, *Business Times*, 10 September 2004.
- Lim, C.P. Personal interview. 19 August 2004.
- National University of Singapore (NUS). (2003). *Annual Survey of Infocomm Usage in Business 2002: Final Report*. Prepared by NUS for InfoComm Development Authority of Singapore, May 2003.
- Reed Electronics Research. (Various years). *Yearbook of World Electronics Data Vol.2: America, Japan & Asia-Pacific*. Oxford, U.K.: Elsevier Advanced Technology.
- RichLand Group Limited 2003 Annual Report.
- RichLand Prospectus (2004).
Spring website: http://www.spring.gov.sg/portal/national_plans/sme21/sme21.html
<http://www.spring.gov.sg/portal/products/assist/edf/letas.html>
- Straits Times. (2004). “Keeping Starship Enterprise on course”, *The Straits Times*, p. 28, 10 July 2004.
- The Edge Singapore (2004). “RichLand drives home solid profits”, *The Edge Singapore*, 3 May 2004.
- Uniseal Waterproofing website: <http://www.uniseal-waterproofing.com/>
- Wong, P.K. (2003). “From using to creating technology: The evolution of Singapore’s national innovation system and the changing role of public policy”. In S. Lall and S. Urata (eds.), *Competitiveness, FDI and Technological Activity in East Asia*, p. 191-238. Cheltenham, Northampton: Edward Elgar Publishing.

- Wong, P.K. (2004). *The Information Society and the Developmental State: The Singaporean Model*. NUS Entrepreneurship Centre Working Paper WP2004-17. Downloaded from http://www.nus.edu.sg/nec/publications/full_text.htm.
- Wong, P.K and Ho, Y.P. (2003). *E-Commerce in Singapore: Impetus and Impact of Globalization*. NUS Entrepreneurship Centre Working Paper WP2003/03. Downloaded from http://www.nus.edu.sg/nec/publications/full_text.htm.
- Wong, P.K. and Singh, A. (2002). ICT industry development and diffusion in Southeast Asia. In S.Y. Chia and J.J. Lim (eds.) *Information Technology in Asia: New Development Paradigms*, pp. 48-67. Singapore: Institute of Southeast Asian Studies.
- Wong, P.K., Wong, F., Lee, L. and Ho, Y.P. (2004). *Global Entrepreneurship Monitor 2003: Singapore Report*. NUS Entrepreneurship Centre, National University of Singapore, April 2004.

THAILAND

Chanin Mephokee
Kaipichit Ruengsrichaiya

I. Introduction

The term “enterprises” covers a wide range of economic activities involved in the process of production, marketing and trade (both wholesale and retail), and services. Under the SME Promotion Act 2000, enterprises that can be categorized as SMEs are those which possess either a certain amount of properties, a certain size work force or a certain amount of registered capital (see table 1).

TABLE 1
DEFINITIONS OF SMES

Types	Small		Medium	
	Work force (persons)	Registered capital (THB million)	Work force (persons)	Registered capital (THB million)
1. Manufacturing	Not more than 50	Not more than 50	51-200	50-200
2. Services	Not more than 50	Not more than 50	51-200	50-200
3. Wholesale	Not more than 25	Not more than 50	26-50	50-100
4. Retail	Not more than 15	Not more than 30	10-30	30-60

Source: Department of SME Promotion.

In the year 2000, there were 1.6 million enterprises in Thailand. Amongst these, 99.63% were SMEs. SMEs are adaptable in that they are small-scale, easy to set up and close down, adjustable to practical production processes and new machines, and able to switch to other new products and services in an ever-changing industrial environment of present-day business. These characteristics place them in an advantageous position as the most flexible and adaptable industrial firms in the present economic situation. However, most of Thailand SMEs apply labour-intensive production processes. Under globalization, relatively low labour costs no longer give Thailand a comparative advantage. SMEs in Thailand are forced to participate in the world market facing intense competition. They cannot compete on the world market with products from other countries. What needs to be dealt with promptly is the replacement of obsolete engines, slow production processes and ineffective management. SMEs need to improve the quality of their products and management processes, as well as lower costs, so as to be able to compete with products of other countries that are more adaptable.

This paper attempts to describe the present situation of IT use by SMEs in Thailand and the development of SMEs in the IT revolution. Government efforts to promote IT use and international trade by SMEs are also discussed.

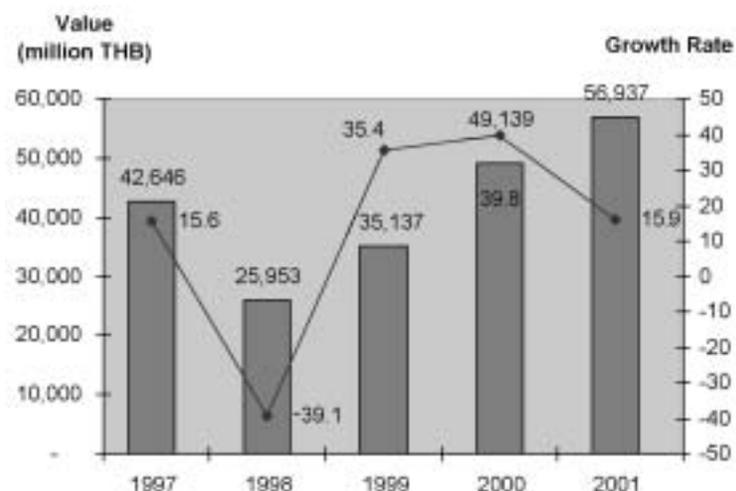
II. Present situation of IT market and IT use by SMEs

A. USE OF IT IN THAILAND

IT Market

The overall IT market of Thailand has been significant and expanding. Before the economic crisis of 1997, its value was over US\$ 1.2 million per annum. Though it was hit by the crisis, which decreased its value and growth rate in 1998, the market bounced back at an impressive rate. As shown in figure 1, the growth rate in 1999 and 2000, the years following the crisis, was considerable: 35.4 and 39.8% a year. The market value had also recovered within two years, to over US\$ 1.2 million since 2000.

FIGURE 1
VALUE AND GROWTH RATE OF IT MARKET IN THAILAND



Source: The Association of Thai Computer Industry, 2002.

The major categories of products on the IT market are the hardware segment, consisting of systems, PCs and workstations; data communication; packaged software; and IT services. Statistics on their value, share and growth rate for the years 1999 to 2001 are shown in table 2. During the period 1999 to 2001, PCs and workstations accounted for the largest share – one half – of total market values. In second place was the IT service segment. Packaged software was third.

Another important aspect of the market is growth rate. The outstanding category was data communication. Its average growth rate was 89.5% per annum between 1999 and 2001, reflecting an increased interest in and use of data communication among users. The Internet was another important factor of growth during this period. The second highest growth-rate category was packaged software, which reflected the use of IT knowledge in different activities. The impressive growth rate of both categories indicates increased interest in ICT within the Thai market and among the Thai people in this new era.

It should be noted that the statistics on packaged software values in table 2 may significantly underestimate the actual use of software. This is because most private use and small-business use of software is not registered. These users may be making extensive use of various kinds of unlicensed software. As regards business uses, though there is no formal estimate of unlicensed software use, a high percentage of SMEs do not use authorized software. This is due to the market

for pirated software and the weak Intellectual Property Rights (IPRs) law. Hence, ICT penetration in business use may be deeper and broader than what the statistics show.

TABLE 2
VALUE OF IT MARKET, CLASSIFIED BY PRODUCTS AND SERVICES

Items	1999		2000		2001		Growth /year (%)
	value (million THB)	Share (%)	value (million THB)	Share (%)	value (million THB)	Share (%)	
(1) Systems	2 704	8	2 894	6	3 406	6	11.9
(2) PCs & workstations	16 456	47	24 623	50	26 933	47	20.7
(3) Data communication	950	3	3 758	8	5 480	10	89.5
(4) Packaged software	6 289	18	8 378	17	10 125	18	26.7
(5) IT services	8 738	25	9 486	19	10 993	19	14.2
Total	35 137	100	49 139	100	56 937	100	22.7

Source: The Association of Thai Computer Industry www.atci.or.th, 2002

Penetration of IT in business enterprises has been limited. According to the National Statistical Office Survey on Trading and Service Enterprises in 2002, as shown in table 3, computer-equipped firms accounted for only 10.6%, and the concentration was in Bangkok and outlying areas. In the aggregate view, only half of the companies that used computers also made use of the Internet, but less than 10% of them had their own websites. The highest use of computers and related systems has been clustered in Bangkok and outlying areas. The other regions of the country account for approximately equal shares.

TABLE 3
PROPORTION OF ICT USE, BY TRADING AND SERVICE ENTERPRISES
CLASSIFIED BY REGION IN 2002

	Total	Bangkok	Outlying areas	Central	North	NE	South
Total	100	100	100	100	100	100	100
No computers	89.4	82.6	87.2	93.4	91.8	93.5	93.6
Computers	10.6	17.4	12.8	6.6	8.2	6.5	6.4
No Internet	5.3	7.8	7.5	3.5	4.8	4	2.8
<i>Internet</i>							
Business	4.3	8.2	3.8	2.6	2.5	2.1	2.6
Other	1	1.4	1.6	0.5	1	0.4	1
<i>Website</i>							
No website	9.8	15.7	11.9	6.2	7.8	6.3	5.9
Website	0.8	1.7	0.9	0.4	0.4	0.2	0.4

Source: WWW.NSO.GO.TH, 2002

E-commerce

According to the National Electronics and Computer Technology Centre, a survey of 6 460 examples from websites using www.com and www.co.th addresses showed that in 2001, most of the websites were accounted for by the tourism, computer and internet, and entertainment industries. Most of them (88.58%) were at a beginning stage, being used for advertising purposes only. These beginning-stage websites belonged mainly to the tourism industry, computer and internet industry, and entertainment industry.

Approximately 11.42% of websites were in the advanced stage and were used for a variety of purposes, such as purchasing, clearing or logistics. Most of the websites (89.77%) used a www.com

address. These advanced-stage websites were mainly in the tourism, computer and Internet, garments and cosmetics, florist and handicraft industries.

TABLE 4
E-COMMERCE USERS IN SELECTED INDUSTRIES IN 2001

Industry	Number of websites		
	Total	Early-stage	Advanced-stage
1. Tourism	607	494	113
2. Computers and Internet	393	328	65
3. Entertainment	330	316	14
4. Services	147	147	0
5. Agriculture	141	129	12
6. Food and Drugs	124	115	9
7. Publishing	122	109	13
8. Real Estate	120	110	14
9. Finance and Banking	114	106	8
10. Retail and Wholesale	114	89	25

Source: National Electronics and Computer Technology Centre.

Most of the websites (55.3%) were written in English; 26.5% were written in Thai, and 18.1% were in both English and Thai. The main reason for using English as a medium is to serve the purpose of expanding to overseas markets. Among the advanced-stage websites, the contents include sufficient information to satisfy customer needs such as details on prices and how to make orders. These websites also provide purchasing-order forms, information on payment systems both online and offline, and information on how to receive products. Order forms are provided on 69.5% of advanced-stage websites, 79.5% provide payment systems, 47.7% provide information on how to receive products, and 61.2% offer services to both domestic and overseas customers. Details on website contents may be seen in table 5.

TABLE 5
SERVICE PROVIDED BY ADVANCED-STAGE WEBSITES

Level of service	Description	% of total
1	Purchasing orders only	20.5
2	Purchasing orders and offline payment	14.7
3	Purchasing orders, offline payment and delivery system	18.4
4	Purchasing orders and online payment (by credit card)	17.4
5	Purchasing orders and online payment (by credit card), and delivery system	29.1

Source: National Electronics and Computer Technology Centre.

According to the survey, Thai websites for e-commerce have satisfactory quality, providing information and services in terms of security and privacy, website contents, and after-sale services. The system-user features (personal profile, shopping cart and payment system, data-collecting system, and catalogue system) are also high quality. User-friendliness, including account setup, order-status checking, order tracking, and password protection, are satisfactory to customers. System design (navigation, graphics, and international service) is quite good as well. So far, in technical terms, Thai websites for e-commerce can be used effectively.

B. PARTICIPATION OF SMES IN IT

(a) Manufacturing SMEs

According to the Office of Industrial Economics, medium-sized enterprises have participated in IT at higher levels than small enterprises. Thus, the level of IT participation depends on the size of the enterprise. It was found that 58.3% of medium-sized enterprises are using IT, while only 24.4% of small enterprises are.

TABLE 6
INTERNET AND EDI USE BY ENTERPRISES
Unit: percent

	Large enterprises	Medium-sized enterprises	Small enterprises
Use IT	61.9	58.3	24.4
Planning to use IT	21.8	18.4	25.2
Do not plan to use IT	16.3	23.3	50.4
Total	100.0	100.0	100.0

Source: Office of Industrial Economics.

Another indicator of IT participation is the proportion of IT-related products in fixed assets. Assigning a percentage of software in fixed assets as a rough indicator, the relative importance of the firm's aspect in IT does not differ according to size (see table 7). Larger enterprises would have a greater investment in IT.

TABLE 7
PERCENTAGE OF FIXED ASSETS IN MANUFACTURING ENTERPRISES,
BY ASSET CATEGORY AND SIZE

Type of Permanent Asset	Firm size (Number of employees)			
	Total	Small enterprises	Medium-sized enterprises	Large enterprises
Total	100.0	100.0	100.0	100.0
Land and developed land	12.4	33.4	11.8	10.9
Building and construction	20.4	23.4	18.8	20.7
Machinery and equipment	60.2	33.6	62.2	61.7
Office equipment	1.9	1.5	2.0	1.9
Vehicles	1.8	7.2	2.6	1.1
Software	0.1	0.1	0.1	0.1
Other permanent assets	3.2	0.8	2.5	3.6

Source: National Statistics Office.

As far as the influence of foreign ownership on IT involvement of SMEs is concerned, as shown in table 8, the proportion of software in fixed assets is not different between those having and not having foreign ownership. However, it could make a difference in the case of hardware and IT services, such as computers and data communication devices, which are included in the office equipment category. Because IT products account for a significant percentage of the office equipment assets of general SMEs and SMEs with foreign ownership, and this asset is 40% higher than in the case of local companies, it can be expected that SMEs with foreign ownership will be inclined to have higher IT participation than local ones.

TABLE 8
PERCENTAGE OF FIXED ASSETS OF SMES, BY ASSET
CATEGORY AND OWNERSHIP

Category	Type of Permanent Asset							
	Total	Land	Buildings	Machinery	Office Equipment	Vehicles	Software	Other
Percentage of permanent assets	100.0	12.4	20.4	60.2	1.9	1.8	0.1	3.2
Not in joint venture with foreign investor	100.0	17.3	19.8	56.5	1.5	3.3	0.1	1.5
Joint venture with foreign investor	100.0	9.5	20.8	62.4	2.1	0.9	0.1	4.2

Source: National Statistical Office.

(b) Trading SMEs

Currently, most trading SMEs do not use IT to improve managerial and marketing functions. According to the e-commerce ranking of businesses conducted by the National Electronics and Computer Technology Centre, the retail-wholesale industry ranks sixth, after the service industry and the manufacturing industry.

The use of IT in trading SMEs has been clustered in newly established firms. The main objective is to lower operating costs and increase competitiveness. The main ITs used in this sector are cross-docking and efficient consumer response (ECR), which focus mainly on the wholesaling process. As regards retailing, rudimentary IT is used, such as the bar code. However, due to the overall transformation of the Thai economy into an IT-based one, the number of retailers using bar codes and elementary IT functions has increased. With this broad IT-user base in the trading sector, it is expected to progress quickly to a more advanced stage in the near future.

(c) Service SMEs

IT has been introduced in some sectors such as real estate, tourism, private hospitals and transportation. Most (55%) of the tourism agencies and hotels that are SMEs have their own websites.

In some cases, there is a digital divide between large enterprises and SMEs. Among SMEs themselves, the problem of the digital divide exists as well, especially between the new-economy SMEs (such as software industry) and the traditional SMEs (such as handicraft and One Tambon One Product (OTOP) industries).

In services, IT and e-commerce have played an important role in marketing, advertising, sale processing and service management. The sector that has been most successful in applying IT and e-commerce is tourism (see table 9). More than half the firms (55%) in this business have websites. Most of them (85%) understand the importance of the Internet and e-commerce for their business. In addition to tourism, other types of SMEs in the service sector also appreciate the value of IT, such as private hospitals, insurance, transportation and real estate companies.

The types of IT used in service SMEs range from advanced to basic levels. Tourism has the highest number of full-fledged e-commerce applications for providing information, ordering products or services and making online payments. This is an example of a business that successfully applies IT and e-commerce in Thailand. Use of IT by private hospitals and insurance and transportation businesses is focused chiefly on data storage and processing. The most elementary use of IT in service SMEs is in real estate, where it is limited to providing information online to customers; there is no clear policy for introducing IT into these businesses.

TABLE 9
SUCCESSFUL E-COMMERCE USE, BY BUSINESS CATEGORY

Industry	Number of websites using E-Commerce
1. Tourism	113
2. Computers and Internet	65
3. Garments and cosmetics	36
4. Flower suppliers	28
5. Handicrafts	26

Source: Thailand Electronic Commerce Resource Centre.

To sum up, there is a digital divide between large enterprises and SMEs. A higher percentage of large enterprises, over 60%, use IT, while half of the small businesses still have no plans to use IT. Among SMEs, the digital divide also exists. Trading SMEs seem to have the most shallow level of IT use, while service SMEs have the deepest IT penetration. The former use IT only for part of their business purposes, while the latter already have fully developed e-commerce and data processing procedures in place. As regards manufacturing SMEs, though they widely apply IT in production, they are likely to use digital IT in the Thai market; use of IT among businesses in general is uneven.

III. SME Development in the IT Revolution

A. IMPORTANCE OF SMES IN THE THAI ECONOMY

In the year 2002, there were 1 645 530 enterprises in Thailand. Amongst these, the number of SMEs was 1 639 427, or 99.63% of all companies. This number has grown by 840 394 since 1997, when there were only 799 033.

In 2002, most SMEs were in the retail sector, i.e., 732 593, or 44.69% of the total number of SMEs. In second place were SMEs in the service sector: 500 970, or 30.56% of the total. The manufacturing and the wholesale sectors have 356 806 and 49 058, or 21.79 and 2.99% respectively.

In terms of regional distribution of SMEs in the year 2002, the north-eastern region has the highest number of SMEs, i.e. 511 245 or 31.07% of all SMEs. Next is the Bangkok metropolitan region, with 347 827 or 21.14%. There are 278 101 SMEs in the north, 224 120 in the south, 201 481 in the central region and 76 653 in the east.

In terms of Gross Domestic Product (GDP), in the year 2002, SMEs in all sectors in the country delivered products and services to the economy worth THB 2 112 934 million (US\$ 52 823.35 million) out of a total of THB 5 430 455 million (US\$ 135 761.37 million), or 38.91%. The sector in which SMEs account for the highest share of GDP is the service sector. This covers all types of services provided by the private sector, but not educational or health and other services that are provided by the State. In 2002, the GDP from service-sector SMEs was worth THB 724 934 million (US\$ 18 123.35 million), or 13.35% of overall GDP. These are followed by the wholesale and retail trade sector (12.23%) and the manufacturing sector (9.89%).

TABLE 10
GROSS DOMESTIC PRODUCT, 1998-2002

GDP (THB million)	1998	2000	2002
GDP	4,639,847	4,916,505	5,430,455
GDP for SMEs	1,750,706	1,956,673	2,112,934
As % of GDP	37.73	39.80	38.91

Source: Office of Small and Medium Enterprises Promotion.

In the year 2002, a total of 7 234 022 persons were employed by all types of enterprises in the country. Of these, 4 990 217, or 68.98% of the total labour force are employed by SMEs. Compared with the figures for 1997, the total labour force – 5 313 370 overall and 4 057 595 in SMEs –has grown by 1 920 652 overall and by 932 622 in SMEs.

Table 11 shows the statistics on investments for the year 2002, when SMEs were granted 573 projects promoted by the Board of Investment Office (BOI). This includes 167 projects that are 100% owned by Thais, 211 fully foreign-owned projects and 195 projects that are joint ventures between foreigners and Thais. Investments totalled THB 91 582 million (US\$ 2 289.55 million) and accounted for 35 492 jobs.

TABLE 11
TOTAL NUMBER OF SMES ACHIEVING INVESTMENT
PROMOTION, 2002

	Number of Projects	
	Small Enterprises	Medium-sized Enterprises
Total Number	264	309
Projects 100% owned by Thais	79	88
Projects 100% foreign owned	119	92
Joint ventures	111	84
Investment (THB million)	66,640	24,940
Jobs (persons)	27,565	7,927

Source: Board of Investment Office.

In 2002, Thai SMEs exported industrial products worth THB 1 209 303 million (US\$ 30 232.575 million), or 38.22% of all industrial products exported from Thailand. Even though the percentage has fallen from 39.47% in the year 2001, the value of exports from SMEs has grown steadily.

TABLE 12
EXPORTS FROM SMES

	2000	2001	2002
Export value (THB million)	754 784	793 760	1 209 303
As %	38.45	39.47	38.22

Source: Customs Department.

The five most important exports from SMEs account for 53.85% of all industrial exports, or approximately THB 651 288 million (US\$ 16 282.2 million). This includes electronic and electrical appliances, which have the highest export value, i.e., THB 209 091 million (US\$ 5 227.75 million), or 17.29% of the total value of SME exports. In second place are exports from the textile industry, amounting to THB 166 596 million (US\$ 4 164.9 million) or 13.78%. Ranking third is the plastics industry, with exports worth THB 95 504 million (US\$ 2 387.6 million), or 7.9%.

TABLE 13
VALUE OF EXPORTS GENERATED BY SMES, BY INDUSTRIAL SECTOR
Unit: THB million

Industry	2000	2001	2002	Proportion
1. Canned and processed foods	44 878.59	53 374.58	82 705.03	6.84
2. Beverages	2 222.83	2 964.81	4 463.62	0.37
3. Weaving	108 412.28	117 946.37	166 596.16	13.78
4. Jewellery and stones	44 874.22	56 369.44	92 419.35	7.64
5. Electronics and electronic appliances	149 914.55	131 254.71	209 091.94	17.29
6. Furniture and parts	22 183.56	23 799.18	39 273.82	3.25
7. Wood and wooden products	14 889.56	16 767.94	27 633.40	2.29
8. Steel, refined steel and steel products	29 907.81	27 826.27	41 042.42	3.39
9. Plastic products	56 838.48	59 746.55	95 504.84	7.9
10. Chemical products	33 929.84	30 817.92	47 181.31	3.9
11. Shoes and parts	10 847.69	12 674.94	15 918.47	1.32
12. Leather, leather products and travelling equipment	8 085.79	7 489.69	11 858.71	0.98
13. Rubber products	53 118.47	50 969.54	87 676.63	7.25
14. Tableware and kitchen appliances	3 651.75	41 606.63	5 035.07	0.42
15. Motor vehicles, spares and parts	18 955.84	10 068.03	49 513.97	4.09
16. Paper and paper products	10 162.56	2 363.95	14 251.50	1.18
17. Machinery, spares and steel moulds	2 099.84	2 164.44	3 847.77	0.32
18. Flowers, leaves and nursery flowers	2 120.28	5 598.89	2 875.70	0.24
19. Ceramic products	5 342.21	5 598.89	7 586.01	0.63
20. Other industrial products	135 350.17	136 111.55	204 827.98	16.94
Total	754 787.56	793 760.96	1 209 303.71	100.00

Source: Office of Small and Medium Enterprises Promotion.

B. CASE STUDIES

1. Chatchawal Orchid Co., Ltd.

Chatchawal Orchid Co., Ltd. was set up in 1998 as a manufacturer and exporter of orchids. The company started its business by exporting orchids to the United States through its connection with Thai-owned orchid importers located in the United States. After a few years, the company started to ship products to United States customers (supermarkets) directly. Since the owner had the experience of training at a Japanese co-operative for nine months, he was able to establish connections with Japanese importers and started to export products to Japan. In 2000, the company expanded its products from fresh orchid cut flowers to fruits and vegetables, according to customer requirements. Japan gradually replaced the United States as the company's main market. Currently, the range of products includes a variety of fresh orchids, such as dendrobium, makara, aranda and aranthere; ornamental plants, such as dracaena, bamboo, snow bush and hoyia; vegetables such as asparagus, mushrooms and okra; and fruits, such as Japanese melons, pineapples, durian, and guava. The company started with small quantities and only one shipment a week; today it makes more than five shipments per week. In the case of okra, the company supplies fresh okra to Japan at a volume of seven tons a week.

Chatchawal Orchid Co., Ltd. is a private limited company with registered capital of US\$ 100 000. However, the company presently generates total annual revenues of US\$ 800 000. One hundred per cent of the company's products are exported to Japan.

As a typical Thai SME, the company started exporting through personal contacts (human networks). However, to expand its market globally, human networks were not sufficient. The company realized that IT was essential to compete on the world market. Therefore, it started to invest in IT for exports. First, the company got technical support from the National Science and Technology Development Agency (NSTDA), a government agency. However, several problems arose in dealing with the government agency, and the company hired a private firm to create a

company website (www.qualitygreen.com) and a management system. After the company set up its own e-mail address (orchid@ji-net.com) and website, it was able to contact new customers (mainly supermarkets in Japan) and get their orders. Since customers have some concerns regarding product safety, as in the case of pesticides, the company set up digital cameras at its working site. Customers are able to view the company's production process live on the Internet 24 hours a day, every day. This is how the company is using IT to guarantee the quality of its products to its customers.

2. Victor Packaging Co., Ltd.

(1) Company Profile

Victor Packaging has been established since 1975 as the first manufacturer of tube packaging. The company supplies customers both domestically and abroad. About 40% of the tubes made are exported to destinations such as the United States, Indonesia, Malaysia, Japan, the United Kingdom and many more. The products are used in the cosmetics and cleansing industry, and key customers include P&G, L'Oreal Kao, Avon, Shiseido, Pola, Natri-Metrics and Marks & Spencer. The products include two-layer and three-layer low-rigidity standard soft tubes used for toiletries products and industrial uses, medium-hardness tubes used for sunscreen products and products requiring some degree of hardness, and high-hardness tubes to increase the strength of high-moisture barriers used for sunscreen products and oily lubricant additives. The company also produces five-layer standard soft tube and five-layer hard tubes for special applications. Today the company has a production capacity of over 150 million units per year and a product range of 3-ml to 400-ml tubes. The company is located in Nonthaburi province, just a 20-minute drive from Bangkok International Airport. The company employs a total of 150 persons.

Making tubes is the basic process for tube body-making. The process requires precise calibration of diameter and wall thickness. Wall thickness may range from two to five layers. Structure requirements depend on the nature of tube contents.

Heading involves two main processes: compression moulding and injection moulding. Head styles and thread designs are available in both standard range and custom made.

Printing is the process of decoration and may be done by offset silk-screen processes. Tube coating may be either glossy or matte. Hot stamping is a hot-foil blocking process whereby silver or gold blocking are added, increasing the value of the packages. Labelling is also a decorative process and consists of either all wrap-around or partial labelling.

To complete the packaging, cap assembly is required. Basically, there are screw-on closures and snap-on closures. The company also has an in-house cap-making facility. Customized closures can be produced to meet the customer's specific requirements.

Each individual product is checked for defects. The company also sets a quality-control system whereby random checks are conducted on every batch of products throughout the production process.

(2) IT Use

Since the company is an SME, investing in IT was considered unimportant and expensive. Therefore, in the beginning, the company ignored IT investment. It was not until 1984 that the company owner visited an IT exhibition in Bangkok, Thailand, and became interested in IT use for administration purposes. He decided to buy one computer (Epson) with basic software programmes, such as spreadsheet and word processor, in order to handle basic tasks like letter writing and accounting. One reason the owner decided to buy was that the software programmes came with a training program. The software company managed the three-day training programme for Victor Packaging staff and assumed responsibility for potential problems with the programmes. The company used this IT package for two or three years and realized the importance of IT. Then

the company invested more in IT by upgrading to new technologies. The company purchased personal computers, along with the Microsoft Office programme, accounting programme, production planning programme, Illustrator, and Photoshop. All programmes include training courses which contribute to the development of company human resources. Today the company is able to produce in-house moulds and dies with computer technology.

Internet is the other IT used by the company. The company started using Internet in 1999. With Internet, it is able to communicate with customers faster and at lower cost. Customers can send the specific design of products with the right colours in three-dimensional blueprints through the Internet. This enables the company to minimize difficulties in designing the structure of products and product decoration to meet customer needs. Since the company focuses on long-term key customers, there is no need to seek new customers. E-commerce is not important for the company at the moment. However, it has put the company profile in PowerPoint and distributes this information by e-mail to new customers. The company website is under construction and will be available soon. According to the owner, the company website is not designed for reaching new customers (because the company is already producing at full capacity for existing customers), but the company wants to have its own website to send the signal to the market that it is equipped with new IT technologies. Thus, having or not having a website can be a sign of a “good” or a “bad” company.

The website is also useful for recruiting new staff. Announcing vacancies through the company website allows it to screen the IT-literate applicants from IT-illiterate ones.

In the production process, the company has recently started using IT. To produce moulds, the company purchased two computerized numerical controller (CNC) machines with CAD and CAM software for designing moulds. With these new technologies, the company is able to increase its productivity and its competitiveness.

However, the shortage of IT officers is the most crucial problem of IT use. Even though the degree of IT use by the company is relatively low compared to larger firms, IT officers who can manage the IT system are needed. The average cost of IT labour in SMEs is higher than in the large firms. In terms of salaries, the SMEs cannot compete with the large firms. High-quality IT personnel have a tendency to move to large firms that pay higher salaries. Therefore, the SMEs are facing a shortage of IT officers and are unable to use IT fully. In the case of Victor Packaging Co., there is only one IT officer, who is in charge of the research and development (R&D) department.

In brief, Victor Packaging Co. represents a successful case of IT use for exports. IT use not only reduces production and marketing costs but it also sends a signal to the market that Victor Packaging Co. is a quality company. IT use also helps the company screen IT-literate applicants from IT-illiterate applicants. However, since on average, the cost of IT use in SMEs is relatively high, and there is a shortage of IT personnel, the company is reluctant to invest more in IT.

3. Nuntiya Care Stone Co., Ltd. (NCS Group)

Nuntiya Care Stone Company began its business in 1997 as a traditional gemstone wholesaler based in Chanthaburi province, located about two and a half hours east of Bangkok. All company products were exported to the United States. At first, the company staff had to take some samples to the customer in the United States directly, which was very costly to the company. Since then, the company has been able to establish its reputation among United States customers as a quality exporter of coloured gemstones from Thailand.

As its business grew, NCS developed its marketing strategies by sending its catalogue directly to its customers. Instead of sending sales staff to the United States, NCS communicated with its customers by fax or long-distance telephone.

In 1998, NCS Group Co., Ltd. began to experiment with online sales and the instantaneous profit that brought resulted in extremely rapid growth. Initially listing five items on eBay, it added

more and more items as sales escalated. By the end of that year, NCS Group Co., Ltd. had thousands of gemstones listed online, and *Thaigem.com*, the website, was started with only five items of gemstones listed and three persons in charge of e-commerce.

After 18 months of sales through *Thaigem.com*, the site had had more than one million visitors and total sales of nearly US\$ 4 million a month. The company has also listed products on several well-known auction websites such as *eBay.com*, *Yahoo! Auction*, *Amazon.com* and *Gemkey.com*.

Today, the company lists over 1.6 million individual items online. Starting with only six gem types, *Thaigem.com* used to purchase most of its gems in Chanthaburi. Today, *Thaigem.com* sources gems from 60 countries, stocking over 400 gem types. *Thaigem.com*'s success and large online market share has allowed it to rapidly diversify into related areas such as jewellery, carvings, beads, tools and more.

In 2001, the company opened its new Gem Centre. The 28,000-square-foot centre is located inside a three-story, air-conditioned building. It is completely wired for Gem TV, a cable station developed by *Thaigem.com* to bring news, edutainment and gem-related interviews and real-time online trading information. Buyers' requirements are entered into the in-house internet terminals and are then transmitted directly onto Gem TV, which is also piped into 9 000 gem factories across Chanthaburi via CTV, a local cable TV network.

The main barrier to trading online is losing money. Therefore, the company decided to implement a connection with *Escow.com* so that customers can approve their purchases before *Escow* releases their money to *Thaigem.com*.

Fast delivery is one of the company's successes. After a transaction has been completed, products are delivered to customers within 24-72 hours. All products are refundable with no questions asked.

Price competitiveness is one success factor for online trading. *Thaigem.com* is able to cut prices to as low as four dollars per carat for certain stones. The company can cut prices because it buys everything in bulk straight from the cutters in full quality range.

As mentioned earlier, the company started its online sales with only three IT staff. The company developed its own applications using JAVA, JAVA Script C, and ASP, working with an Oracle database.

IV. Government Policies

A. IT POLICIES

1. IT-2000: The first national IT policy

In February 1996, Thailand's first national IT policy, IT-2000, which was proposed by the National Information Technology Committee (NITC), was approved by the Cabinet. IT-2000 was a five-year policy framework spanning from 1996 to 2000. In essence, the policy addressed three foundations or fundamental prerequisites that must be in place to enable Thailand to fully take advantage of IT in order to become a key sustainable economic power in Southeast Asia and, at the same time, to provide social equity and prosperity for all. These three fundamental prerequisites are:

- National information infrastructure (NII);
- A well-educated population and adequate IT human resources; and
- A "dare to dream and resolve to act" commitment.

These critical prerequisites are translated into three national agendas, as follows:

Agenda 1 - Invest in an equitable information infrastructure to empower human ability and enhance quality of life.

Agenda 2 - Invest in people to build a literate populace and an adequate information technology human resource base.

Agenda 3 - Invest for good governance.

2. The impact of IT-2000

After IT-2000 ended, NITC requested an independent group of researchers to conduct an evaluation study. The purpose of this study was to compare the actual performance of the country within the IT domain against the proposed goals expressed in IT-2000. In sum, the research results indicated that Thailand made significant progress within a few years with respect to information infrastructure. As a result, the country's telephone penetration was increased tremendously. The telephone line service coverage expanded to all tambons around the country, so that public telephones are now available in all villages. Through optic fibre cable and microwave technology, the Telephone Organization of Thailand (TOT) now provides communication services with a minimum speed of 64 kbps.

In addition, there has been a significant change in the regulatory and legal infrastructure. In February 2000, the Organization to Allocate Radio Frequency and Regulate Television Broadcasting Act was enacted. This Act mandates the establishment of an independent telecommunications regulatory body called the National Telecommunications Commission (and also a broadcasting regulatory body called the National Broadcasting Commission). The actual set-up of this committee is still an ongoing process, but is expected to be completed soon. Other laws in addition to the Organization to Allocate Radio Frequency and Regulate Radio and Television Broadcasting Act have also been developed. The Electronic Transaction Act was enacted in April 2001, while the other four IT-related laws – on universal access, computer crime, data protection and data privacy – are in process.

With respect to investment in people, progress has also been made. Research conducted by the Ministry of Education indicates that by the end of 1998, the computer-to-student ratio was 1:84 at the primary school level and 1:53 at the secondary school level (compared to IT 2000 targets of 1:80 and 1:50). Also, by the end of 2000, almost all universities were connected to ThaiSarn, while more than 3,000 schools were connected to SchoolNet. On the other hand, the plan to establish the National Interactive Multimedia Institute has not been implemented, largely because of budget constraints. Though the Institute has not been founded, many multimedia educational and CAI development projects have been carried out by several entities. In addition, in August 1999, the Education Reform Act was passed. This reform clearly expresses the importance of IT in education. At present, however, the demand for IT manpower in Thailand is still greater than the supply. Clearly, this disparity between demand and supply needs to be resolved.

Regarding the third agenda, investing in good governance, there has also been perceivable progress. In 1999, for example, based on an NITC proposal, the Cabinet requested every public ministry and department to appoint a high-ranking official (i.e., deputy permanent secretary for a ministry or deputy director-general for a department) as the Chief Information Officer (CIO) of the organization. The responsibility of a CIO includes drafting the organization's IT master plan and translating relevant national IT policies into organizational actions. In recent years, there has been a visible improvement in IT utilization in the public sector for both internal operations and public services. Many of the public services are now available online. GINet was also established to provide secure network services for government organizations. Also, an agency called Software Park was set up to promote and support the Thai software industry.

In sum, after the release of IT-2000, Thailand made great strides in developing information infrastructure, human resources and good governance. It appears, however, that progress in the

areas of human resources and good governance has been slower than in the building of infrastructure. In the case of the human-resources and good-governance agendas, although obvious progress has been made, a number of goals have not yet been achieved.

3. From IT-2000 to IT-2010

After IT-2000 successfully provided a framework for subsequent policies and projects, IT-2010, a national IT policy framework covering a ten-year period, was drafted and approved by the Cabinet in March 2002. As discussed in the previous sections, IT-2000 focused on three fundamental prerequisites that must be put in place; IT-2010, however, extends the focus to include not only the required foundations but also the application domain in which IT is to be utilized. More importantly, the long-term vision of IT-2010 is not on the technology itself but the idea that use of IT can lead to the sustainable social and economic development of the country.

The long-term vision of IT-2010 is to bring Thailand into a knowledge-based economy and society, an economy and society in which creation, collection, dissemination and utilization of knowledge are considered major tools of economic development. To make this vision a reality, IT-2010 identifies three guiding principles that must be followed:

- Invest in knowledge-based human capital
- Promote innovation
- Invest in information infrastructure and information industry promotion

In addition, three measurable goals are targeted:

- To increase national technological capability, expressed in the United Nations Development Programme (UNDP) Technological Achievement Index, from being in the “dynamic adopters” class to the “potential leader” category.
- Using the International Labour Organization (ILO) classification standard, to increase the proportion of “knowledge workers” from 12% (as of 2001) to 30% (to match the average knowledge-worker proportion of OECD member countries for the year 2001).
- To increase the proportion of knowledge-based/knowledge-intensive industries, adopting OECD classification standards, to 50% of the overall economy (to match the average knowledge-based industry proportion of OECD member countries in 2001).

As mentioned previously, in addition to the fundamental principles, IT-2010 also identifies specific application domains in which IT should be utilized. These application domains are called “flagships.” These flagships consist of the following: (1) e-government; (2) e-commerce; (3) e-industry; (4) e-education; and (5) e-society.

IT-2010 clearly indicates the need to ensure synergy in the development of the five flagships. For example, resources should be shared to reduce investment redundancy, demand-supply relations among the flagships should be created to keep exports to a minimum, physical and information networks should be built to urge close collaboration, and cooperation within and across public and private sectors should be encouraged.

The three guiding principles described above and the five flagships are intertwined and should all be viewed in the context of the big picture. For example, the development of e-education will have a positive effect on human capital development. Likewise, investment in infrastructure will have a positive effect on all flagships. More importantly, the principle of promoting and supporting the local IT industry must be given high priority. Otherwise, the development of the five flagships might possibly lead to a higher negative export balance.

In addition to the three guiding principles and the five flagships, IT-2010 also outlines certain so-called “key success factors” that must be included in all IT policy development and implementation. These key success factors are follows:

1. Content and knowledge creation must receive more or at least equal attention in comparison to infrastructure and hardware.
2. Continuous human resource development is a must. This should be carried out through both traditional (in-school) and non-traditional education, including short-term training to improve the skills of the workforce so that they can become knowledge workers.
3. Digital-divide problems must be tackled by creating digital opportunities for all. It is important that all dimensions of the divide, i.e. infrastructure divide, literacy divide, cultural divide and management divide, are recognized.
4. IT leadership must be emphasized and included in IT policy development and implementation at all levels, starting with the Prime Minister in his role as the chair of the national IT policy-making body.
5. The linkage between universal access policy and telecommunications and broadcasting policy must be ensured. Technological convergence should also be considered to optimize the utilization of resources.

4. IT Master Plan (2002-2006)

As previously mentioned, IT-2010 provides a policy framework to guide Thailand during the first decade of the twenty-first century. In addition to IT-2010, NITC also drafted a five-year plan called the National IT Master Plan 2001-2006, which identifies visions, missions, objectives, strategies and plans and establishes a time frame for the first five years of IT-2010. This IT Master Plan was approved by the Cabinet in March 2002. It is intended to provide guidelines to be followed by government agencies and other related organizations in drafting their five-year IT strategies. Thus, the IT development of all related parties will be well coordinated.

The SWOT (Strengths, Weaknesses, Opportunities, Threat) analysis was adopted to identify strengths, weaknesses, opportunities and threats in Thailand with respect to IT development and utilization. Based on these findings and other related information, national IT strategic agendas for the next five years were drawn up as follows:

- Strategy 1: Elevate Thai IT industry to become a regional leader.
- Strategy 2: Utilize IT to enhance the quality of life and Thai society.
- Strategy 3: Reform and enhance R&D for IT development.
- Strategy 4: Human resource development.
- Strategy 5: Enhance entrepreneurial spirit and leadership to strengthen national competitiveness.
- Strategy 6: Promote the utilization of IT in SMEs.
- Strategy 7: Encourage the use of IT in public administration and services.

Of these seven strategies, three have been included in national top-priority agendas, namely, IT industry development (software industry in particular), human capital development and IT utilization in the public sector. It is obvious that these three strategies are closely related. For example, to strengthen industry, quality human capital is needed. Likewise, IT utilization in the public sector will result in a significant expansion of the local IT market, which in turn will encourage further industry development and so on and so forth. At present, much has been done to implement these three strategies. For example, the plan to set up the Software Industry Promotion

Agency has been executed, and this agency should be operational very soon. Furthermore, the services provided by the Visa Service Centre operated by the Board of Investment (BOI) have been expanded to accommodate all visa/work permit requests for IT knowledge workers (whether or not they are employed by BOI member organizations). After this new regulation is fully implemented and all documents have been filed, IT knowledge workers' visas/work permits should be granted within a few hours.

B. Policies in support of SMEs

1. Ministry of Industry and the promotion of SMEs

The most important state agency directly involved with SMEs is the Ministry of Industry. A law on the promotion of SMEs was proposed by this Ministry in 2000 and was promulgated during that same year. The three major components of this law are as follows:

(a) The establishment of the Office of SMEs Promotion (OSMEP), which reports directly to the Executive Board of the Office of SMEs Promotion. This Office acts as a liaison, or coordinating unit, in drawing up a major plan of operations for the promotion of SMEs at all levels of government agencies, state independent promotion units and relevant private organizations. It also manages and administers SMEs promotion funds.

(b) Granting of SMEs Promotion Funds. These include loans made to newly set-up SMEs, as well as loans for the improvement and expansion of existing private SMEs, R&D projects, technical and financial consultations, and seminars and workshops.

(c) Formulation of a major promotion strategy plan and policy. This five-year (2000-2005) plan was formulated by the Ministry of Industry in the year 2000.

Seven strategies to increase the strength and efficiency of SMEs have been laid down as follows:

Strategy 1. To increase the operational efficiency of SMEs in terms of technological and managerial capacity;

Strategy 2. To improve the human-resources development and entrepreneurial skills of SME operators;

Strategy 3. To create and expand marketing opportunities for SMEs;

Strategy 4. To increase the capacity of both public and private financial institutions and increase the availability of funds granted to SMEs;

Strategy 5. To improve the existing business environment;

Strategy 6. To support the development of small-scale enterprises and community enterprises in both rural and urban areas;

Strategy 7. To set up networks and clusters of SMEs.

In order to implement all these strategies, the government has already provided several fundamental bases for the accomplishment and materialization of each strategy, as follows:

1.1. Financial support base for SMEs

(1) In the year 2000, a loan totalling 35 billion THB was raised for the promotion of SMEs, with the cooperation of the Ministry of Finance working through various state financial agencies, such as the Bank for Agriculture and Agriculture Cooperatives (BAAC) and the Industrial Finance Cooperation of Thailand (IFCT). In 2001, the Government approved a total amount of 45.3 billion THB for loans to SMEs and another 4 billion THB as down payment for loans provided to SMEs.

(2) A joint loan programme with the Siam City Bank has been established. A similar effort has also been made with the Bangkok Bank.

(3) Similar financial contacts have also been made with domestic financial institutions and international finance corporations, such as the Asian Development Bank, the Overseas Economic Cooperation Fund and others.

1.2. *Increase the capacity of SMEs*

(a) The Institute of Small and Medium Enterprises Development (ISMED) was set up in 1999 as an independent institution responsible for enhancing and increasing the capacity of both existing entrepreneurs and potential new entrepreneurs. This Institute provides support to those two groups through a process of learning by experience, as well as consultation and support with research information. The Institute is operated as a collaborative effort of the Department of Industrial Promotion of the Ministry of Industry and eight state universities scattered throughout the country, notably Chulalongkorn University, Thammasat University, Khon Kaen University and Chiang Mai University.

(b) An Industrial Restructuring 5-Year Plan (1998-2002) was also drawn up. This entailed collaboration between the public and private sectors to improve and increase industrial capacity in the production and distribution process, as well as in manpower utilization and industrial equipment and technology.

(c) Industrial Settlement Zones were set up in order to provide the public infrastructure needed for the promotion of SMEs and other basic facilities. Standardization of land use, factories and industrial assemblies will be implemented to meet demand from various types of SMEs, such as food production, textiles, wood crafts, furniture factories, and certain public services.

2. **Institute for Small and Medium Enterprises Development (ISMED)**

The Institute for Small and Medium Enterprises Development (ISMED) was established with financial support from the Government on April 5, 1999, under the supervision of the Ministry of Industry. Its main purpose is to develop and strengthen the skills and capacity of SMEs to become viable and sustainable. In particular, its purposes are:

1. To act as a primary centre for supervising and supplying information on where and what kind of assistance entrepreneurs seeking help can gain access to. This is known as the SMEs Service Centre Programme;
2. To provide further services in connection with:
 - Training courses in administration, management and technology,
 - Supervision and consultation,
 - Business information services,
 - Setting up SMEs networks and clusters to overcome technical and human resources problems and to enhance business performance.

2.1. *Services*

To date, ISMED has provided a wide range of services to those who have just recently started up businesses, as well as to those who have already set up SMEs. Services offered include:

(a) SMEs Service Centre Programme

This is a service and information centre aimed at helping SME entrepreneurs obtain closed-circuit information, as well as to gain access to information and services of various public and private service agencies (both in connection with promotion and development of enterprises and with supervision and administration to solve specific problems). The programme is intended to be the first primary centre to assist those entrepreneurs who seek help. Other services, such as business transactions, business correspondence and business partnership, both within and between countries, are also included.

(b) Training programmes

Specific training programmes are provided directly to target groups so that trainees can gain skills and knowledge pertaining to their specific businesses in a short period of time. There are short, medium and long-term training courses under a wide range of topics, as follows:

1. General management – marketing, personnel management, finance, accounting and business tax;
2. Business operation (closed-circuit training courses) – a variety of professional training courses, e.g. hotel management, restaurants and food shops, and others;
3. Specific business management – production, marketing and services, and agribusiness;
4. Specific business operations – shipping and export, commercial electronics, etc.;
5. Business facilities – business plan, negotiating and bargaining; and
6. Promotion of new entrepreneurs – training of young-generation entrepreneurs, venturing in new business, business adjustment in periods of economic downturn, and community business enterprises.

(c) Advisory and supervision programme

Services include solving business problems and enhancing the business enterprises, including:

1. Introductory supervision by full-time Institute specialists with a view to making an in-depth analysis so as to improve the enterprises or refer them to affiliated agencies (more than 40 agencies) for further guidance and assistance;
2. Supervision in connection with business planning, as in connection with obtaining alternative financing from private and public financing agencies, or to improve the existing business system;
3. Supervision in connection with business decisions and improvements to facilitate market competition;
4. Supervision on special matters, such as packaging, market promotion and cost reduction; and
5. Business clinic for small enterprises conducted by a group of specialists and covering a variety of issues.

(d) Information services

The Institute provides a wide range of information through the Internet, fax, and telephone numbers for public inquiries. Information provided covers the following:

1. Information is provided on buying and selling and/or helping enterprises advertise their products and contact potential customers seeking information on specific products and services. The Institute acts as an intermediary, providing data on more than 100 000 products and lists of interested entrepreneurs.
2. General information on technical matters concerning SMEs is covered, including rules and regulations, tax information and advice on how to get started in business. Recommendations on how to run a successful business are offered, as well as ample information on successful case studies.
3. Information on all agencies concerned with SMEs is provided. The Institute supplies all necessary contacts with agencies involved with SMEs. Letters of introduction can be provided to those who need further information and assistance from relevant agencies.

(e) Business upgrading services

Development and achievement of business firms are crucial to SMEs, and this service is provided under the responsibility of ISMED. The Institute is ready to help upgrade a business from a shop operating at home to a mini-mart, for example. This includes supervision on management of the store and purchasing of products, as well as training of employees. Introducing other relevant agencies, such as financing agencies, to help with further development, is not disregarded. Additionally, with regard to SME networks and clusters, the Institute also provides assistance in searching for new prospects on the international market, finding partner companies abroad as well as marketing channels to export products to foreign countries. In order to improve the level of specialization and creation of demand, the Institute cooperates with local SMEs in setting up networks and clusters to strengthen their cooperative arrangements.

(f) Other services

The Institute for Small and Medium Enterprises Development (ISMED) promotes activities of SMEs by organizing SMEs Day at least once a year, at which time entrepreneurs can get together and exhibit their products. More than 100 000 items of goods and products are on display in this exhibition. In addition, radio and TV programmes on SMEs are also widely broadcast and televised. This service also includes newsletters and other published materials relating to SMEs.

As mentioned above, ISMED has also established connections with universities in Bangkok and in four other regions of the country to represent them in the activities and services described above. The Institute therefore is easily accessible to all entrepreneurs in every part of the country.

3. Office of SMEs Promotion (OSMEP)

As mentioned above, the Office of SMEs Promotion (OSMEP) is a coordinating body chaired by the Executive Board of the Office of SMEs Promotion. Given its coordinating and facilitating functions, it is a corporation, not a governmental agency or public enterprise; this enables it to carry out a broader range of tasks and perform its work more expeditiously. It has the benefit of access to governmental information and cooperation, and can also work in partnership with other corporations. This subsection describes its present crucial roles.

At present, the important tasks of OSMEP include promoting international marketing and operating a venture capital fund. Both tasks are bound to foster and increase competitiveness of SMEs. The ongoing responsibilities include developing a national information infrastructure of SMEs and coordinating international cooperation on aspects relating to SMEs. These are supportive of and complementary to the first two, but they provide payoff in the long-run and keep SMEs development sustainable.

3.1. *Promotion of international marketing*

International marketing problems may be classified in three categories. Firstly, most SMEs lack marketing knowledge, especially concerning the international scene. They are not competent in finding and creating export channels or researching international markets. Secondly, international transportation may be a heavy burden for exporting and hence, for competitiveness. Most SMEs must depend on many stages of transportation, and this increases the cost of the product. Thirdly, the lack of financial capital, qualified human resources and managerial skill when dealing with strong international competition is also a problem.

To address the difficulties with exports, OSMEP has initiated policies on international marketing as follows:

- (i) Promotion of SMEs and information on the international market;
- (ii) Development of international cooperation at the governmental level on policy guidelines for upgrading Thai SMEs; and

(iii) Support for the role of Thai SMEs in regional networks.

In addition to promoting policies, OSMEP has founded another corporate-type instrument called SMEs Trader Partner (STP). It focuses mainly on facilitation pertaining to the international marketing process for SMEs engaged in exporting. From finding markets to shipping procedures, STP assists enterprises in finding information, contacting related foreign offices and advising on potential problems. Thanks to its corporate form of operation, it is able to perform functions with flexibility, unlike governmental institutions.

3.2. *Venture Capital Fund*

The Venture Capital Fund, designed to promote SMEs, is managed by OSMEP. It was created by agreement with the Competitiveness Development Board chaired by the Prime Minister. In order to increase the competitiveness of SMEs, the Venture Capital Fund serves major objectives, such as:

- Being a financial resource for SMEs in accordance with the Promotion Strategic Plan and Policy;
- Providing financial support for SMEs so as to adjust the debt-equity ratio at an appropriate level;
- Contributing to steady growth of SMEs' administrative, marketing, accounting and other systems until the enterprises are able to raise funds via the capital market on their own;
- Encouraging SMEs to get into professional management;
- Contributing to the growth of the domestic capital market; and
- Providing support for plans and projects related to SMEs and their efficiency.

The benefit to SMEs includes both source of capital and assistance in operational and information aspects, e.g., through advisory services, training in accounting and market knowledge. To be a source of capital as a partner of SMEs, the enterprises are exempted from paying interest and do not need collateral for fundraising. These advantages of venture capital over loans allow for a screening process in picking the winners or those companies included in the groups targeted by the Government.

An alternative way to gain access to the fund is to be in an industry in the target groups chosen by the Government, namely:

- fashion-and-design-based business;
- software or IT business;
- food and herbs business;
- automotive industry;
- tourism industry;
- export-oriented business;
- business or industry that supports those mentioned above; and
- firms in plans or projects selected by the Government.

Assistance from OSMEP as mentioned above is based on improvement in competitiveness. The institution provides technical and administrative knowledge for management, especially with regard to exporting, together with financial help for improving the feasibility of SMEs in general. Although knowledge assistance benefits all kinds of businesses, financial assistance is limited to certain selected industries and businesses. Under the joint venture approach, it becomes an owner, in the range of 10% to 50% of total registered capital, sharing the risks and profits of SMEs. This

is the main reason why it is directed only at officially selected businesses. These industries and businesses had been picked up before the Promotion of SMEs Act was implemented.

After a two-year operational period under a private fund management company, the performance of the Joint Venture Fund is much lower than targeted. As shown in table 14, the Fund achieves about 16% of its goal in terms of both the number of enterprises and the amount of joint venture capital.

The major obstacles are threefold. The first and most important one is a lack of business potential. According to the Fund manager's evaluation, 38.3% of total applications fail to meet that requirement and are not considered feasible for operation and investment.

The second obstacle is the high debt-equity ratio. The ratio of unsuccessful applicants is above the limit assigned by the Fund manager. This problem accounts for 12.1% of total applicants.

Thirdly, the non-achievers are not willing or not ready to improve their accounting systems. Normally, SMEs tend to have informal accounting systems, which makes them unwilling or unable to open their books to the Government. It would be very costly to the firms to change their accounting system in order to apply for venture capital. This obstacle accounts for 7.1% of the total number of applicants. Although the Venture Capital Fund is an instrument of the government and beneficial to SMEs, there are many problems that delay its expected success.

TABLE 14
TARGETS AND PERFORMANCE OF SMES VENTURE CAPITAL
FUND IN 2001-2002

Period	Target		Performance		
	#	Amount of funds (millions of THB)	#	Amount of funds (millions of THB)	% of success
Jul 00 - Jun 01	25	375	4	57	15.20
Jul 01 - Jun 02	32	460	9	76.52	16.63
Total	57	835	13	133.52	15.99

Source: Office of SMEs Promotion

4. SMEs Development Bank (SMEs Bank)

The SMEs Bank was founded by law in 2002. It is a governmental financial institution under the supervision of the Ministry of Finance and the Ministry of Industry. Its main objective is to undertake business operations, expansion and improvement of SMEs through loans, guarantees, joint ventures, advisory services and other necessary services. In line with this objective, its functional goals are:

(i) To provide financial services to SMEs targeted by the Government so as to strengthen them and equip them for sustainable development, as well as to give them liquidation support with regard to economic and social benefits rather than financial profits;

(ii) To support existing SME entrepreneurs and new SME start-ups so as to improve their competitiveness and increase their potential to become the economic foundation of the country;

(iii) To increase the capacity of the organization, in line with the country's mission of supporting SMEs.

Services are provided to a very broad range of SMEs, including manufacturing, trading and service SMEs. Eligibility is based simply on their being of Thai nationality and of an investment size classified as SMEs. Specific services are:

- loans for long-term investment;
- loans for short-term current cash flow;
- factoring loans for liquidation support via cashing and invoices;
- bill discount, acceptance and letter of guarantee;
- leasing loans for buying or investing in machinery or vehicles for business;
- joint-venturing in which SMEs Bank participates at no more than 50% of the registered capital and no more than 50 million THB in each case;
- foreign loans;
- services including advisory services, training and other support for the development of business capacity.

5. Board of Investment Office (BOI)

The Board of Investment Office (BOI) has played an important role as an investment promotion agency for more than 40 years. It was authorized and empowered by the Investment Promotion Act and is chaired by the Prime Minister and the Minister of Industry. It focuses on large-scale production and investment promotion covering a wide range of industries and businesses, such as agriculture, mining-ceramics and iron production, machinery and transport equipment, electrical and electronics, chemicals-paper-plastic products and public services and utilities. Decisions on granting of promotion and provision of benefits are made by the Board on a case-by-case basis. In a recent year, 2003, BOI turned its attention to SMEs, in keeping with the Ministry of Industry's policies.

The scope of BOI promotion of SMEs is smaller than that provided for large investments. There are only two groups of businesses, i.e., agricultural products and creative products or production such as furniture and components, toys, clothing and stationery products. Eligibility requirements for SMEs are:

- to be an SME with an investment of over 500,000 THB (about US\$ 12 000) but less than 5 million THB (approximately US\$ 120 000), excluding working capital and land value;
- to have Thai ownership of more than 51%;
- to be a producer in the One Tambon One Product (OTOP) programme or a producer authorized by the Office of SMEs Promotion.

The privileges and benefits given to eligible companies include import-duty exemptions for machinery and corporate income tax exemptions for eight consecutive years. This is equivalent to the highest benefit provided for large investments.

Promotion of SMEs by BOI is new, and many enterprises are not aware of it. The performance and success of the policy are presently not clear. Nevertheless, it is worth noting that the kinds of businesses that are eligible are few, and that it is not expected to affect firms in a broad area. This could be because the first tier of policy is as a pilot project. The Board of Investment will soon start more projects and expand the range of SME businesses or industries. As regards support for SME use of technology, its promotion is applied to another group.

V. Conclusions and recommendations

A. CONCLUSIONS

After the 1997 economic crisis, the growth rate of the IT market was considerable, namely, 35.4% in 1999 and 39.8% in 2000. The market value has been over US\$ 1.2 billion since 2000. Telecommunications is the sector that uses IT the most. However, the IT penetration ratio in Thailand is relatively low. Computer-equipped firms accounted for only 10.6% of the total, and these companies were concentrated in Bangkok and the surrounding area. Only half of all firms using computers have access to Internet and less than 10% have their own websites. Most of the websites are used in the tourist industry and are at the beginning stages, using them for advertising only. Only 11.42% of all websites are at an advanced stage and are used for a number of purposes, such as purchasing, clearing or logistics.

It is generally recognized that SMEs are presently the most important and fundamental organizations for accelerating national economic development. They play crucial roles and functions in helping large enterprises increase production efficiency by supplying primary spare parts and components. In the year 2002, there were 1 645 530 enterprises in Thailand. Amongst these, 99.63% were SMEs.

Even though IT is the key element for international and domestic trading, only a small number of Thai SMEs use IT for increasing their productivity and efficiency and for trading. Since the world economy is becoming a digital economy, the uses of electronic networks or electronic media should not be ignored. Consequently, Thai SMEs in general are unable to compete on the world market.

Chatchawal Orchid Co., Victor Packing Co., and Nuntiya Care Stone Co. are the case studies discussed in this paper. Nuntiya Care Stone Co. represents a successful case of using IT for international trading. The company website, www.Thaignem.com, has reached the full scale of e-commerce. There were more than one million visitors with total sales of US\$ 4 million a month. The website also provides real-time online trading information.

Chatchawal Orchid Co. is a case of an SME using e-commerce at the beginning stage. The company website, www.qualitygreen.com, is used for advertising purposes only.

Victor Packing Co. is a successful SME that does not use e-commerce. However, the company is using IT for increasing the productivity and efficiency of its organization.

The Thai government has recognized the benefits of IT use for SMEs. However, the cost of using IT may be too high for small organizations. The Thai government is planning to create a positive environment for SMEs by using IT for SME capacity building, financial assistance and human resource development. E-government is one of the projects designed to ease all barriers of IT use by SMEs. This programme includes e-procurement, e-revenue, e-license, e-payment and e-auctions, for example. The Thai government has also established several institutions to create this positive environment, such as the Electronic Commerce Resource Centre (ECRC, www.ecommerce.or.th). There are several websites used that serve SMEs as trading places, such as www.Thaitambon.com and www.Siamvillage.net

Regional networks have also been established to assist SMEs. The ASEAN+3 SMEs Network has been set as the largest online meeting place for suppliers and buyers in the ASEAN+3 region and the number one destination for buyers from the rest of the world to purchase products made in Asia.

B. RECOMMENDATIONS

The factors that affect the slow pace of IT use by Thai SMEs are as follows:

(1) Thailand has some of the most competitive pricing in terms of individual users, i.e., dial-up services. However, Thailand has some of the most expensive lease-line prices, making it less competitive. Thailand is five times more expensive than Hong Kong, four times more expensive than Japan and three times more expensive than Singapore. The core of the problem is the monopoly in the telecommunications sector, which is largely controlled by the Communications Authority of Thailand. In order to lower IT costs, market liberalization must be given priority.

(2) With a population of more than 60 million, Thailand only has 1.4 million computers. The electronic market is too small for e-commerce to be profitable on the domestic market. The low level of computerization in Thai society can be explained by the lack of information technology infrastructure and the low IT literacy rate. The transformation of the whole society to an IT society has to be accomplished through implementation on the part of the Thai Government.

(3) The inadequate IT law structure is an IT burden as well. The Thai government is introducing six bills relating to e-commerce, namely, an e-commerce law, a digital signature law, a law on computer-related crime, an electronic funds transfer law, and the national information infrastructure law. The real problem may not be the laws themselves, but rather how the law is implemented, such as through the establishment of a neutral body to be the certification authority and the gateway for monitoring the inflow-outflow of e-commerce trade.

References

- Koanantakool, Thaweesak, “E-commerce for rural development”, presented at the Workshop on Electronic Commerce Policy and Regional Cooperation, “Digital Economy for Communities and SMEs Development”, 19-21 June 2002, Bangkok, Thailand.
- Mephokee, Chanin, “Information Technology: Some Implications for Thailand.” *Digital Divide or Digital Jump: Beyond ‘IT’ Revolution*, Kagami and Tsuji (eds.) Institute of Developing Economics, Japan External Trade Organization, 2002.
- Mephokee, Chanin, “Transfer of Technology for Successful Integration into Global Economy: A Case Study of the Electronics Industry in Thailand”, United Nations, New York and Geneva, October 2004.
- National Electronic and Computer Technology Centre (NECTEC), IT2010, National Science and Technology Development Agency, Ministry of Information and Communications Technology, 2002
- National Electronic and Computer Technology Centre, “Enlightening: Successful e-business Model.” The first National Conference on Electronic Business, Thammasat University and NECTEC, 24-27 October 2002.
- National Electronic and Computer Technology Centre, The Asia E-commerce Incubator Project Workshop, National Science and Technology Development Agency, Ministry of Science and Technology, 2002.
- www.aseansec.org
- www.ecommerce.or.th
- www.nationaljeweler.com
- www.nectec.or.th
- www.nstda.or.th
- www.Thaigem.com
- www.ThaiTambon.com

VIET NAM

Nguyyen Thanh Ha

I. Introduction

For a long time a centrally planned economy, Viet Nam was dominated by State-owned enterprises focusing on heavy industry, while SMEs, especially the private corporate sector, were not developed. Only since the mid 1980s, when reforms and an open door policy were introduced, did the SME and private sector have a chance to develop. However, SMEs and the private sector were not given fair and equal opportunities (in terms of licensing, access to credit and other resources, government support and incentives, etc.) until the late 1990s. By the end of the last century, SMEs and the private sector became an essential sector of the Vietnamese economy, providing significant contribution to GDP growth and job creation.

In the last decade, the Government of Viet Nam created numerous regulatory and institutional mechanisms for SME development. These include amendment of indiscriminate commercial bank lending policy, easier access to land use rights, the abolition of restrictive licensing requirement for the entry of SMEs into important and lucrative industrial and services sectors, equal access to government grants and financial support, etc.

IT has also been a government priority for the social-economic development for a long time now. However, until very recently, the focus was given to IT development and application in public administration and the large corporate sector. Most of government resources for IT development and application were directed to large state-owned enterprises. Thus, SMEs and the private sector lacked critical support for the initial phase of IT application. This has a negative impact on the scope, scale and result of IT development and application for the SME sector, with the result that IT use in SMEs was very limited.

However, there have also been a number of efforts to promote IT application in SMEs and the private sector, especially from SMEs themselves, industry and trade associations (notably the Viet Nam Chamber of Commerce and Industry-VCCI), entrepreneurs, and also some government agencies (notably the Viet Nam Trade Promotion Department-Vietrade). Several industrial clusters have been formed, to help one another in IT application. Efforts to promote e-commerce businesses and their cooperation with government agencies have also been pursued by many SMEs.

The Government of Viet Nam has recently adopted a more pro-active and specific policy toward IT development and application for SMEs, including extensive human resource development for SMEs and the allocation of financial resources for IT in the SME sector. At the same time, regulatory and institutional frameworks (such as electronic accreditation) and technical infrastructure (e.g. broadband development) for IT application are also being actively developed by the Government and the agencies concerned. All of these efforts are expected to usher in new era for a broader and more effective application of IT for SMEs in Viet Nam in the near future.

II. Present Situation of IT market and IT usage by SMEs

1. ICT Penetration

Viet Nam's ICT industry is growing at a rate of 25% per year. Personal computers (PCs) assembled by domestic firms shared 90% of the related market in 2002. About 20 firms assembled PCs with trademarks and the market share of these products was 25-30%. Domestically manufactured ICT products were worth about US\$ 170 million and met 30-40% of domestic demand. Turnover from software products and related services was approximately US\$ 75 million in 2002. As at July 2003, there were around 2,500 firms registered to operate in the IT field, of which over 400 were working in the software sector, with 8,000 employees. Several factories producing hardware, such as Fujitsu, Samsung VINA and Canon, and factories producing communication equipment, such as Hanel and Vietronic Thu Duc, contribute about US\$ 1 billion to the total turnover of the hardware sector. Many software producers have focused on strengthening quality management capabilities and seeking and participating in international markets. Some software industrial parks are in the process of being developed. Some are operating efficiently, such as Quang Trung Software Park in Ho Chi Minh City, which houses 52 firms with over 2,400 employees and trainees, about US\$ 11 million of registered capital and over VND 500 billion of invested capital.

The telecommunication and Internet infrastructure is moving towards immediately applying modern and automated multiservice technologies with 100% digitization. The industry has a very high growth rate. The number of fixed telephone lines is increasing by 20 - 40% per year, with about 7 million subscribers and a ratio of 8.75 fixed telephone lines per 100 people. Internet services have been officially in operation since 1997. To date, the number of Internet subscribers is around 650,000 and the number of Internet users is 2.6 million, accounting for 3.2% of the total population of Viet Nam. At present, there are six Internet exchange providers (IXPs) and about 20 Internet service providers (ISPs). By the end of October 2003, telephone lines were available in 8,400 communes, representing 93.53% of the total number of communes in Viet Nam. Service charge cuts and the dismantling of the monopoly in the telecommunication field are being implemented radically.

In terms of ICT training, by 2002 there were 57 universities, 99 colleges, 90 government schools and 56 centres participating in ICT training. Most universities and colleges were connected to the Internet via telephone lines. About 20 universities hired their own transmission lines and had their own websites on the Internet. In 2003, 100% of high schools, universities and colleges had Internet connections. ICT training is diversified in nature. During the three years from 2000 to 2002, the requirements for enrolling IT university students and postgraduate students increased sharply by 50% and 30%, respectively.

TABLE 1
AVERAGE INDICATORS FOR ICT SERVICE USAGE IN 2003

Average indicator 2003	No. of fixed phones/100 people	No. of mobile phones/100 people	Internet users/ 10,000 people	No. of PCs/ 100 people	GDP per capita (US\$)
World	18.76	21.91	1107.08	9.91	5.383
America	34.12	33.80	2592.71	28.95	15.633
Europe	41.00	55.40	2373.14	21.44	12.822
Asia	13.64	15.03	647.25	4.45	2.313
Africa	3.01	6.16	147.93	1.38	663
Viet Nam	5.41	3.37	430.10	0.98 [02]	429

Source: Prepared by the author on the basis of information provided by the International Telecommunication Union (ITU), May, 2004.

TABLE 2
VIET NAM ON THE WORLD IT MAP

No.	Indicator	Ranking 2004	Ranking 2003	Ranking Organization/Year
1	Information Society Index (ISI)	N/A	53/53	IDC & World Time - 2003
2	Infringement of Copyright Ratio	N/A	86/86	BSA - 2003
3	Digital Access Index IDA	122/178	N/A	ITU - 2004
4	E-Readiness Index	60/64	56/60	EIU - 2004
5	Networking Readiness Index (NRI)	68/102	711/82	WEF - 2004
6	E-Government Index	97/173	90/169	UNDPEPA-ASPA - 10/2003
7	Contract Manufacturing of Software - Services	20/25	N/A	Kearney - 2004
8	Telecommunication – Internet			ITU - 2004
	– No. of phone lines/100 people	129/182	125/196	
	– No. of Internet users/10,000 people	82/182	126/196	
	– No. of PCs/100 people	126/182	124/196	
	– No. of mobile phones/100 people	125/182	144/196	

Source: MPT, Evaluation of Policy for Development of Internet in Viet Nam, Hanoi, unpublished, 2004.

2. Use of IT by Government

Although most of the major ministries have websites, the majority are slow to load and contain limited information. Some of major weaknesses of government websites are:

- Links to other ministries and agencies, and to private sites, were generally lacking.
- Content was not generally delivered in a segmented, “role-based” way, which has been found by other jurisdictions to be a user-friendly way of providing tailored information.
- There is no clear central portal, although www.business.gov.vn does have links to seven ministries and agencies and has some useful content.
- Few sites appear to have any interactive features or even downloadable forms that can be mailed in after having been filled out.

In general, Viet Nam is probably in the lower left region of the “web presence” stage, characterized by limited content, no clear central portal, few links between agencies, and zero to low interactivity.

At the local level in Viet Nam, there are also attempts to apply IT for public administration. One of the major e-government efforts to date is in Ho Chi Minh City, where the city administration has launched CityWeb (www.hochiminhcity.gov.vn), as part of a five-year e-government master plan. The site reportedly covers investment opportunities, tax information, construction information, tax forms, and legal requirements. In a very progressive move, the site solicits comments from businesses in a “Talk with the Enterprises” section. City officials will then post responses to the corporate input. One of the latest developments in Ho Chi Minh City e-government efforts is the application for and granting of investment licenses through this web. This is still in its experimental phase, but promises to be a major development towards online government services.

3. Usage of computers by small, private SMEs

The use of IT by SMEs in Viet Nam is still limited, especially in terms of application for business management purpose. In 2002, the Viet Nam Chamber of Commerce and Industry (VCCI) conducted a survey on the usage of computers in small enterprises, most of which are private enterprises and had fewer than 50 employees. According to the survey results, computers were

used rather commonly in surveyed firms (91.6%). Of these, 48.7% had fewer than three computers. However, their purposes for using computers were just typing, accounting management, Internet access and e-mailing. Few used computers for other purposes, especially training. They had not made full use of computer applications in supporting and managing their research and product development (see the Table 3). Nevertheless, with quite a high proportion of computer-using firms, it could be said that infrastructure is already available for organizing training courses on financial/accounting software and management information systems, and remote training.

TABLE 3
PURPOSES OF COMPUTER USAGE AMONG SMALL
PRIVATE SMES, 2002

Purposes	%
Typing	85.4
Accounting	78.4
E-mailing	54.1
Internet access	48.5
Inventory management	20.9
Graphic design	19.9
Business management	15.5
Budgeting	10.3
Other purposes	6.9
Software design/programming	4.6
Training	1.2

Source: Viet Nam Chamber of Commerce and Industry (VCCI), Report of the Survey of the Application of Information Technology at Enterprises, Hanoi, 2002.

Due to easier access to finance and greater human and other resources, the larger SMEs (those with over 100 employees) have more experience with IT development and application. According to the result of a survey of 44 such enterprises in early 2004 (Vinasa, 2003), in general, most are aware of the importance of information technologies in their business development and management. Eighty-six per cent of surveyed firms applied IT in their business and management, while only 14% had not taken advantage of IT.

There were several reasons why these enterprises did not use IT: unavailability of specialized staff (33%), dependence on parent companies' decisions (16%) and financial difficulties (16%). It can be said that most of them did not lay down suitable policies for attracting qualified staff and did not invest enough funding into promoting IT applications. Regarding IT personnel and organization, only 27% of surveyed firms had arranged positions for IT management on their management board. Thirty-six per cent of surveyed firms did not have a department specializing in IT. Regarding IT infrastructure, 80% of firms operated in a networking environment. Twenty per cent did not establish network connections. Among the former, 49% used Local Area Networks (LANs), 3% exploited the benefits of Wide Area Networks (WANs) and 3% were connected using other network architectures.

Nearly three quarters (73%) of the firms surveyed had taken advantage of the Internet for their business development. They accessed the Internet for various purposes. However, the most popular purposes were e-mail (100%) and information collection (94%). Twenty-five per cent used the Internet for normal communications, 16% for selling products, 34% for connecting with affiliates, and 16% for connecting with suppliers.

Regarding website, nearly half (43%) of the firms surveyed were aware of its importance and had set up websites of their own, while 57% had not. Own websites were used for various purposes, including advertising (28%), service provision (16%), product sales (20%), information exchange (16%) and others (20%).

Among the manufacturers surveyed, only 16% offered and sold their products through network service providers, while 84% did not.

Regarding the efficiency of applying the Internet in business, 3% of enterprises were considered to have exploited the Internet very efficiently, 41% efficiently, and 10% inefficiently. The level of efficiency it brought to 28% of enterprises was evaluated as moderate.

TABLE 4
ASSESSMENT OF SOFTWARE FOR BUSINESS MANAGEMENT

Software for business management	Assessments by users		
	Satisfied	Not very satisfied	Not satisfied
Finance and accounting	7%	57%	3%
Personnel	5%	10%	
Salary	5%	25%	
Fixed assets	5%	10%	
Inventories	5%	7%	
Purchase	5%	5%	
Sales	5%	23%	
Production	3%	5%	
Client	3%	7%	
Project	3%	7%	
Interactive operation	3%	5%	
Control of production process			3%
Others		3%	

Source: Vinasa, Present situation of Application of information technology in State-owned enterprises, Hanoi, unpublished, 2003.

TABLE 5
CURRENT INVESTMENT IN IT BY STATE-OWNED SMES
Unit: thousands US\$

Field of investment	2001	2002	2003
Hardware	89	46	59
Software & services	11	6	5
Training	11	2	2
Total	93	51	63

Source: Vinasa, Present situation of Application of Information Technology in State-Owned Enterprises, Hanoi, unpublished, 2003.

Assessment of IT goods/services, and government policy

The survey also received responses from surveyed firms regarding the price of IT equipment. Thirty-four per cent regarded it as reasonable. Forty-eight per cent said it was high and the remaining 18% said it was too high.

Concerning the cost of training, more than half of respondents said that the cost of IT training was high, while 21% found it reasonable. According to 7% of respondents, the cost was too high. A very small proportion (3%) thought it was low.

With regard to the cost of business management software, 21% of enterprises thought it was reasonable. Over half (55%) said it was high, and 11% thought it was too high.

Similarly, more than half of enterprises (55%) had the general feeling that the cost of IT consulting services was high. Ten per cent said it was too high. Nineteen per cent found it reasonable, and a few (3%) thought it was low.

The cost of Internet access was no exception. Fifty per cent of firms answered that it was high. Eighteen per cent found it too high and 14% thought it reasonable.

When asked to evaluate the capabilities of Vietnamese IT firms, 35% of surveyed enterprises felt satisfied with their services, 43% said that domestic IT firms did not have the capabilities to meet their demands, and 7% assessed their capabilities as low.

Regarding the Government's policies, in the opinion of 66% of the firms surveyed, the Government had no specific policies. According to 10% of firms, existing policies were not good, while 7% thought the policies were good.

The ratios of total IT investment by enterprises compared with their total turnover in 2002 and 2003 were 0.07% and 0.06% respectively. Taking the turnover for 2003 as the base value, this ratio is estimated for the years from 2004 to 2006 as follows: 2004 - 0.04%; 2005 - 0.09%; and 2006 - 0.09%.

4. SMEs and e-commerce

At the policy level, although there have been several e-commerce related initiatives, there is scant market research on e-commerce or business adoption of ICTs. Most activities so far appear to be road maps for planning, or segmented initiatives at the development stage, rather than systematic and successful implementation efforts.

Among SMEs, the awareness of and the readiness for application of e-commerce is different.

TABLE 6
E-COMMERCE READINESS OF SMES IN VIET NAM BY TYPE OF ADOPTER

Type of adopter:	Innovators	Adopters	Latecomers
SMEs	ISPs	Some companies in the service sector (tourism/travel, hotel, entertainment, beauty care, etc.), the trading sector (import/export activities) and manufacturing (e.g. garments, textiles, handicrafts, leather and embroidery).	The remaining SMEs
Characteristics	They have rapidly understood the potential contribution of e-commerce	They are likely to be aware of the contribution that e-business practices can make to the company, but are perhaps not fully convinced of its relevance to them. This group will provide the threshold needed for e-commerce and is likely to constitute the largest market for any initiatives that may be implemented in the context of e-commerce in Viet Nam.	They have little idea about e-commerce and don't have any plans for e-commerce.

Source: Prepared by the author on the basis of International Trade Center, "Viet Nam E-Trade Bridge" Geneva, January, 2002.

The actual situation of e-commerce application therefore also varies. According to a survey by the Ministry of Trade in 2003:

- A significant proportion of enterprises (46%) had participated in e-commerce. However, the rest seemed uninterested in e-commerce. Only 9% and 24% of the firms surveyed planned to participate in e-commerce in the coming six and 24 months, respectively. Eleven percent were still in two minds and a lot did not answer.

- Those that had participated in e-commerce were more interested in the business-to-business (B2B) form of e-commerce (76% compared with 57% for the business-to-consumer (B2C) form). This shows that the B2B form in Viet Nam brings more benefits to enterprises.

– Most forms of information exchange in e-commerce had been applied, such as e-mail (93%), EDI (electronic data interchange) and XML (extensible mark-up language). Fifty-four percent of surveyed enterprises had their own websites. Types of goods and delivery were diversified from tangible to digitized goods, and were delivered on the networks. This shows that e-commerce has been applied widely, although it has not yet become popular.

– Most enterprises had to stop at payment. This is because the legal framework for online payment is still lacking. They merely introduced their products and themselves through networks. Payment had to be made by traditional methods.

– Only 13% of firms used specialized software when participating in e-commerce, e.g. inventory management, client management and personnel management. This shows that software programmes may be too expensive for their financial means, or are not widely available on the Vietnamese market.

III. SME development in IT renovation

A. OVERVIEW OF THE RELATIVE IMPORTANCE OF SMES IN THE OVERALL ECONOMY

In recent years, in line with the renovation policy set by the Government, with positive support from foreign countries and international organizations, the private economic sector, including SMEs, has been booming throughout the country, providing a major contribution to the country's economic development, mobilizing social resources into production and business activities, creating more employment and improving livelihoods for people.

The statistics indicate that almost 99% of all private enterprises are SMEs. Of all business activities engaged in by SMEs, 42% are involved in trade and repair activities; 35% in manufacturing; 10% in construction; 4.4% in hotel and catering; 3.3% in transportation and communication; and 2% in property and business services. SMEs constitute a substantial majority of the total number of enterprises engaged in all fields, ranging from a low of 10% in construction, to 62% in electricity, gas and water; 72% in finance and credit; 78% in transportation and communication; 86% in manufacturing; 84% in mining; 84% in hotel and catering; 88% in education and training; 93% in trade and repair and 94% in R&D.

Since the Law on Enterprises was issued in 2000, business start-ups have been increasing rapidly, with an average of 1,600 new companies per month. In 2002, private enterprises contributed nearly 30% of total new investment. Private industrial output increased by 19.2% in 2000, 20.3% in 2001 and 19.3% in 2002. Employment growth is reported to be about 30% per year.

In 2003, the growth rate of the industrial sector was 16% compared with 2002, the highest rate in the past three years, in which the State sector achieved 12.4%; the private sector achieved 18.7%; and the foreign investment sector achieved 18.3%. As at April 2004, industrial production was reportedly growing at 15.4% over with the same period in 2003, when the growth rate was 12.6%; the private sector achieved a growth rate of 21.4%; the foreign investment sector achieved a rate of 14.1%. These are considered to be the highest sustainable growth rates compared to the previous year.

TABLE 7
MAJOR INDICATORS ON ENTERPRISES

Major indicators	Type of ownership			
	Total	State-owned Enterprises	Private enterprises	Enterprises with foreign investment capital
1. Percentage of enterprises (%)	100.0	8.5	87.8	3.7
2. Percentage of employees (%)	100.0	48.5	36.6	14.9
– Average number of employees in one enterprise	74	421	31	299
3. Ratio of capital source (%)	100.0	62.1	16.5	21.4
– Average capital of one enterprise (millions US\$)	1.438	10.438	0.25	8.375
4. Average fixed asset per employee (millions US\$)	7.438	8.563	2.688	15.438
5. Revenue percentage (%)	100.0	51.3	30.1	18.6
– Per employee (thousands US\$)	16,250	17,190	13,375	20,438
6. Ratio of profit-making enterprises (%)	75.1	83.0	73.6	46.5
– Average profit per enterprise (millions US\$)	1.55	6.5	0.17	34.5
– Income compared with revenue (%)	6.0	4.7	1.9	16.4
7. Ratio of contribution to GDP (%)	100.0	57.5	16.5	26.0
8. Ratio of contribution to the State budget	100.0	52.6	10.8	36.6
– Amount paid to the State budget compared with revenue (%)	9.04	9.27	3.25	17.75
10. Rate of return (%)				
– On business capital	4.32	2.90	2.31	9.99
– On revenue	5.13	4.18	1.50	13.61

Source: Nguyen Ngoc Tuan, Development of different economic sectors, *Viet Nam Investment Review*, No. 79, May 2004.

B. CASE STUDIES ON THE USAGE OF E-COMMERCE

In the context of open markets and development of the global digital economy, enterprises face significant challenges in international competition and export market development.

Wise and strategic use of information and communication technologies can give SMEs the competitive edge they need to survive in this demanding environment. In Viet Nam, despite the infrastructure constraints, a number of SMEs are already leading the way. Initiatives are under way to improve the national environment for e-commerce and to provide support and encouragement to enterprises taking advantage of this new way of doing business.

However, many SMEs are still unaware or reluctant to take advantage of e-commerce for many reasons.

The case studies in this report focus on the websites designed, operated and managed by two of Viet Nam's trade-facilitation organizations: VCCI (Viet Nam Chamber of Commerce and Industry) and Vietrade (Viet Nam Trade Promotion Agency), which comes under the authority of the Ministry of Trade (MOT).

1. VCCI and its website

VCCI is a non-governmental organization, representing Viet Nam's entire business community. Its aim is to speed up the country's socio-economic development and to promote economic, commercial and technological cooperation between Viet Nam and other countries in the world. It is also a non-profit organization operating with financial autonomy. However, it may get financial support from the State budget for selected projects of major importance. It has a head office in Hanoi and representation offices and branches in other major cities in Viet Nam. It also has representation offices in a number of foreign countries.

1.1. *Some major support activities for SMEs*

The SME sector in Viet Nam is still very young and has little experience of conducting business activities. Therefore, promoting the development of SMEs has been given the highest priority amongst VCCI's political tasks.

In 1994, VCCI established a centre specializing in assisting SMEs. Support services for SMEs focus mainly on training, marketing assistance, information provision and consultancy.

– **Training**

In terms of training, VCCI focuses on management skills, use of technologies, improving competitiveness, disseminating new laws and government policies, and guidance on their implementation, etc. Training courses are often short and geared to the business conditions of SMEs. VCCI often defrays part of the fees for SMEs to participate in training courses. In 2003, the VCCI system held 449 short-, medium- and long-term training courses involving 19,010 participating enterprises. VCCI programmes and projects also participate in training.

– **Marketing assistance**

VCCI assists SMEs by conducting various marketing activities, such as; (i) providing SMEs with a marketing planning service; (ii) supporting SMEs in the regular display of their products in showrooms; (iii) sponsoring SMEs for stand rental fees and assisting them in organizing joint stands at large trade fairs; (iv) supporting the organization of SME Weeks; (v) organizing overseas market exploration missions in order to improve SME export potential. In 2003, VCCI organized about 259 business trips abroad for 4,500 participating enterprises for market investigation and partner search. At the same time, VCCI hosted nearly 600 international missions to Viet Nam involving over 11,000 business people to explore this market and seek cooperation opportunities. A total of 190 seminars, forums and meetings between Vietnamese and foreign enterprises were held.

– **Information provision**

Information is provided to SMEs at a preferential fee that can cover part of the direct costs for collecting information. SMEs can access information on business opportunities, business partners, markets and technologies. Additionally, in order to prepare for penetrating foreign markets and participating in international business, SMEs can obtain useful information and knowledge from such VCCI publications as “*Trading in the EU Market*”, “*Exporting to the US Market*”, etc. In order to help Vietnamese enterprises to penetrate the Chinese market through Lao Cai market, VCCI has coordinated with the People's Committee of Lao Cai Province to establish a website to provide necessary information on the South-West market of China.

– **Consultancy**

The VCCI SME Promotion Centre is always ready to provide SMEs with advice on business, legal issues and technology, etc. A team of specialists in various fields is registered at the Centre. They are willing to share with SMEs their business experience and skills, such as management, accounting standardization, technology and input selection, material analysis, etc. In addition, SMEs may get help from the Centre in accessing financial sources and writing business plans.

1.2. *Vnemart - the e-trade floor of VCCI for the business community*

In an attempt to promote trading for enterprises, VCCI has designed an electronic portal - www.vnemart.com (hereafter referred to as “Vnemart”). Vnemart was launched in late 2002 to help build a bridge between Vietnamese enterprises and the international business community via the Internet. Vnemart is the first national e-commerce portal where users can conduct the whole transaction online. The portal is designed to assist Vietnamese and foreign businesses in gaining more market knowledge and understanding of legal and regulatory frameworks and business practices in each country and to seek trading partners and opportunities.

Vnemart acts as:

- *An exhibition centre* for Vietnamese goods and services on the Internet;
- *A trade transaction centre*. It helps enterprises to seek counterparts and products and to conduct online transactions;
- *An information support centre*. This centre provides enterprises with updated information on markets, prices, partners, economic and legal information and international market profiles;
- *An enterprise training centre*. It provides and consults information on business management, policies, regulations and international trade customs to help enhance the competitiveness of Vietnamese enterprises; and
- *An enterprise forum*. It supports enterprises in sharing experiences and discussing matters of concern.

1.3. *Membership*

A firm that wants to become a member of Vnemart merely has to send its registration to Vnemart's office via any means of communication, such as fax, e-mail, courier, etc.

There are two types of Vnemart membership, VIP Members and Basic Members.

VIP Members are allowed to advertise themselves and establish their own showrooms and transaction offices on the website. In order to become a VIP Members, a firm must have legal status, must have passed the VCCI training courses on registration procedures and exploiting the website and fall into the industrial sub-sector categories already available on Vnemart. Firms in other sub-sectors that want to become VIP Members and showcase their products have to wait until the website infrastructure is ready to accept them.

Basic Members are only permitted to post their offers to sell or demands for buying products/services on the website. Basic Members are not required to attend the above training courses or operate in the above sub-sectors.

Vnemart Members have an obligation to ensure that any information provided to and uploaded on Vnemart's website is truthful, up-to-date and accurate. Vnemart has the right to remove any material or information at its sole discretion which might be unlawful, inappropriate or contrary to its stipulations. Vnemart membership may be suspended or terminated if: (i) the member is found in breach of Vnemart's rules or has engaged in a fraudulent activity in connection with the use of Vnemart's website; or (ii) membership has not been activated or the account provided remains inactive for three consecutive months.

Since Vnemart acts only as the facilitator of transactions among its members, it does not take any responsibility for the quality, safety and legality of the products/services offered for sale, or the failure of any processes in the transactions conducted by the members through the website.

1.4. *Operational results of Vnemart*

VCCI has carried out many activities to attract website members and visitors. In coordination with various business associations, VCCI has organized more than 10 seminars to introduce this website and its advantages to enterprises in Viet Nam. VCCI has also provided about 30 training courses to firms registering to advertise and showcase their products on Vnemart.

Initially, during the pilot implementation phase, the site showcased close to 1,800 handicrafts produced by 27 selected firms. About 95% of these companies were small and unable to introduce their products onto the international market. They were selected from about 200 enterprises on the basis of their export volume and their willingness and readiness to participate in e-commerce.

In February 2004, Vnemart's services were expanded to include eight more sub-sectors, making a total of nine sub-sectors, including handicrafts, textiles and garments, leather and shoemaking, agricultural products, aquatic products, electronics and mechanics, foodstuffs, chemicals and plastics, and construction materials. At that time the number of members was 648, of which 128 were firms in foreign countries such as America, Europe, Japan, China, Republic of Korea and India. There were 2,714 products showcased on the website. As a result, many members concluded commercial contracts worth hundreds of thousands of US dollars. They included Van Nam, Artex Saigon, Mitex, Hamico, and Barotex Viet Nam. The number of enterprises applying for VIP and Basic Membership increased to over 1,000 and 1,500 respectively, including more than 500 foreign firms throughout the world.

Four months later, the statistics were even more impressive. By June 2004, the number of members had increased to 910, including 225 foreign members on various continents. Pharmaceuticals became the tenth sub-sector participating in Vnemart. A total of 2,848 types of product in all ten sub-sectors were showcased, with 250 transactions. With about 10,000 visits to Vnemart per day, Vnemart has become one of the top 225,000 websites in terms of attracting visitors.

The above achievements have been obtained with the strong support of government ministries, agencies and organizations that are pooling their efforts with VCCI to promote and develop e-commerce in Viet Nam.

TABLE 8
SOME OF THE MAIN OPERATIONAL RESULTS OF VNEMART
SINCE ITS ESTABLISHMENT

Period	No. of participating sub-sectors	No. of official members	No. of products showcased on the website
Late 2002	1 (for pilot implementation)	27	1,800
February 2004	9	648	2,714
June 2004	10	910	2,848

Source: Interview with VCCI, 2004

1.5. *Structure of Vnemart clients*

As mentioned above, Vnemart clients come from various countries and various industrial sub-sectors, such as handicrafts, textiles, leather and shoes, aquatic products, etc. The number of Vietnamese firms operating in the handicraft sub-sector account for approximately 77%, textiles 5%, leather and shoes 3%, and others 15%.

In terms of ownership, most Vietnamese members of Vnemart are limited liability companies and State-owned enterprises (SOEs), which account for 44% and 32% respectively. Joint stock and private enterprises are also active participants on the website, accounting for approximately 8% of the total. Only 3% of Vietnamese members are joint ventures with foreign companies. Cooperatives share over 3%.

In terms of scale, SMEs with limited financial capability are wise to take advantage of the website to introduce themselves, advertise their products and seek clients. Sixty-five percent of Vietnamese members are SMEs. The remaining 35% are large enterprises, including SOEs and joint-venture companies.

1.6. *Financing for Vnemart's operation and members' financial obligations*

Vnemart's operation is now financed from the State budget and by VCCI. In order to encourage and support enterprises to participate in the network, Vnemart provides free services

for the first two years of operation. This means that participants in the website do not have to pay any registration or membership fee until the end of 2004. However, depending on the level of financing by business associations and VCCI, they may have to pay fees for attending the related seminars and training courses. These fees, if any, are required merely to cover organization costs.

1.7. *Main findings*

- *Vnemart has not been able to provide comprehensive services*

Despite the convenience and benefits brought to clients, Vnemart's services are still limited. Due to the lack of a legal framework, Vnemart has not been able to let its clients complete the entire transaction through the network. Electronic documents and electronic signatures have not been legally recognized. The implementation of online payment services is impossible at the moment.

- *Many SMEs encounter problems when participating in the network*

The most common problem is to do with poor infrastructure. According to a report by the International Trade Centre in 2002, of the 700,000 PCs currently in use in Viet Nam, 75% belong to government offices and State-owned companies. About one third of SMEs have Internet connections. However, a large proportion of them still use dial-up technology for accessing the Internet, as ADSL technology is not widely used. Therefore, the efficiency of using the Internet in general and e-commerce transactions in particular is somewhat limited.

In addition to the common problem mentioned above, enterprises have to satisfy a number of requirements to enable their products to be showcased electronically. For example, they must pass a VCCI training course, which cannot be organized for individual firms immediately they apply for website membership. Such courses are only held for groups of enterprises in coordination with the relevant business association. This means that firms may have to wait for quite some time to advertise on the website.

2. **Vietrade and its website**

Vietrade is a government agency which comes under the Ministry of Trade's authority. It has been in operation for nearly four years now and is responsible for the management, coordination and development of trade and related investment promotion activities in Viet Nam.

2.1. *The website www.vietrade.gov.vn*

In response to the Government's policy on trade promotion and e-commerce development, in August 2001, Vietrade designed the website www.vietrade.gov.vn with the original objective of providing the Vietnamese business community with commercial information.

The main function of the website is to provide information relating to:

- *Legal documents.* Firms can review legal stipulations or policies relating to trade, especially foreign trade such as import, export, duties and quotas, etc.;
- *Business opportunities.* Here visitors to the website can find demands for buying or selling specific products;
- *Trade fairs.* This item provides information on all trade fairs to be held during the year;
- *Business directory.* When clicking this item, business people can easily search for target firms by selecting a particular industrial sub-sector, particular city or type of enterprise;
- *Commercial news (events) at home and abroad.* The website provides information on prices and the situation in domestic and foreign markets, relevant articles selected from newspapers, commercial events, etc.;

- *Publications of Vietrade.* Through this item enterprises are able to access Vietrade publications online without wasting time getting hard copies via mail;
- *E-commerce.* Visitors to this page can access information about the E-Trade Bridge for SMEs - Viet Nam. This is part of an international initiative by the International Trade Centre to address the realities of e-facilitated commerce by developing solutions to maximize the opportunities and minimize the risks of trading internationally in the digital age;
- *Consultation.* By just clicking on this item, business people and website visitors in general can get interesting and useful information on trade-related issues, such as the definition of trademarks and their uses in competition, ways in which enterprises can protect their trademarks in domestic and foreign markets, etc.
- *Useful addresses.* This allows visitors easily to search for addresses to contact functional organizations for guidance, consultation or registration to participate in trade events, etc.

As the website is hosted by the FPT Corporation, one of the best Internet exchange providers in Viet Nam (IXP), access the website is quite fast even when logging on from outside Viet Nam.

However, the search engine inside the website database is not yet adequate, particularly when users want to search the trade fair and exhibition or enterprises list.

VIETRADE is an agency operating with annual government funding to support the business community, so gets no fees for its activities. There is no advertising service for enterprises on this website. Enterprises can contact VIETRADE directly to introduce themselves through the business directory item on the website.

2.2. Operational results:

Due to its limited budget, Vietrade has not organized any public seminars to introduce the network to the business community. Vietrade merely takes advantage of its other events to publicize the website.

The website was set up in August 2001. A lot of enterprises have accessed the website to search for information on markets, partners and legal provisions, etc. The website receives about 300,000 visits a month. Up to now, 1,086 enterprises have registered to be listed on the “*Business Directory*” page.

The website interface has been upgraded and made more professional to turn it into an efficient information tool for the business community.

The Vietrade website is coordinated closely with the websites www.mot.gov.vn and www.vinanet.com.vn, which are operated by the Ministry of Trade’s E-Commerce Department and Commercial Information Centre (CIC) respectively.

In order to provide enterprises with a better trade promotion service, MOT has recently reorganized and assigned specific tasks to units in charge of providing information. The information provided is divided into two types: (i) information on long and medium-term macro issues, which is handled by the E-Commerce Department, and (ii) information on markets and prices, which are handled by CIC and Vietrade.

The E-Commerce Department uses the www.mot.gov.vn website as the main tool for providing information on Viet Nam’s policies, legal regulations and international commitments in such fields as trading, e-commerce and economic integration.

CIC provides information on Vietnamese and international markets and changes in prices every hour and every day to serve businesses and consumers.

With its www.vietrade.gov.vn website, Vietrade focuses on providing instructive information and training on trade promotion techniques and skills to enable enterprises to advertise their products in foreign markets and to seek partners. Every month, Vietrade reports to the E-Commerce Department on the information provision situation.

2.3. *Client structure*

Most participants in the website are Vietnamese enterprises. Of the 1,086 firms listed in the website, 843 firms are in the garment and textile sub-sector, 152 are in the aquatic and marine products sub-sector, and 91 are in the leather and shoemaking sub-sector, accounting for 78%, 14% and 8% respectively.

In terms of ownership, more than half (53%) of the network participants are State-owned enterprises. They consist of 576 firms from the above three sub-sectors. There are 466 limited liability companies, accounting for 43% of the total. Other forms of enterprise, such as holding companies, private and joint-venture enterprises account for only 4% of the total.

With regard to the size of network participants, unlike Vnemart (the VCCI portal), the Vietrade website attracts larger enterprises. They account for 55% of the total, while SMEs account for 45%.

2.4. *Main findings*

- With regard to the original objective, the website is fairly successful as the Ministry of Trade's main tool and official portal for providing commercial information, especially information announced by Viet Nam's government agencies, embassies, international organizations and forums in which Viet Nam is a member or counterpart.
- The website gives quite a good daily service, providing and updating information on commercial events, trade-related legal regulations and requests for buying and selling, etc.
- The website also meets the demand of enterprises for listing on the website. However, the only information that searchers can find about particular manufacturers is company names, their telephone numbers/addresses and the names of their products. No product exhibitions or showcases are found on the website. Nor are there any specific product descriptions or offers. Therefore, no real e-trade floor has been developed on the website.

IV. Government policies designed for SMEs, IT, and international trade

A. IT POLICIES IN THE VIET NAM'S OVERALL DEVELOPMENT STRATEGY

1. Current IT policies

During the past few years, Viet Nam has issued a number of policy and regulatory documents to promote IT. The underlying policies for IT development were laid down in Resolution No. 58-CT/TW of the Politburo of the Communist Party of Viet Nam (the ruling party), issued on 17 October 2000 on speeding up the development and application of IT for industrialization and modernization.

Subsequently, during the 2001-2002 period, the Government prepared and issued several documents on action plans and measures to implement the resolution, notably the following three documents:

- Prime Ministerial Decision 112/2001/QD-TTG approving the project on the computerization of public administration.
- Prime Ministerial Decision 33/2002/QD-TTg approving the master plan for Internet development.
- Prime Ministerial Decision 95/2002/QD-TTg approving the Master plan for IT application and development in Viet Nam up to the year 2005.

The Decision 95/2002 is a most comprehensive and ambitious document. The main contents of the Decision are as follows:

Main objectives:

- Level and efficiency of IT application in Viet Nam should be equal to those of other countries in the region. In Hanoi and Ho Chi Minh City alone, the advanced level is targeted.
- The telecommunication and Internet infrastructure should be modernized, with broadband, high speed and high quality, to provide consumers with diversified services at the same average prices as those of other countries in the region. By 2005, all provinces and cities should be interconnected by optical cables. The number of Internet users should account for 4 - 5% of Viet Nam's total population.

Main implementation measures:

- Promoting IT application in prioritized areas: (i) socio-economic sectors that play a key role in improving the competitiveness of the economy and businesses for promoting industrialization and rural development; (ii) national security and defence; and (iii) public administration.
- Telecommunication and Internet: By 2005, the communication networks of ministries, central agencies and provincial and district governments are to be connected to the Wide Area Network of the Central Government and the Internet. Most officials in these units should be able to master applications on the Internet for their professional activities. The Internet should be applied in e-government development. The national information highway should be established. Broadband services, such as optical cables, wireless broadband and satellite information, should be provided to households

2. Policies and strategies for future development

The long-term strategy for developing the ICT sector is set out in the Strategy for Development of the ICT Sector up to the Year 2010, adopted by the Government in 2002. The main thrust of the Strategy is as follows:

Objectives to the year 2010

By 2010, Viet Nam should be at a moderate level of ICT development and application in the ASEAN region, by:

- a) Applying ICT in all fields including the economy, society, education, health care, rural development, security and national defence, etc.

The value of e-commerce transactions should be ten times higher than in 2002. Regular transactions amongst State bodies, between the State and enterprises and between the State and the public should be carried out through networks.

Total investment in ICT application and development should account for 2.5% of GDP.

- b) The ICT industry should grow at a rate of 25 - 30% per year.

The ICT industry should become a key sector of the national economy, with total turnover of about US\$ 6-7 billion, accounting for about 5 - 8% of GDP.

- c) The national communication highway should be basically complete, meeting the information exchange demands of society as a whole.

Providing broadband services at an acceptable cost to all districts and a number of communes in the country. The density of telephone lines (fixed and mobile) throughout Viet Nam should be 26 - 27 lines per 100 people (30 - 40 lines per 100 people in Hanoi and Ho Chi Minh City). The average density of Internet subscribers should be 8.4 subscribers/100 people (40% of whom are broadband subscribers). Around 40% of people should use Internet services. The average density of personal computers should be 10 per 100 people.

- d) Professionalizing ICT human resources, doubling the 2002 productivity figure for ICT, and universalizing ICT applications.

Ensuring that 20% of graduates from such faculties have enough qualifications and command of foreign languages to participate in the international ICT labour market.

Productivity in the ICT industry should be double that of 2002 and reach a fairly good level in the ASEAN region: the targets are 150 telephone lines per unit of labour in telecoms services and an annual turnover of US\$ 19,000 per unit of labour in the field of software production.

Universalizing knowledge and skills in using ICT applications and services for most officials, staff and students, 70% of learners at vocational and high schools, and 50% of secondary school pupils.

B. POLICIES TO SUPPORT SMES

According to the Social-Economic Development Strategy up to 2010, the private sector, including SMEs, is an important component of the national economy. Developing the private economy is a long-term strategic issue in line with developing the socialist-oriented multisectoral economy, contributing to the successful realization of industrialization and modernization and increasing the internal strength and capacity of the nation in progress towards international integration. It states that the State assists and creates conducive conditions for economic entities to set up business and operate in both urban and rural areas and encourages all types of voluntary joint businesses or partnerships and cooperation. The State also creates favourable conditions for policy, the legal framework and the social-psychological environment to ensure the widespread development of the private sector in production and business branches not prohibited by law.

(a) Legal framework

Regarding the legal framework and policy, Viet Nam has issued a number of Laws governing businesses, including SMEs, such as the Private Enterprise Law (1990) and the Company Law (1990). However, such laws did not take into proper consideration SME characteristics and requirements. Therefore, after much discussion and experimentation, an Enterprise Law was passed in 2000, providing a more favourable environment for SMEs, especially private ones.

On this basis, a number of other documents were issued on the regulatory and policy framework for SMEs, e.g. Directive number 27/2003/CT-TTg of 11 December 2003 by the Prime Minister on several issues, including hastening the implementation of the Enterprises Law, promoting SME development; and establishing an SME promotion council.

(b) Institutional set-up for the SME sector

As the Government has identified the important roles of the SME sector, a comprehensive institutional framework to support the sector has been consistently established:

- (i) At government level, the SME Development Encouragement Council is responsible for providing advice to the Prime Minister on SME development promotion policies and mechanisms. This is a consultative, advisory body, with representatives from the relevant ministries, which is chaired by the Minister of Planning and Investment; the permanent Secretary of the Council is the Director of the SME Development Department. Other Council representatives are gathered from ministries, VCCI, the People's Committees of Hanoi, Ho Chi Minh city, Hai Phong and Da Nang and several experts in the economic, science, technology and training fields. The Council's operational costs are allocated under the operational costs of the SME Development Department.
- (ii) At ministerial level, the Ministry of Planning and Investment (MPI) is responsible for coordination with other ministries, as well as with Local Peoples' Committees, in supporting SMEs. The SME Development Department has been established under the authority of the MPI, to assist the Minister in performing State management functions to promote SMEs. The MPI Minister stipulates the detailed responsibilities, powers and organizational structure of this body.
- (iii) Technical Assistance Centres for SMEs in Hanoi, Danang, Ho Chi Minh City and Haiphong have been established under the authority of the SME Development Department. They are the public service units responsible for advising the SME Department.
- (iv) SME promotion at provincial/municipal level: this is mainly the task of the Planning and Investment Departments of the Local People's Committees.

(c) Specific policies on SMEs

The first ever comprehensive policy document on SMEs is Decree No. 90/2001/ND-CP, under which SMEs will benefit from many State support programmes. Such programmes will be allocated in the annual plans and five-year plans, as decided by the Prime Minister or the Chairmen of the People's Committees, based on the priority guidelines for socio-economic development.

Decree No. 90/2001/ND-CP lays down details regarding the financial aspects, stating that the Government shall: (i) support investment by applying financial and credit measures for a certain period to SMEs investing in a number of industries, including traditional ones, and in encouraged localities, and (ii) the Government shall encourage financial institutions, enterprises and legal entities to contribute their investment capital to SMEs. One practical step was to establish the Credit Guaranty Fund for SMEs.

SMEs shall be eligible for encouragement policies in terms of land lease, re-lease, collateral and mortgages, and other rights on their land-use rights under the current regulations.

In terms of trade and export promotion, through export promotion support programmes, the State shall partially subsidize costs for SMEs involved in studies, research, cooperation exchanges, participation in trade fairs, product exhibitions and introductions, to be carried out both in Viet Nam and abroad. Such subsidies shall be financed by the Export Support Fund.

In terms of training, Decision No. 143/2004/QD-TTg of 10 August 2004 approving the Human Resources Training Programme for the period of 2004-2008, sets out the programme's objectives as: (i) the general objective to promote and create favourable conditions for SMEs to strengthen their competitiveness; to develop a system of supported and developed services providers, especially human resource consulting and training services and management; (ii) the specific objective to provide the necessary knowledge for SMEs managers and to improve managerial capability. This programme is to be implemented over a five-year period from 2004 until 2008, and is to be implemented as follows:

- Drafting some basic training books.
- Opening 18 courses of lecturer-training for 540 groups of people.
- Opening 3,598 training courses for SMEs, individuals and organizations, attended by around 107,670 groups of people.

The total estimated cost of this programme during the period five-year period is VND 119.4 billion (approximately US\$ 7.5 million).

C. E-GOVERNMENT AIMED AT SMES AND TRADE PROMOTION

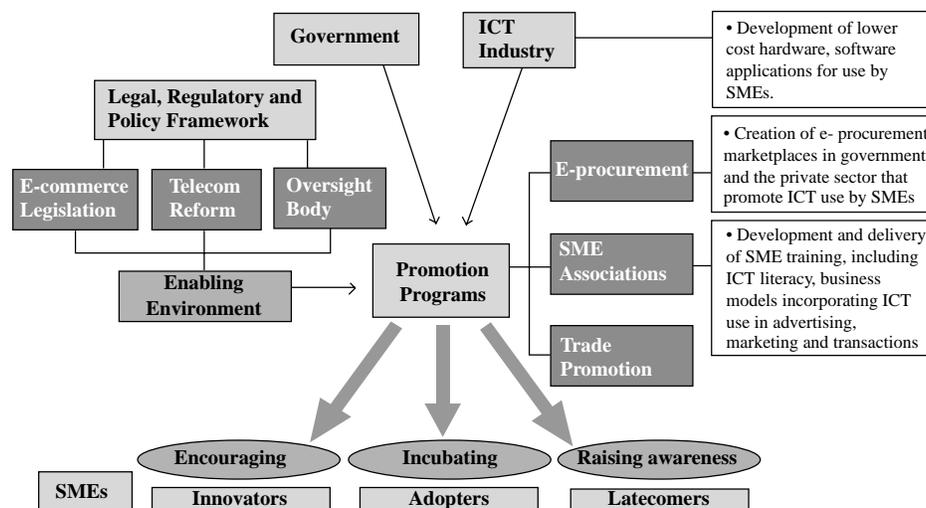
The government has set forth a master plan up to the year 2020 for development of e-government, and application of e-government for businesses. According to this master plan, e-government will develop through four phases, i.e. Presence (2004 - 2005), Interaction (2006 - 2010), Transaction (2011 - 2015) and Integration (after 2015).

Creating favourable conditions for e-commerce development and ICT application is also a high priority issue in the government agenda. In order to create favourable conditions for e-commerce development and ICT application, the Law on Electronic Transaction of Viet Nam should be adopted by the National Assembly of Viet Nam in 2007. The system of legal documents, mechanisms and policies relating to ICT, in line with international common practice and Viet Nam's special conditions, should be basically complete by 2010.

ICT users should be divided into two kinds: those obliged to use ICT and those encouraged to use it. The State should issue specific stipulations and criteria for those that are obliged to use ICT (such as officials and students), in order to force them to learn and gain enough knowledge and skills for ICT application. Where the use of ICT is not compulsory, the State should have policies to encourage people to use ICT.

The key elements and their linkages with e-commerce proposed to the Government are illustrated in the figure below.

**FIGURE 1
E-COMMERCE AGENDA FOR VIET NAM**



Source: World Bank, *Accelerating E-readiness in Viet Nam: Information and Communication Technologies for Development*, draft for discussion, 2003.

Detailed elements of a strategic agenda in this area include:

- Development and delivery of ICT training for SMEs.
- Creation of e-procurement marketplaces in government and the private sector that heavily utilize SMEs.
- Support for associations active in the SME ICT area.
- Support and government encouragement of the spread of cyber cafés.
- Development of lower cost PCs for use by SMEs.
- Designing and establishing an appropriate oversight body to review and regulate Certification Authorities.
- Studying and implementing ways to increase credit card use in the private sector (and possibly in government).
- Commissioning studies on the use of computers in private business, and on the size of the e-commerce market.
- Supporting private associations active in this area, including associations of ISPs, of IXPs, persons active in the Internet, computer professionals, etc.

To fulfil those objectives, the main programs and priority projects for IT development are as follows:

- A programme to promote ICT applications.
- A programme to develop the ICT industry.
- A programme to develop Internet and telecommunication infrastructure.
- A programme to develop ICT human resources.

Priority projects are those to be implemented with the assistance from and direct management of State bodies to create the impetus and act as a catalyst for the strong development and application of ICT in Viet Nam:

- A project for one million low-priced PCs for the community.
- A computer literacy project for 20 million people.
- A project for training 1,000 senior officials in charge of ICT.
- A project for electronic identity cards for everybody.
- A project for 50% of enterprises to apply ICT to improve competitiveness.
- A project for 100% of high schools to use the Internet.
- A project for digitizing 50% of State documents.
- A project for one million non-profit websites to supply public information.
- A project for 50% of public administrative services to be provided online.
- A project for 30,000 ICT experts.

V. Conclusion and recommendations

1. Regarding development of SMEs

In many respects, SMEs in Viet Nam differ from those in other countries. For a long time, Viet Nam being a centrally planned, socialist country, SMEs and the private sector were not developed. The Government began economic reforms and the introduction of market mechanisms in the late 1980s, and this accelerated in late 1990s, resulting in a rapid increase in private SMEs. The introduction of the first Law on Private Enterprise in 1991 has created a more conducive environment for SMEs to grow. The gradually improved legal framework helps to facilitate the operation of SMEs such as the regulations on direct export rights, the possibility of links with foreign investors and partners, and preferential tariff, etc. Consequently, SMEs in Viet Nam have been developing rapidly in number and operational effectiveness. Approximately 100,000 private enterprises have been registered so far, contributing substantially to the diversity of the economy.

SMEs in Viet Nam have proved to be of importance in national efforts, since they share around 65% of the country's GDP, contribute half of the country's exports and employ approximately 85% of the total workforce. More than one million jobs are generated each year, mainly by SMEs. Investment from the non State-owned sector, especially local private investment, has been a major driving force for economic growth in recent years.

SMEs are increasingly considered as the backbone of the economy. Their contribution to economic growth, reducing unemployment, developing the workforce and improving the standard of living has been significant, making them the most active sector in the Vietnamese economy.

However, Vietnamese SMEs have a lot of obstacles to cope with, notably the following:

- Serious shortage of capital.
- Lack of markets.
- Lack of raw materials.
- Lack of advanced technology, machinery and equipment.
- Lack of management and technical skills.
- Lack of information on market and business opportunities.

Recommendations for SME development

– Business cooperation between enterprises is fundamental to economic growth. Therefore SMEs should enhance their coordination in order to facilitate trade and investment.

– Market awareness, business information and local business practices should be developed. This also means developing human resource training and retraining. These elements have become fundamental conditions for SMEs to prosper.

– International and regional cooperation in human resource training, technology transfer between developing countries in ICT for SMEs should be tabled at international forums.

– Existing tools that serve the cooperation and development of SMEs in Asia and Latin America should be developed, updated and interconnected. Governments of country members and multilateral institutions should support this process.

– The increased globalization of SMEs should be promoted through trade missions and virtual business meetings.

2. Regarding ICT application

Given that a very high proportion of Viet Nam's GDP is generated by SMEs, developing their ICT capability, starting from a low base, is an important concern and opportunity to maximize their current efficiency, future competitiveness and participation in international trade.

One of the important characteristics of ICT is that it allows even a small business with minimum initial investment to have access to a global market. ICT therefore provides a unique opportunity to promote the growth of SMEs in countries like Viet Nam, where capital is scarce. ICT also allows SMEs located in small towns or villages far away from the capital to develop, where local information sources are limited. Moreover, by enabling domestic entrepreneurship, ICT allows sustainable development and strengthens the local economy.

Recommendations for IT development and application

- The Government's efforts to promote IT should focus on small and very small firms.
- Government support policies or actions should focus on advising SMEs on selecting technologies and training.
- Enterprises should allocate a reasonable budget for human resource development. Furthermore, universities and training centres should have suitable training programmes so that their trainees are ready for working in an e-commerce environment.
- Enterprises should invest in IT as an efficient method of trade promotion.
- The Government's support for IT application, especially for enterprises in remote areas, should focus on financial assistance (preferential tax rates and preferential loan interest rates), human resource development, and strengthening the dissemination of IT.

References

- Center for International Development, Harvard University, *The Global Information Technology Report*, 2003.
- General Office of Statistics, *Annual Statistics of 2002*, Hanoi, 2003.
- Government of Viet Nam, *Decision on the Strategy for Development of Post and Telecom to the year 2010 and the Orientation to the year 2020*, No. 158/2001/QĐ-TTg, Hanoi, 2001.
- International Trade Center, “*Viet Nam E-Trade Bridge*”, Geneva, 2002.
- International Telecommunication Union (ITU), *Viet Nam Internet Case*, Geneva, 2002.
- Ministry of Trade (MOT), *Report on the result of the survey of present situation of application of e-commerce in Viet Nam*, Hanoi, 2003.
- Ministry of Posts and Telematics (MPT), *Draft Strategy for development of information and communication technology up to 2010 and the orientation to 2020*, Hanoi, unpublished, 2003.
- MPT, *Evaluation of Policy for Development of Internet in Viet Nam*, Hanoi, unpublished, 2004.
- Nguyen Ngoc Tuan, *Development of different economic sectors*, *Viet Nam Investment Review*, No 79, May 2004.
- National Steering Committee for Information Technology Development, *Assessment of Current Development and Strategy for up to the year 2020*, Hanoi, 2003.
- United Nations Industrial Development Organization (UNIDO), *Industrial Development in Viet Nam: Performance and Policy*, Hanoi, 2000.
- Viet Nam Chamber of Commerce and Industry (VCCI), *Report of the Survey of the Application of Information Technology at Enterprises*, Hanoi, 2002.
- Viet Nam Competitiveness Initiative (VNCI), *Viet Nam ITC industry at a glance*, Hanoi, unpublished, 2004.
- Viet Nam Software Association (VINASA), *Present situation of Application of Information Technology in State-Owned Enterprises*, Hanoi, unpublished, 2003.
- World Bank, *Accelerating E-readiness in Viet Nam: Information and Communication Technologies for Development*, draft for discussion, 2003.