International Seminar and Workshop on Policies to Promote the Use of ICTs by SME Experiences in APEC Economies

Research study of the main benefits of investing in the use of ICT in selected economies
Final Report

APEC Small and Medium Enterprises Working Group

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SME 04/2010A

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Project SME 04/2010A – International Seminar and Workshop on Policies to Promote the Use of ICTs by SME Experiences in APEC Economies

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1. Overview: Purpose of Study and Results

Small and medium-sized enterprises (SMEs) play a critical role in the economic development of the member economies of the Asia-Pacific Economic Cooperation (APEC). In recent years the effective use of information and communications technology (ICT) has become increasingly essential to the continued growth of these SMEs. ICT can increase business productivity in the following ways:

- Reducing transaction costs
- Facilitating market integration
- Facilitating the creation of business and entrepreneurship networks
- Improving access to the financial system
- Strengthening linkages between knowledge and innovation
- Improving communication with government

In order for SMEs to fully realize these benefits however, several obstacles to ICT use must be overcome, including lack of adequate infrastructure, high technology acquisition costs, and lack of ICT training. Solving these challenges would support the growth of not only SMEs but also each economy as a whole. According to the World Bank,[1] a 10% increase in an economy's broadband connections translates into an improvement of 1.3% in economic growth. Similarly, a 1% increase in broadband penetration is estimated to improve GDP per capita by US $2,000.[2]

This research study has been carried out in the selected APEC economies of Indonesia, Mexico, Korea, Chile, the United States and Peru, about the main benefits of investing in the use of ICT and the opportunities that SMEs have to increase access to international markets. These economies have been selected due to the diversity of their levels of technological and business development advances and investment in ICT. Additionally, the use of ICT in rural areas and cluster development has been analyzed in the developing economies of Mexico, Indonesia, Peru and Chile.

As Table 1 below illustrates, the selected APEC economies are at different stages of ICT development and adoption, with U.S. and Korea leading the way in most criteria.

Table 1: ICT Metrics[3]

	United	Korea	Chile	Mexico	Indonesia	Peru

[1] *World Bank*, "Information and Communication for Development 2009: Extending Reach and Increasing Impact."
[2] Thornberry Villarán, Guillermo, "Impacto Socieconómico de las TIC en las Américas," May 19 2011
[3] Please see p. 85 for bibliography

States								
Data	**ICT Access**[i]	**Mobile phone subscriptions per 100 people (2010)**	90.8	**100.7**	96.9	76.2	69.2	84.7
		% of households with PC (2010)	72.5	**81.4**	40	26.8	8.3	18
		Broadband Internet subscriptions per 100 people (2010)	25.8	**33.8**	9.6	8.8	0.7	2.8
		Internet users per 100 people (2010)	78	**81.5**	41.3	28.3	8.7	31.4
	ICT Industry	**Size of ICT market in U.S. $ billion**	**609.1 ('09)**[ii]	254.9 ('07)[iii]	3 ('12 est.)[iv]	6.72 ('10)[v]	1.3 ('07)[vi]	1.5 ('11)[vii]
		ICT market as a % of GDP	4.3 ('09)[viii]	**16.9 ('07)**[ix]	1.5 ('10)[x]	1.7 ('10)[xi]	0.2 ('07)[xii]	1 ('11)[xiii]
		ICT goods exports (% of total goods exports (2009)[xiv]	13	22.6	0.2	**22.9**	5.7	0.1
		ICT service exports (% of total service exports (2009)[xv]	4.6	1.5	2.8	1.3	**8.4**	3.5
	SME ICT usage	**Mobile phone**	N/A	N/A	N/A	N/A	N/A	N/A
		PC (% of companies using)	**98 ('10)**	N/A	74.2 ('06)[xvi]	92 ('02)[xvii]	N/A	12 ('04)[xviii]
		Broadband Internet	**90 ('09)**[xix]	N/A	62 ('06)[xx]	N/A	N/A	N/A

Washington CORE conducted surveys and a comprehensive literature review of relevant government websites, academic journals, media and trade publications in order to determine the contributing factors to the level of ICT adoption by SMEs operating in the six economies. A particular emphasis was given to identifying the nature and purpose of government policies and programs and their effects on the adoption and usage of ICT by SMEs.

The total numbers of survey respondents are as follow:

Table 2: Survey responses

Economy	SME responses	Government responses
United States	8	2
Korea	2	1
Indonesia	4	3
Chile	158	8
Mexico	8	2
Peru	26	11

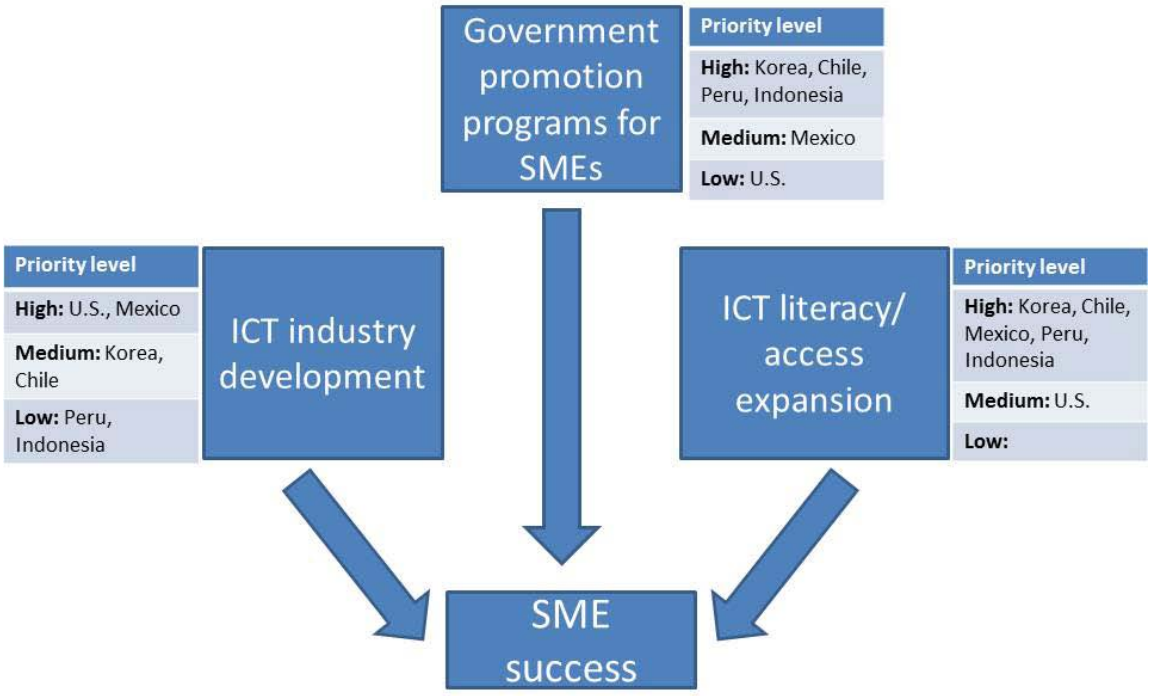
SMEs in Chile and Peru responded in healthy numbers, but responses from other economies were a little lower than hoped for. Responses were especially limited for Indonesia and Korea, perhaps due to language barriers, so a more general impression of SME and government viewpoints will be provided for those two economies. In total, more than one thousand SME and government survey candidates were contacted across all six economies.

Overall SME respondents reported high levels of ICT use by employees, and common uses of the Internet included getting information about goods and services, interacting with government, and conducting financial transactions. However, there were some notable differences in the response trends for each economy, which reflected the varying levels of economic development and ICT sophistication amongst the chosen economies. The results of the survey and secondary research for each economy will be discussed in the following sections.

1.1 Elements for achieving SME success through ICT promotion

It appears that SME ICT success in the six target economies is achieved through a combination of three elements: specialized government promotion programs for SMEs, ICT industry development, and expansion of ICT literacy and access. These elements and the respective policy priorities of the six economies are illustrated in Figure 1.

Figure 1: Elements for achieving SME success through ICT promotion



While these key elements are the same for all economies, the governments pursue different mixes in their ICT promotion strategies. As seen in the table below, economies such as the United States have successfully pursued a mostly market-driven approach that focuses on ICT industry development, while others such as Korea have successfully pursued a more government-driven approach with specialized government initiatives for SMEs. These strategic approaches were reflected in the survey responses.

Table 3: SME Promotion model comparison

Economies by SME promotion model and survey results			
Level of SME ICT adoption	**Economy**	**SME ICT promotion model**	**Survey results**
Advanced	United States	The U.S. has the world's largest ICT industry, and its citizens have an extremely high level of ICT literacy/access. Government provides some support for SMEs, but no focused strategy for SME ICT promotion, preferring a market-driven approach.	SMEs reported high levels of sophisticated ICT use, and had slightly unfavorable impressions of government programs. A major government priority cited was encouraging competition in the ICT marketplace.
	Korea	Korea also has a large ICT industry and its citizens have the world's highest level of ICT literacy/access. SME ICT promotion is government-driven, carried out by highly targeted policies for SMEs.	SMEs reported high levels of sophisticated ICT use, and had very favorable impressions of government promotion programs.
Medium	Chile	Chile has a relatively small ICT industry and a moderate level of ICT literacy/access. Like Korea, SME ICT promotion is government-driven and carefully targeted.	SMEs reported moderate levels of sophisticated ICT use, and had moderately favorable impressions of government programs. A major government priority cited was expansion of E-Government services to encourage ICT usage by SMEs.
	Mexico	Mexico has a small but growing ICT industry and a low level of ICT literacy/access. SME ICT promotion strategy adopts elements of the U.S. and Korea models, taking a mostly government-driven approach to nurture its software industry.	Most SMEs reported high levels of sophisticated ICT use, and had moderately favorable impressions of government programs. A major government priority cited was ICT education and training.
Early stage	Peru	Peru has a very small ICT industry and a low level of ICT literacy/access. SME ICT promotion strategy is government-driven.	SMEs reported low levels of sophisticated ICT use, and had slightly favorable impressions of government programs. A major government priority cited was expansion of ICT access.
	Indonesia	Indonesia has a very small ICT industry and very low level of ICT literacy/access. SME ICT promotion strategy is government-driven.	SMEs reported moderate levels of sophisticated ICT use, and had mostly favorable impressions of government programs. A major government priority cited was ICT education and training.

Based on a comprehensive literature review and the survey results mentioned above, a comparative analysis of the six APEC economies shows that their levels of ICT access and ICT industry growth affect the use of ICT by their SMEs.

Table 4: ICT Economy Comparison

	United States	Korea	Chile
ICT Access	The level of ICT access is very high in the U.S. The U.S. has very high levels of personal computer penetration and Internet security, but lags behind countries like the United Kingdom in usage of Ethernet[xxi] and virtual private networks (VPN).[xxii] The U.S. also continues to lag behind East Asian economies like Japan and Korea in deployment of high speed consumer broadband networks. Average U.S. consumer broadband speeds have been measured to be less than 50 percent of Korean speeds. The U.S. additionally lags behind Japan and Korea in terms of wireless broadband usage, as only 50 percent of U.S. mobile subscriptions are 3G, compared with over 90 percent in Japan and Korea.[xxiii]	The level of ICT access is extremely high in Korea. Korea leads the world in consumer ICT infrastructure, boasting the highest levels of 3G and fiber-to-the-home adoption, as well as the highest broadband speeds. However, ICT adoption by industry lags behind similar nations, which may be a contributing factor to Korea's overall low labor productivity.[xxiv]	The level of ICT access is moderate in Chile. ICT diffusion and usage have been continuously prioritized by the Chilean government since the 90s, with the adoption of one of the first digital agendas in Latin America and the establishment of a very conducive regulatory environment. However, individual ICT readiness remains very low, mainly due to Chile's poor math and science education, and to high tariffs for fixed phone lines and fixed broadband Internet.[xxv]
ICT Industry	The U.S. has a very large and robust ICT industry. The U.S. stands out from other countries as a case of ICT industry growth and general business ICT usage driving substantial productivity gains. 38% of U.S. labor productivity growth between 2000 and 2006 was attributable to ICT investment and usage, well above most other countries. U.S. ICT industry growth is aided by the most extensive innovation collaboration between academia and business in the world.[xxvi]	Korea has a large ICT industry. Although Korea leads other advanced economies by a wide margin for the quality of its ICT infrastructure, the ICT market environment is burdened by the limited effectiveness of law-making bodies and the low efficiency of the legal system to challenge onerous regulations.	Compared to the developed nations Chile's ICT industry is very small, but it is relatively large within Latin America.
ICT Use by SMEs	SME use of ICT is widespread and extremely sophisticated. The bulk of SME ICT spending is focused on PCs and software, followed by investments in security, services, support, networking, websites, and mobile communications. Nearly 30% of SMEs planned to implement SaaS and managed services solutions in 2010. SMEs are placing increasing importance on technology solutions that drive revenues, produce immediate results to the bottom line and have a direct, positive impact on the customer's experience. Between 70% and 80% of SMEs consider the usage of ERP, CRM and online E-Commerce capabilities as strategic to their business. One-third use virtualization and over half use custom software in house to help tie their ICT investments together.	SME use of ICT is widespread, but the sophistication is modest relative to the high level of general ICT literacy. . As of 2003, most Korean SMEs did not have enough ICT experts or staff members, most of them had only deployed basic software and hardware and were content with conducting internal processes with ICT rather than doing B2B transactions over the networks. 60.2 percent of SMEs did not have a separate ICT department. 35.2% of small businesses and 59.8% of medium businesses had their own websites, [xxvii] but only 18% of SMEs conducted E-Commerce.[xxviii] Many SMEs, however, do recognize the value ICT delivers such as improved work productivity and cost savings. SMEs mostly wanted help from the government regarding the financial support for ICT costs and recruiting technical staff.	SME use of ICT is widespread and sophisticated. As of 2006, SME spending on ICT averaged 2.32 percent of revenue. 74.2% of SMEs owned computers, 66% had Internet access, and 25.8% had websites. More than half of SMEs had no dedicated ICT support staff, with the remainder relying on combinations of outsourced and internal support staff. In terms of software, the following were the top applications (and adoption rates): personal productivity software (65%), financial and accounting software (23%), customer/supplier relations software (7%), and production software (4%). As for Internet usage, 78.1% of SMEs used it for online banking, 53.6% for Business to Government (B2G) transactions, and 34% for making purchases and sales.

	Mexico	Indonesia	Peru
ICT Access	The level of ICT access in Mexico is low, although it compares favorably with most developing nations. Mexico's worldwide ICT readiness ranking, or its ability to use ICT, has actually declined since 2006. Individual and business readiness measures remain very low, due to a combination of poor educational standards and training and high ICT access costs. For example telephone installation and monthly telephone subscription costs are very high. On the positive side, Mexico displays relatively high levels of business and government usage, and in particular, the government provides extensive and well-functioning E-Government services to its citizens and many opportunities for e-participation.[xxix]	The level of ICT access in Indonesia is very low. However, Indonesia performs well in consumer readiness to use ICT, due to fairly good educational standards and affordable ICT. Nevertheless, current actual penetration and usage of ICT remain low. The government has recently begun giving more importance to ICT in its development agenda.[xxx]	The level of ICT access in Peru is very low. Peru has limited Internet infrastructure, and as of 2008, 71.7% of Peruvians accessed the Internet only via privately operated public access facilities called Cabinas. In 2007 there were 52,546 Cabinas nationwide. Regarding business usage, Peru scores well for the impact of ICT on new services and products and organizational models, but poorly for business Internet use. The high costs of business phone installation and monthly subscriptions are obstacles to adoption in Peru.[xxxi]
ICT Industry	The Mexican ICT industry is small, but considerable among developing nations. The government so far appears not to adequately prioritize ICT or to have a coherent vision of its importance for the economy's long-term competitiveness. An enhanced government focus on the ICT sector should be pursued along with an improvement of the market environment, particularly in its regulatory and infrastructure dimensions, which at the moment are not totally conducive to innovation and ICT development.	The Indonesia ICT industry is very small. Few recent details are publically available.	The Peru ICT industry is very small, although Peru scores relatively well in the quality of local ICT suppliers and availability of ICT imports.
ICT Use by SMEs	SME use of ICT is widespread and fairly sophisticated. As of 2002, 92% of Mexican SMEs owned PCs and 65% of their employees had access.[xxxii] 82.2% of SMEs in the services sector, 69.4% in the manufacturing sector, and 68.7% in the commerce sector had Internet access. 36.6% of manufacturing SMEs, 31.2% of commerce SMEs and 21.1% of services SMEs owned their own websites. Finally 36.4% of manufacturing SMEs, 36.1% of commerce SMEs and 36.1% of services SMEs had implemented ecommerce.[xxxiii]	Few recent details are publically available.	SME use of ICT is low and fairly basic. According to a 2004 study, 50% of surveyed SMEs utilized Cabinas for Internet access, and 45% used email. 12% of SMEs owned PCs, 19% of PC-owning SMEs had dedicated Internet connections, and 25% of SMEs with Internet connections had established their own websites. Only 1% had implemented ecommerce.[xxxiv]

The following is an analysis of the key policies and programs identified in each economy that are directly or indirectly linked to the promotion of ICT adoption among SMEs. In addition, the trends seen in the survey responses of government officials and SMEs in each economy will be analyzed against the backdrop of government initiatives and their efficacy.

2. Indonesia

2.1. Government Policies and Case Studies

2.1.1. ICT access and training support for rural communities

Background

The Partnerships for e-Prosperity for the Poor (PePP) is a program sponsored by the Indonesian Government's National Development Planning Agency (BAPPENAS) and the United Nations Development Program (UNDP) to support the development of telecenters, or warnets, in rural communities to alleviate poverty. PePP fulfills the following objectives:[4]

- To empower and mobilize poor communities for economic activities and accessing social services through better access to information and communication,
- To forge strategic partnerships in bringing individual efforts together for the benefit of the poor communities,
- To establish multi-purpose community development telecenters to provide shared access to information and communication to poor communities and to be a channel through which partners can bring services and opportunities, and
- To draw on and disseminate the best practices and lessons learned from pilot projects in order to raise awareness of the applicability and potential of ICT for poverty reduction.

Description of Policy

BAPPENAS oversees PePP as the lead agency and coordinates with other national government agencies that are active in ICT and/or poverty reduction, such as the Ministry of Communications and Information, the Ministry of Economic Affairs, and the Ministry of People's Welfare. [5] BAPPENAS works with its partner agencies to identify local

[4] *UNDP*, "Partnerships for e-Prosperity for the Poor," August 2004, URL: http://www.undp.or.id/archives/prodoc/ProDoc-Pe-PP.pdf (p. 1)
[5] Ibid, pp. 18 - 19.

communities that can serve as a pilot project for PePP by deploying warnets that will provide access to ICT services for their community in order to promote social and economic development.

After a community is selected by BAPPENAS to serve as the host for a warnet pilot project, a local agency will take a lead role to directly oversee the project and coordinate with BAPPENAS. Organizations within the local community take a lead role in developing and managing the warnet. PePP provides support to these organizations from national and local agencies in order to develop their ability to support ICT and poverty reduction. BAPPENAS and other national government agencies will provide a variety of contributions including support for Internet access, content and ICT services, training and financial assistance to support the project.[6]

Current Status and Results

PePP supported the launch of multiple pilot projects in impoverished communities in rural areas. The first pilot project, called e-Pabelan, was launched in 2004 and is located in a farming community in Kabupaten Magelang. National and local agencies as well as NGOs and the private sector worked with PePP to support the establishment of the e-Pabelan warnet. Based on the success of e-Pabelan and other PePP pilot projects, similar warnets have been deployed in many other rural communities.[7]

Key Findings

PePP sought to bridge two communities that had not worked together in the past, ICT and poverty reduction, and demonstrate how ICT can serve as a tool to combat poverty. The success of e-Pabelan and other PePP pilot projects demonstrated the value of government support for warnets in rural communities.

Case Study

E-Pabelan was the first pilot project supported by PePP. The facility offers telephone access, a dialup Internet connection, television, computers and peripherals, a meeting room and a class room. The warnet has three full time staffers and three part time staffers.

The e-Pabelan warnet is managed at the local level by members of the local community with support from PePP, the local government, PT Telekom, Intel, the Open Learning

[6]Ibid, p. 6
[7]*UNDP,* "Project Facts: Partnerships for e-Prosperity for the Poor," November 2007, URL: http://www.undp.or.id/factsheets/2007/GOV%20PePP%20Nov2007.pdf (p. 2)

University, the US Embassy and other partners. Start up funding for the warnet was provided by BAPPENAS.

E-Pabelan serves as an intermediary that organizes and delivers ICT services from government and NGOs that meet the needs of the local community, such as providing information about crops that could offer higher profits and more stable prices for farmers.[8] Other services offered by the warnet include English language classes, ICT training for teachers, and access to ICT for women small business owners.

2.1.2. Business Development Services

Background

Business development services (BDS) providers (BDSP) are organizations that provide a wide variety of training, consulting, and access to financing for SMEs. Depending on the business model of the BDSP, they can also act as a third party service provider to deliver back office services for SMEs that have not yet developed their own in-house capabilities, such as IT services. BDSPs can help SMEs to acquire the expertise and capabilities they need to increase productivity and thus improve their chances of becoming a successful and sustainable business venture.

A BDSP can be operated by a national or local government agency, university, non-profit organization, or a commercial provider. The Government of Indonesia can support BDSPs through three different strategies based on varying degrees of government involvement:[9]

BDS Provider – The most interventionist approach is simply for a stakeholder, such as a national or local government, to offer ongoing business development services itself, at no cost to participants.

BDS Subsidizer – At the next level, government funders turn to the private sector to deliver BDS, but provide ongoing subsidies so that participating SMEs do not bear the cost.

BDS Facilitator – The least interventionist approach is simply to facilitate service provision, providing technical assistance and/or resources to overcome initial obstacles,

[8] *World Bank,* "An Evaluation of Telecenters in Indonesia," October 2005, URL: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2005/11/28/000160016_20051128174141/Rendered/PDF/335030v20IND0w1ver0P09151401PUBLIC1.pdf (p. 117)

[9] *Indonesia Competitiveness Program, USAID,* "Competitiveness at the Frontier: Business Development Services," September 2008, URL: http://senada.or.id/new/attachments/154_CAF%20-%20Sep%2008e.pdf (p. 3)

but ultimately allowing the free market to function and determine which BDSPs will succeed.

Description of Policy

The Government of Indonesia's current approach towards supporting BDSPs emerged in 2002. In 2002, the Ministry of Cooperatives and SMEs issued Decree of the State Minister for Cooperatives and SMEs No. 27.1 Regarding Technical Guidelines/Instruction for the Development of SME Centers/Clusters, Business Development Service Strengthening Facilities, and the Provision of Initial Capital and its Equivalent.[10] This Decree stated that the Government of Indonesia would not act as a direct BDS Provider as shown in the first approach, but instead would serve as a facilitator, as described by the third approach.

The decree reflected concerns that BDSPs that rely primarily on government or non-profit funding to provide services would not be sustainable when funding dried up, as they are not used to dealing with competitive market pressures. Additionally, BDSPs that do not charge SMEs for their services create an expectation among SMEs that they will continue to receive free services, which can undermine their own sustainability.

The Government of Indonesia offers support to BDSPs as a facilitator through services offered by the Ministry of Cooperatives and SMEs and the Bank of Indonesia (BI), Indonesia's central bank. Both agencies provide training and other technical assistance to BDSPs. For example, BI created a special unit called Establishment of Promoting Enterprises Access to Credit (PEAC) that seeks to improve the quality of services offered by BDSPs so that their SME clients can improve their own productivity and access to credit.[11]

In April 2011, BI and the Ministry of Cooperatives and SMEs signed a memorandum of understanding (MOU) to coordinate their programs to support SMEs and BDSPs. Among the MOU's objectives, the two agencies seek to improve the training that they provide to BDSPs. BI and the Ministry of Cooperatives and SMEs acknowledged during the signing of the April 2011 MOU that discussions about to how to provide the best support to SMEs and BDSPs remains an ongoing goal.

[10] Ibid, p. 5
[11] *Bank Indonesia,* "Strengthening the Banking Sector Capacity for MSMEs Financing," 2009, URL: www.afdc.org.cn/afdc/UploadFile/200922440243549.ppt (Slides 11, 14)

Current Status and Results

The Government of Indonesia has migrated from an earlier approach in which it acted as a direct BDSP to an indirect facilitator of BDSPs.[12] A 2008 review by USAID and the Indonesia Competitiveness Program (SENADA) found that their remains a shortage of quality BDSPs that can deliver real value for their SME clients. The review found that the most successful BDSPs focus on an offering a defined set of services to help their clients to improve within a specific area rather than offering general, comprehensive services. The review also found that there is also an ongoing need for SMEs to recognize that they can turn to third party providers, such as BDSPs, to help them to improve their productivity.

Key Findings

The Government of Indonesia's policy for supporting BDSPs is notable because it redefined the relationship between the Government and BDSPs from being a direct provider to an indirect facilitator. The market determine which BDSPs will succeed and the Government can provide assistance to other BDSPs so that they can adopt best practices and become sustainable ventures themselves.

Case Study

One BDSP that was identified by USAID and SENADA as a successful provider is SimpulNet.[13] SimpulNet is an IT service provider based on Yogyakarta that offers Internet access, hosting, website design, software development, IT training, and IT consulting services to SMEs. USAID and SENADA cited SimpulNet for successfully helping its clients to use the Internet for their marketing and business development efforts.

2.1.3. SME innovation support

Background

The SME Innovation Center (PI-UMKM) was launched by the Ministry of Economy in 2007 in response to the recognition that the ability of most SMEs to use technology and produce technological innovations themselves is poor. According to the Small Business Association of Indonesia, Indonesian SMEs have traditionally been reluctant to adopt ICT unless there is an obvious and immediate economic benefit to them. Moreover, SMEs will only achieve significant business growth through ICT use if domestic sellers, buyers, and suppliers all adopt ICT.[14]

[12] "Competitiveness at the Frontier: Business Development Services," pp. 5 - 8.
[13] Ibid, p. 6.
[14] Boedisetio, Kawai, "E-development for SMEs," October 25, 2011

However, studies of economic development have shown Indonesian policymakers that the potential of SMEs to enhance the capabilities of local Indonesian industries through innovation is considerable. As a result, SMEs are an important component of Indonesia's innovation and economic development strategies across many sectors, including ICT.

Dr. Tatang Taufik, Director of the Information and Communication Centre at Indonesia's Agency for Assessment and Application of Technology (BPPT), identified SMEs as a critical component of the Sub-national Innovation System (SIN). SIN is a strategic policy framework led by the Ministry of Economy to promote innovation at the national and regional, or sub-national, levels. SIN calls for government-wide collaboration and partnerships with research institutes and industry to develop regional innovation clusters. Dr. Taufik identified six initiatives that are needed to implement SIN:

- Develop a general framework conducive to innovation and business development.
- *Strengthen science and technology (S&T) institutions and develop the capability of SMEs to absorb technology innovations.*
- Foster collaboration for innovation and enhance the diffusion of innovations, best practices, and R&D outputs.
- Develop a culture of innovation.
- Foster and strengthen partnerships to support regional innovation and industry clusters.
- Develop strategic responses to global changes (i.e., intellectual property rights).

A recurring theme through these six initiatives is the importance of partnerships to drive innovation. Studies of innovation in Indonesia had found that innovation suffers because of a lack of interaction between the government, industry, and research institutes. The SME Innovation Center promotes greater interaction between these three sectors so that they can support the growth of innovative SMEs. These SMEs will produce innovations that can improve the technological capabilities of Indonesian businesses, particularly SMEs.

Description of Policy

The policy to establish the SME Innovation Center is led by the Ministry of Economy and supported by many other agencies including BPPT and the Ministry for Cooperatives and SMEs. A network of regional centers, or nodes, are created within the framework of the SME Innovation Center to provide support to innovative SMEs within a specific field of S&T. Research institutes are evaluated and selected by the Indonesian Government to lead a regional node.

In order to be selected to lead a node, a research institute must have expertise in a field of S&T and support services that can be offered to SMEs. The node can offer any of the following services, either by the research institute directly or a partner. Although the exact mix of services offered by a node can change, each node must offer technology development, human resources development, networking, and access to financing.

- Business development – Consulting on productivity improvements.
- Technology development – Licensing of technology, support for prototyping.
- Technology and business incubation – Technology and business support for startups.
- Human resources development – Supporting entrepreneurship, workforce training.
- Access to technical facilities – Access to measurement, standards, testing and quality assurance facilities.
- Access to expertise – Technical assistance and expert advice.
- Access to information – Databases of information on technologies, market needs, funding sources, and intellectual property rights.
- Legitimating technical capabilities – Accrediting and certification services.
- Networking – Promoting partnerships for access to financing, business and technology development, aligning technology and market needs, and facilitating collaborative R&D.

Current Status and Results

As of November 2010, 35 nodes had been established throughout the economy in multiple fields of expertise, including ICT.[15] A December 2008 study conducted on behalf of the US Agency for International Development (USAID) offered the following findings about SME innovation and the SME Innovation Center:[16]

- Indonesian firms are in general pursuing strategies of imitation and are at best fast-followers.
- Entrepreneurship exists but entrepreneurs lack sufficient know-how and financial support.
- Government agencies are thinking about these problems but need to improve coordination of their own agendas and initiatives.

[15]*SME Magazine,* "Innovation Centers Increase the Selling Value of MSMEs," November 9, 2010, URL: http://www.smemagazine.asia/index.php?Itemid=475&catid=100:indonesia&id=600:pusat-inovasi-naikkan-nilai-jual-umkm-&option=com_content&view=article
[16]*USAID,* "Dr. Hittendra Patel STTA Summary Report," November 10 – 14, 2008, URL: http://pdf.usaid.gov/pdf_docs/PNADQ699.pdf (pp. 5 - 6).

- The SME Innovation Center can address these challenges by facilitating public/private partnerships.

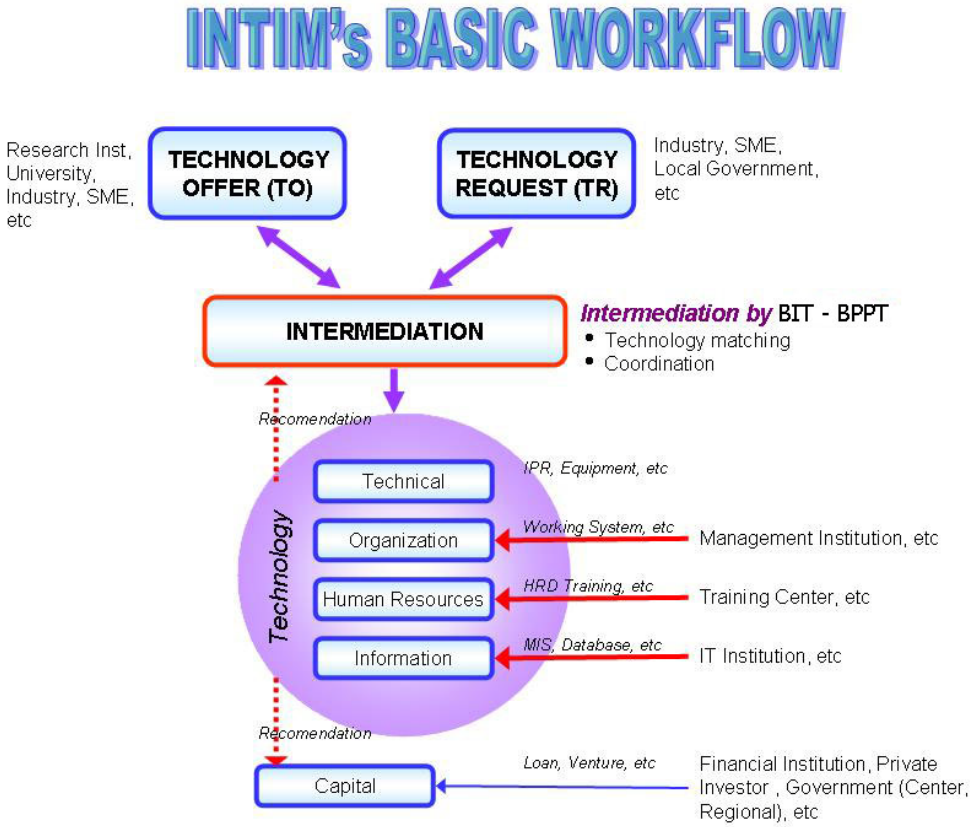
Key Findings

The SME Innovation Center is notable due to the program's emphasis on fostering the emergence of innovative SMEs that can meet the needs of domestic businesses. SMEs that receive support by the Innovation Center develop new technologies that were developed to meet local technology needs and can potentially be acquired and implemented at a lower cost than alternatives from leading foreign technology suppliers.

Case Study - 1

The Institute for Technology Incubator, or i-Tech, is a research institute led by BPPT that was designated as a node of the SME Innovation Center. The services offered by i-Tech, a node that provides services for innovative ICT in many fields of S&T, including ICT, are shown below. This workflow shows that i-Tech matches technology needs from SMEs, large enterprises, or government agencies with available technologies and then provides a variety of support services and access to financing to innovative SMEs who can develop the technology to fulfill the technology need.

Figure 2: Workflow of i-Tech



Source: i-Tech

i-Tech supports 39 SMEs in many different industries. i-Tech supports a number of SMEs in the ICT sector, including PT Derwaraja Indonesia, a firm that develops GPS navigation systems. Another i-Tech client, PT Situsnet, is an Indonesian IT service provider that has developed accounting software along with other enterprise software and has provided IT consulting and systems development services to many Indonesian businesses.[17]

Case Study - 2

Baros Creative is an ICT creative cluster established in the city of Cimahi in West Java, Indonesia. Based on the understanding that what Indonesian SMEs need most is knowledge rather than financial support, the cluster was established to develop a "creative community" (focused on animation, mobile content, software development, etc.) with ICT related facilities and equipment, and to run a "software camp" that through competition

[17] i-Tech – Tenants, URL: http://i-tech.or.id/index.php/en/tenant-bit; PT Situsnet, URL: http://www.lensasoftware.com/companyprofile.html

would assist promising new start-up entrepreneurs to launch businesses in "mobile content." As of 2011, 10 start-up businesses have been launched through this camp, and the program has gained the support of a large telecommunications service provider.[18]

2.2. Survey Results and Analysis

As one of the less developed economies in the group, Indonesia's SMEs had significantly different interests and priorities than advanced economies like the U.S. Indonesian SMEs picked out lack of awareness of the business value of ICT and lack of ICT skills in the workforce as major obstacles to ICT adoption, corresponding with the population's relatively low level of ICT knowledge. SMEs had generally favorable impressions of government efforts to promote ICT, and stressed improved availability of ICT education and training for SMEs as the major government achievement.

In line with these responses, Indonesian government officials stated that their key goals for ICT promotion include:

- Basic ICT skills education
- Online marketing training for businesses
- Expanding fiber network access to the eastern region of the economy

Officials pointed out that while most Indonesians in rural areas do not have private wired internet access, they do have access to wireless internet through mobile devices, and are using social networking sites to start SMEs. Women in particular are adept at using sites like Facebook to sell products. Therefore the government is working to provide training and useful mobile information services to assist these rural entrepreneurs.

[18]Boedisetio, Kawai, "E-development for SMEs," October 25, 2011.

Table 5: Indonesia survey responses

Summary of responses to surveys of SME use of ICT in Indonesia	
Overview	Although much less developed than the U.S. and Korea, Indonesian SMEs indicated relatively sophisticated use of ICT. Due to the low number of survey responses to date, the below characteristics can only be considered a general impression of ICT use by SMEs.
Company background	The SME respondents to date represented industries such as manufacturing and utilities. The size of respondents ranged widely, from less than 10 to over 100 employees.
Significance of gender, ethnicity, and location	No SME respondents to date were minority-owned, women-owned, or located in rural areas, so the impact of ethnicity, gender, and location on ICT usage is difficult to judge.
ICT usage	SMEs reported that 50% or more of their staff use ICT on a daily basis, and interestingly all reported having dedicated ICT staff, unlike the U.S. and Korea. The larger size of some of the SMEs in the sample may help account for this difference. Most common SME uses of the Internet included email, Instant messaging, getting information about goods and services, interaction with government, conducting research, financial transactions, and human resources.
Role of ICT	SMEs cited improved access to market information, developing new products and services, and improved customer relations as the major benefits realized from ICT.
Obstacles to purchasing and using ICT	Obstacles cited were widely distributed, and included high upfront costs, limited access to credit, high operational costs, lack of awareness of business value of ICT, and lack of ICT skills in the workforce.
Effectiveness of government ICT Promotion Policies	SMEs had a generally favorable impression of government prioritization of promotion of ICT use for SMEs, and of the effectiveness of related efforts. SMEs cited improved availability of ICT education and training for SMEs as the most notable contribution of government policy.
Assessment of interaction with ICT industry and government	In general, SMEs were not highly impressed with the usefulness of interactive activities such as conferences, training sessions, and meetings. Conferences and collaborations with other SMEs were noted as useful means of improving understanding of ICT.

3. Korea

3.1. Government Policies and Case Studies

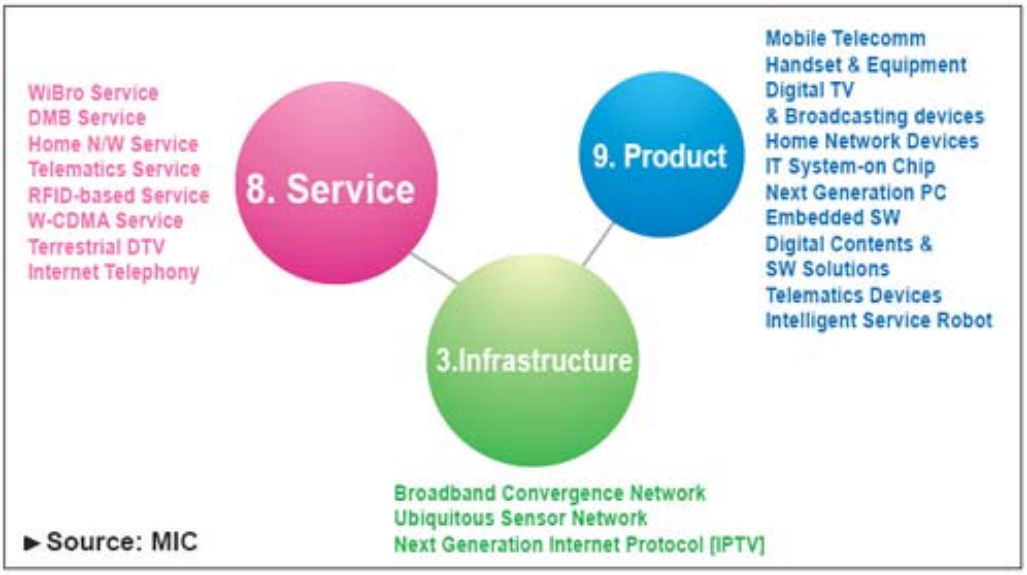
3.1.1. u-IT 839

Background

In 2004, Korea's Ministry of Information and Communication issued ubiquitous IT 839 (u-IT 839), a strategy to promote the development of the IT industry. u-IT 839 recognized that the IT industry had become a vital sector of the economy, contributing to 27.6 percent of Korea's exports.[19] In response to the global economic downturn, u-IT 839 sought to establish a government-wide development strategy that would target opportunities to grow the IT sector.

IT-839 identified eight IT services, three IT infrastructure technologies, and nine IT products that would serve as growth opportunities and a roadmap for development of the IT industry. The growth opportunities are shown in the diagram below:

Figure 3: u-IT 839



[19] *Korea IT Times,* "IT-839: A Korean IT Miracle Worker," January 3, 2008, URL: http://www.kdcstaffs.com/it/main_view.php?mode=view&nNum=4675&page=1&parts=New

Description of Policy

The Korean Government promotes the development of clusters and ICT adoption by SMEs as complements to u-IT 839.[20] The Innovative Cluster City Policy provides financial incentives for SMEs to locate in regional clusters that identified by the national government. The clusters promote greater opportunities for networking between SMEs, large enterprises, academia, and research institutes, which can lead to greater innovation in ICT by SMEs as well as large enterprises.

The Korean Government's Small and Medium Business Administration (SMBA) also supports the adoption of ICT by SMEs and their involvement in clusters through its Fostering Regional Clusters for Digitization Innovation program. This program supports the establishment of regional clusters in under developed areas and ICT adoption by SMEs by funding the deployment of broadband to regions that seek to establish their own regional clusters. This program supports the development of ICT infrastructure for clusters in under developed areas and the ability of SMEs in these areas to access that infrastructure.

Current Status and Results

In 2005, the SMBA allocated US$2.1 million to fund ICT infrastructure development for eight clusters throughout the economy.

In 2005, seven clusters were identified as targets by the Innovative Cluster City Policy. As of 2007, nearly 1,900 businesses, 660 universities and research institutes, and 300 supporting organizations were participating in these seven clusters. As a result of support for the participation of SMEs in these clusters, SMEs have become more concentrated in these clusters, their sales rose by 56 percent between 2002 and 2006, and their employment rose by 30 percent.[21]

Key Findings

The Korean Government's u-IT 839 strategy and its clustering programs are notable for recognizing the role of SMEs in innovation. The Korean Government has helped SMEs locate in clusters and access ICT infrastructure in order to reduce the ICT adoption gap between large and small enterprise and subsequently foster greater innovation from SMEs.

[20] *OECD,* "Fostering Entrepreneurship for Innovation," January 12, 2009, URL: http://www.oecd.org/dataoecd/11/41/41978441.pdf (pp. 38 - 39)
[21] Ibid, p. 38.

3.1.2. Women's' Startup and Fostering Centers

Background

The Korean Government recognizes the contributions of ICT to economic development and consequently offers a variety of programs to support ICT training and adoption for SMEs. However, programs that are designed to broadly target SMEs in general without consideration of gender can fail to adequately support women entrepreneurs and their businesses.[22] These programs have difficulties in providing support to women-owned SMEs because most women-owned businesses have fewer than five employees, which disqualifies them from applying to many government programs. In response to this problem, the SMBA provides a variety of programs that are specifically designed to support women entrepreneurs, including assisting the adoption of ICT for their businesses.

Description of Policy

The SMBA operates multiple incubators for women-owned businesses throughout the economy, called Women's' Startup and Fostering Centers. Women that recently started a business in the IT or service sector can apply to locate their business in the center. The SMBA also offers a variety of programs to support women entrepreneurs, including ICT training.

Current Status and Results

One center, the Gyeonggi Women's Development Center (GWDC) was launched in 1997 to provide business and IT training to women. Between 1997 and 2005, the Center's training program graduated 1,754 students from its IT training program. 705 students, roughly sixty percent, have gotten jobs in the IT field or started an IT business. Additionally, the Center has hosted 70 women-owned businesses in its incubator between 1999 and 2005, of which 24 became independent and successful since leaving the Center. [23]

Key Findings

The Women's' Startup and Fostering Centers are notable for recognizing the value of creating incubators and ICT training programs that specifically target women entrepreneurs and their businesses.

[22] *Dr. Kio Chung Kim,* "Women Exporters Optimizing ICT: Four Case Studies from Korea," September 2004, URL: http://www.nsi-ins.ca/english/pdf/women_exporters_korea.pdf (p. 10)
[23] *GWDC,* "Socio-Economic Empowerment of Women and IT: The Practices and Lessons from the Provincial Government," 2006, URL: http://wgc.womensglobalconnection.org/conf06proceedings/Cho,%20Ah.--Socio%20economic%20Empowerment.pdf (p. 6)

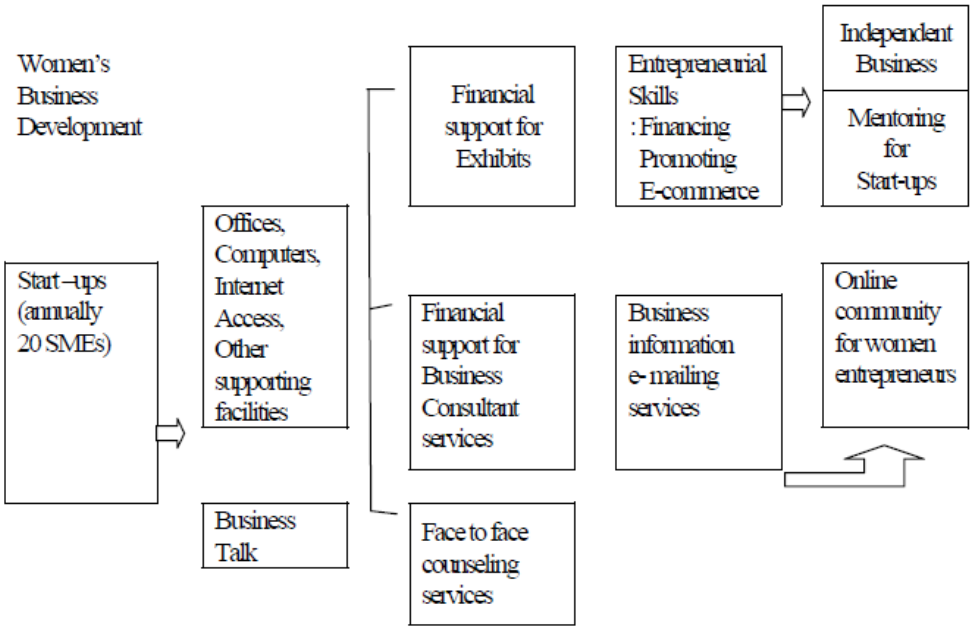
Case Study

The GWDC seeks to support the development of women IT professionals and women entrepreneurs. In order to fulfill this goal, the Center offers the following programs:

- Capacity building for professional women in the areas of information technology.
- Women's Start-up Assistance Office for developing her own business.
- Establishment of E-Learning systems and contents for professional development.
- Publishing web magazine & data services with valuable information on women-related issues, peers, and local support organizations.

The activities that the Center offers to support the development of women-owned businesses is shown in the diagram below. This diagram shows that the Center offers access to ICT and ICT training programs, such as using E-Commerce.

Figure 4: Support for Women's Owned Businesses



Source: GWDC

3.1.3. Developing ICT Capacity of SMEs

Background

The SMBA recognizes that the growth of Korea's knowledge economy will require greater adoption of ICT by SMEs, which can facilitate greater innovation from SMEs. However, the

technological capabilities of Korean SMEs lag behind SMEs in other nations.[24] The SMBA offers a variety of programs to address this challenge and improve ICT adoption and innovation by SMEs.

Description of Policy

The SMBA offers many programs that are designed to help SMEs to adopt ICT. These programs include:

Innovative IT consulting – The SMBA selects some universities or institutes and has them provide customized consulting to SMEs classified in terms of their ICT adoption level. In 2004, the SMBA supported 1,300 SMEs with their digitalization process.

E-Manufacturing Support Program – In an effort to improve the productivity of SMEs, the SMBA supports SMEs by implementing the manufacturing information system. For the setup of the information infrastructure, the SMEs are funded with relevant software development of CIM (Computer Integrated Manufacturing), MES (Manufacturing Execution Systems), POP (Point Of Production), and data base build-up.

Total Information Management Providers – This is an ICT adoption assistance program in which no costs are incurred if there are no achievements. Under this system, a Total Information Management Provider (TIMP), a third party IT service provider, presents a target achievement index for establishing a digital system to SMEs, and should they fail to meet the goal, government grants are then withdrawn. If the TIMP is successful, the SME will repay the SMBA for 30 percent of the cost of the project. This system seeks to achieve practical managerial innovation through ICT adoption and produce tangible results for SMEs that receive government assistance.

Current Status and Results

The SMBA's programs help SMEs to improve their productivity and capacity for innovation.[25] A 2006 study by the Korea Small Business Institute of traditional SMEs and innovative SMEs, or venture companies, found that the technological capability of innovative SMEs increased between 2003 and 2006. As their technological capabilities increased, the export volume of innovative SMEs grew from $7 billion in 2003 to $11 billion

[24] *UN,* "Private-Public Alliances for Export Development: The Korean Case," August 2010, URL: http://www.eclac.org/publicaciones/xml/8/41548/Private_public_alliances_export_development_Korean_case_serie_102.pdf (p. 90)
[25] *Korea Small Business Institute,* "Programmes to Facilitate Innovation of Korean SMEs," 2006, URL: http://j-net21.smrj.go.jp/expand/kokusai/oecd/2_1innovation/lee.pdf (Slide 9)

in 2006. Furthermore, innovative SMEs outperformed traditional SMEs in terms of job creation and sales.

Key Findings

The SMBA's programs are notable for recognizing the contribution of SMEs to the Korean economy and the disparity of innovation and ICT adoption between SMEs and large enterprises. The SMBA has launched a diverse array of programs to address these challenges. In the case of the three programs described above, SMBA supports third party providers, such as research institutes and IT service providers, who will work with SMEs to help them to adopt ICT for targeted government priorities, such as ICT adoption for manufacturing SMEs or greater use of E-Commerce by SMEs.

3.2. Survey Results and Analysis

Korea's SMEs voiced generally similar views to the U.S. SMEs. In terms of ICT usage however, Korean SMEs cited instant messaging and human resources as key uses, indicating a higher level of adoption of ICT for critical business communications. More than other economies, Korean SMEs pointed out developing new products and services as a key benefit of ICT, which is probably due to the respondents to date being concentrated in the information technology sector. As for obstacles, like the U.S. Korean SMEs noted security and privacy concerns as a major concern, a viewpoint which fits with their reliance on ICT for a broad range of important business communications.

Table 6: Korea survey responses

Summary of responses to surveys of SME use of ICT in Korea	
Overview	Like the U.S., the highly developed economy and ICT industry of Korea correspond with sophisticated use of ICT by SMEs. Due to the low number of survey responses to date, the below characteristics can only be considered a general impression of ICT use by SMEs.
Company background	SME respondents to date were concentrated in the ICT industry, and had 50 or fewer employees.
Significance of gender, ethnicity, and location	No SME respondents to date were minority-owned, women-owned, or located in rural areas, so the impact of ethnicity, gender, and location on ICT usage is difficult to judge.
ICT usage	SMEs reported that at least 70% of their staff uses ICT on a daily basis, and half reported having dedicated ICT staff. SME uses of the Internet were spread across a wide range of functions, with customer service being most notable.
Role of ICT	SMEs cited improved access to market information, and developing new products and services as the major benefits realized from ICT.
Obstacles to purchasing and using ICT	Security and privacy concerns were cited as the largest obstacle.
Effectiveness of government ICT Promotion Policies	SMEs stated that the government strongly prioritizes promotion of ICT use for SMEs, and that its efforts to this end have been generally effective. SMEs cited establishment of industry or open standards and expanded access to information and markets as the key contributions of government policy.
Assessment of interaction with ICT industry and government	In general, Korea SMEs had a favorable impression of the usefulness of interactive activities such as conferences, training sessions, and meetings. In particular, conferences and trade shows were cited as a useful means of increasing communication with the ICT industry, increasing communication with government on ICT issues, and improving understanding of government ICT promotion activities.

4. United States of America

4.1. Government Policies and Case Studies

4.1.1. Startup America

Background

In January 2011, the Obama Administration announced the creation of Startup America, a public/private partnership to promote economic growth by supporting entrepreneurs. Federal agencies, private sector partners and nonprofits will support entrepreneurs through policies and programs that target the following five areas:[26]

- Access to financing
- Connecting entrepreneurs to mentors
- Reducing barriers
- Accelerating innovation
- Access to market opportunities for startups

Description of Policy

Federal agencies and private sector partners are participating in Startup America through a wide variety of policies and programs. One of the programs that targets ICT adoption by entrepreneurs is the Veterans Fast Launch Initiative.[27] This is an initiative created by the Veterans Administration (VA) to help veterans to launch their own business. SCORE, a nonprofit organization that partners with Federal agencies and large enterprises to aid small businesses, works with the VA to support the initiative. The Initiative offers many different services to help veterans to start their own business, including access to online training and access to free business software and online services from private sector partners such as Microsoft and Saleforce.com.

Non-veteran entrepreneurs can receive IT assistance from large IT firms through the Startup America Partnership.[28] Large enterprises who participate in the Partnership offer a variety of services to aid startups. IT companies such as Cisco, HP, IBM, and Salesforce.com provide support such as discounts for purchases of IT equipment and services, technical support, access to training programs, and mentorship for entrepreneurs.

[26] *White House,* "Startup America," January 31, 2011, URL: http://www.whitehouse.gov/issues/startup-america
[27] Veterans Fast Launch Initiative, URL: http://vetsfastlaunch.org/
[28] Startup America Partnership, URL: http://www.startupamericapartnership.org/

Description of Policy

Startup America is a new program and detailed information about its status and results is not publicly available.

Key Findings

Startup America is notable for organizing assistance programs for entrepreneurs from Federal agencies, large enterprises, and nonprofit organizations into a single initiative that can promote greater awareness of these programs to entrepreneurs.

4.1.2. National Broadband Plan

Background

The National Broadband Plan is an initiative launched by the Federal Communications Commission (FCC) in March 2010 to promote the deployment and adoption of broadband in the US. The FCC worked with the Small Business Administration (SBA) to determine how the two agencies can work together to promote broadband adoption by SMEs through the National Broadband Plan. The FCC stated that broadband adoption by SMEs suffers due to three factors that can be addressed by the Plan:[29]

- Many SMEs operate in areas that do not have access to broadband. The FCC noted that half of SMEs in rural counties do not have access to broadband of at least 4 Mbps or faster.
- Available broadband may be too slow or too expensive. The FCC noted that the price of broadband per employee is an average of three times higher for SMEs than the price paid by large enterprises.
- SMEs lack an understanding of the benefits and risks of broadband, or ICT literacy.

Description of Policy

The FCC and SBA announced the following actions that will address these challenges as part of the National Broadband Plan:[30]

- Launching with SBA and SCORE a public-private partnership called E-Business Now to help accelerate small business growth through the use of broadband technologies.

[29] *FCC,* "Statement of FCC Chairman Julius Genachowski to US Senate Committee on Small Business and Entrepreneurship," April 27, 2010, URL: http://www.fcc.gov/document/statement-fcc-chairman-julius-genachowski-us-senate-committee-small-business-and-entreprene

[30] *FCC,* "SBA: National Broadband Plan is Key to Small Business Growth and Jobs," November 18, 2010, URL: http://blog.broadband.gov/?entryId=999148

- Examining the market for business broadband services to determine the status of competition and whether our policies in this area can be improved.
- Beginning reform of the Universal Service Fund (USF) to help provide broadband in areas where it's lacking.
- Revising FCC rules governing access to infrastructure like utility poles to remove barriers to deploying broadband networks.
- Clearing more spectrum to unleash wireless broadband.
- Launching a data innovation initiative that will enable consumers and businesses to get more information about the broadband options available in their communities.

E-Business Now is a program launched by SCORE with support from the FCC, SBA, and ten leading IT companies in April 2010 to provide IT training to small businesses.[31] E-Business provides IT training to small businesses through online training, guides, and other resources through the www.ebusinessnow.org website, free, one day workshops on E-Business, and access to free, one-on-one mentoring with IT experts.

Current Status and Results

The National Broadband Plan is a new program and detailed information about its status and results is not publicly available. A $5 billion budget was requested by the White House for 2012, but it is unclear how much has been spent so far.

Key Findings

The National Broadband Plan is notable for addressing many of the factors that contribute to poor broadband adoption by SMEs. In addition to providing IT training, the Plan also seeks to address access to broadband, and the level of competition among broadband providers. The FCC recognizes that regulations to increase the availability and competition to provide broadband will benefit SMEs that suffer from a lack of fast and affordable broadband.

Case Study

The FCC cited the case of Blue Valley Meats and Diller Telephone Company of Diller, Nebraska as an example of how the increased availability of broadband can benefit small businesses.[32] Blue Valley Meats is a specialty meat processing company that is located in Diller, a rural town with a population of 300. Diller Telephone, a USF recipient, expanded its broadband infrastructure as Blue Valley was growing as one of its customers. The

[31] eBusiness Now, URL: http://ebusinessnow.org/
[32] "Statement of FCC Chairman Julius Genachowski to US Senate Committee on Small Business and Entrepreneurship."

underground broadband service that Diller offers to 500 subscribers in the region allowed Blue Valley to deploy an advanced online ordering system for customers.[33] This ordering system helped Blue Valley grow from 11 full and part time employees in 2002 to 30 employees in 2011.

4.1.3. Emerging 200 Initiative

Background

The Emerging 200 (e200) Initiative is a program by the SBA to provide a mini MBA-style program to small business owners and access to networking opportunities to help them to succeed. The program targets small business owners in inner cities and Native American communities to enroll in the program. The program is based on the premise that small businesses are vital to economic recovery but may lack the education and training that they need for their businesses to truly succeed.

Description of Policy

The SBA identifies inner cities in major urban areas as well as cities with large Native American populations that have shown flat or negative growth. The cities selected for the program must possess support mechanisms from state and local agencies, academia, non-profits, and/or the private sector that can provide additional assistance to inner city small business owners that enroll in the program.

After the participating cities are identified, small business owners will be selected to enroll in the program.[34] Participants must be headquartered in the participating city's inner city region, generate at least $300,000 in annual revenue, and be at least three years old.

Participants will attend courses every other week for six months and meet with other students in the off-weeks to discuss their businesses and collaborate on homework assignments. Courses include financial management, human resource management, marketing, and how ICT can support these activities. Upon the conclusion of the program, students will have created a three year business plan that they can present to lenders and investors.

[33] *Lincoln Journal Star,* "FCC Gets a Taste of Internet's Rural Reach," May 18, 2011, URL: http://journalstar.com/news/state-and-regional/nebraska/article_1b6678e7-6a6f-597f-be14-0cf903ff9b02.html

[34] *CNN,* "Training Entrepreneurs to Save Inner Cities," May 27, 2009, URL: http://money.cnn.com/2009/05/27/smallbusiness/sba_emerging_200.smb/index.htm?section=money_latest

Current Status and Results

After the first year of the program, the SBA announced that half of the 200 initial graduates have increased their revenue and two-thirds have created new jobs. Additionally, graduates have received more than $9 million in financing and been awarded $1.3 million in government contracts.[35] Based on the success of the program, the SBA announced the start of a third round of the program in March 2011.

Key Findings

The e200 Initiative is notable for targeting promising small business owners in economically struggling inner cities and providing them with a compact but broad training program to teach them about how to grow their business. Although the program does not exclusively address ICT training, ICT is discussed as an important enabler for a growing business. A number of graduates of the program specifically cited courses on how to use the Internet and social networking tools for marketing as a helpful takeaway from the program.[36]

Case Study[37]

Yashioda Naidoo, owner of the Annapurna's World Vegetarian Café, participated in Albuquerque, NM's 2008 E200 program, where she was one of 19 students. Ms. Naidoo was already operating two branches of the restaurant before enrolling in the program. She stated that two of the greatest benefits of participating in the program were the opportunity to learn about human resources management and marketing and learn about tools for performing these activities.

After participating in the program, Ms. Naidoo introduced a customer loyalty program and began to use e-mail and social networking services as marketing tools. She believes that the online marketing tools that have been adopted since participating in the program have helped to increase revenue and increase awareness of the Café's new third location.

4.2. Survey Results and Analysis

In terms of the benefits of ICT use, U.S. SME respondents emphasized increased visibility and reputation in the marketplace, indicating that customers rely heavily on the Internet to find and do business with SMEs. Unlike most less-developed economies, security and privacy concerns were cited as a key obstacle to ICT use, indicating that U.S. SMEs are

[35] *Small Business Trends,* "Boot Camp for Inner City Small Business Owners," November 27, 2009, URL: http://smallbiztrends.com/2009/11/boot-camp-for-inner-city-small-business-owners.html
[36] "Training Entrepreneurs to Save Inner Cities"
[37] *CNN,* "Training Entrepreneurs to Save Inner Cities: Albuquerque," May 27, 2009, URL: http://money.cnn.com/galleries/2009/smallbusiness/0905/gallery.emerging_200.smb/

already widely engaged in sophisticated online transactions and information sharing, and suggesting that legal constraints on the use of customer information are a concern. U.S. SMEs expressed limited interest in government programs and interactive activities, indicating a stronger internal knowledge base of ICT than in other economies, and perhaps also skepticism about the effectiveness of government efforts.

U.S. government officials identified high upfront costs and security and privacy concerns as the major obstacles to U.S. SMEs adoption of ICT, echoing the SMEs' concerns about security and privacy. Regarding government ICT promotion priorities, the government appears to be focused on a wide range of goals, with particular emphasis on building ICT network infrastructure. Many rural areas in the U.S. continue to lack access to high speed broadband, putting SMEs in those areas at a competitive disadvantage. Encouraging competition in the marketplace to reduce ICT costs was cited as more of a priority than other economies, which may be explained by the great size and significance of the U.S. ICT sector to the U.S. economy.

Government respondents had little to say with regard to government programs to promote ICT for SMEs, illustrating the U.S.'s more hands-off approach to SMEs as well as the already high level of ICT knowledge amongst SMEs. The U.S. Commercial Service, which mainly serves to help U.S. companies with export business opportunities, was mentioned as a government organization that supports SMEs and ICT. Fittingly, the Commercial Service was noted to be particularly effective at advocacy efforts on behalf of SMEs, primarily in relation to international trade barriers. It was mentioned that greater coordination and knowledge-sharing amongst government efforts to help SMEs with ICT would be useful, as there are many government organizations involved with related programs but no cohesive strategy.

Table 7: United States survey responses

Summary of responses to surveys of SME use of ICT in the United States	
Overview	Matching its highly developed economy and robust ICT industry, SME use of ICT in the U.S. appears to be quite sophisticated.
Company background	The SME respondents represented various industries, notably professional services. The majority of SMEs had 50 or fewer employees.
Significance of gender, ethnicity, and location	No SMEs were minority-owned, and most were male-owned, so the impact of ethnicity and gender on ICT usage is difficult to judge. Half of SMEs were located in rural areas, which appears to have little correlation with level of ICT usage. However, the rural locations may contribute to a lack of access to industry and government events, leading to the modest level of interest in interactive activities.
ICT usage	All SMEs reported that 100% of their staff use ICT on a daily, basis, but interestingly only 16.7% reported having dedicated ICT staff. This may indicate outsourcing of specialized ICT functions. Most common SME uses of the Internet included email, getting information about goods and services, interaction with government, conducting research, and financial transactions.
Role of ICT	SMEs cited improved access to market information, increased visibility in the marketplace, improving customer relations, and collaborating with industry and government as the major benefits realized from ICT. Percentages of respondents citing each benefit can be seen in Figure 2 below.
Obstacles to purchasing and using ICT	High upfront costs was cited as the largest obstacle, followed by limited access to credit, lack of critical mass of suppliers and customers using ICT, and security and privacy concerns. Percentages of respondents citing each obstacle can be seen in Figure 3 below.
Effectiveness of government ICT Promotion Policies	SMEs were divided on how much the government prioritizes promotion of ICT use for SMEs, but in general agreed that current government policies were not highly effective at achieving this goal. SMEs cited expanded access to information and markets and improved confidence in the security of online transactions as the key contributions of government policy. Main benefits of government policies can be seen in Figure 4 below.
Assessment of interaction with ICT industry and government	In general, U.S. SMEs were not highly impressed with the usefulness of interactive activities such as conferences, training sessions, and meetings. Direct meetings with ICT industry representatives were cited as a useful means of increasing communication with the ICT industry.

Figure 5: Benefits of ICT use to SMEs in U.S.

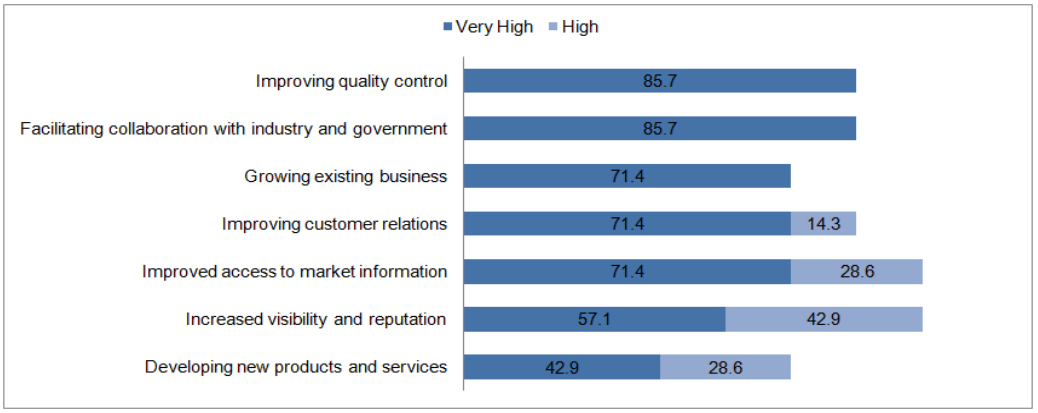


Figure 6: Obstacles to ICT adoption for SMEs in U.S.

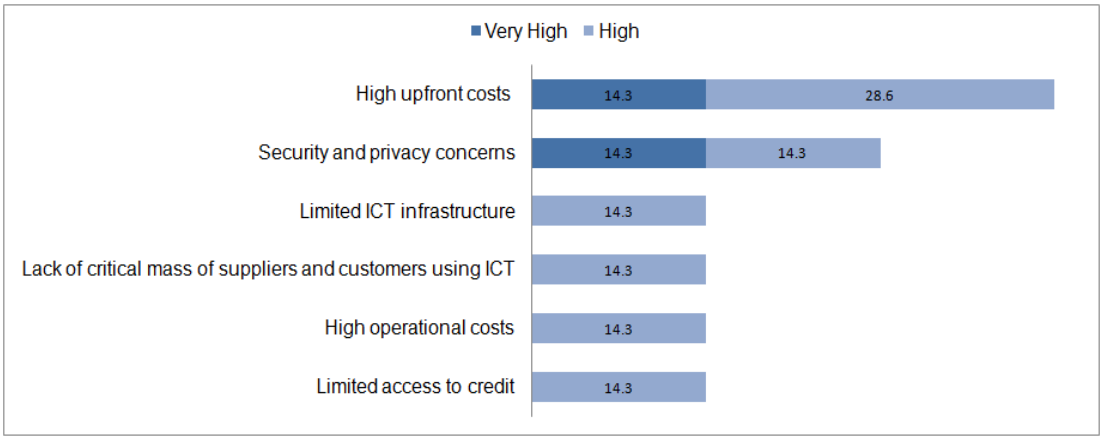
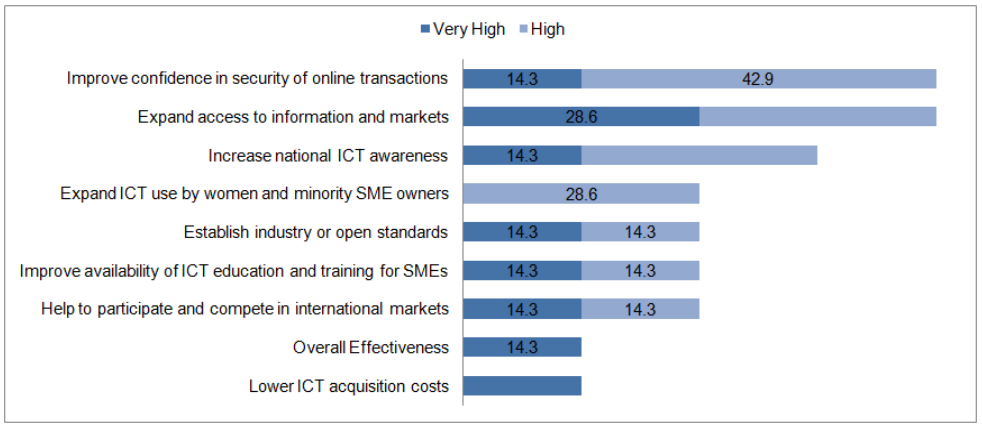


Figure 7: Effects of government policies to promote ICT for SMEs



5. Chile

5.1. Government Policies and Case Studies

5.1.1. General ICT promotion and network access expansion

Background

With the ultimate goal of becoming a fully developed economy by 2020, Chile's leap into the information society started in 1999 with the recommendations of a presidential commission that drew the basic elements of a digital agenda for the economy.[38] The commission outlined short and long-term strategies to promote the use of ICT throughout Chile's society and economic sectors, including the creation of a national network of information kiosks and community Internet telecenters, complete implementation of the Enlaces school network program, and the development of a legal framework to support and promote electronic transactions.[39]

Having achieved positive results in the implementation of these initiatives, a private-public committee (Grupo de Acción Digital) headed by the Undersecretary of Economy developed a digital agenda for 2004-2006, with a vision to make Chile a digitally developed economy, ranked along the OECD member states by the time of Chile's bicentenary celebration in 2010. As a result of the initiatives in the areas of infrastructure, education and training, E-Business and E-Government, *Agenda Digital 2004-2006* helped Chile achieve the following results by 2007[40]:

- Digital literacy of almost 1 million people
- Internet connectivity reached 40% of the population, 25% of households, and 70% of businesses
- 800 infocenters operating full time, and 1,500 operating part time
- 100% of public procurement processed through electronic resources

[38]The Presidential Commission on New Information and Communication Technologies included representatives from the public, private and academic sectors of society.
[39]*Comisión Presidencial Nuevas Tecnologías de Información y Comunicación,* "Chile: Hacia la Sociedad de la Información." January 1999. URL: http://tecnologiaedu.us.es/cuestionario/bibliovir/chile.pdf.
[40]*Servicio de Impuestos Internos de Chile*, "Historia y Lecciones de la Política Digital Chilena," May 2007, URL: http://www.dnp.gov.co/Portals/0/archivos/documentos/DEPP/Difusion_Rendicion_Cuentas/Barraza_Historia%20y%20Lecciones%20de%20la%20Politica%20Digital%20Chilena_7521.pdf

In 2007, the President formed the Committee of Ministers for Digital Development (Comité de Ministros para el Desarrollo Digital) to coordinate and design the implementation of a digital strategy for 2007-2012 (aka Agenda Digital 2.0) by building on the results of *Agenda Digital 2004-2006* and expanding the economic and social impact of public and private investments in ICT. Among the objectives of Agenda Digital 2.0 is to increase the competitiveness of Chilean businesses by means of more intensive uses of technology, including ICT.[41] At the heart of this objective is the Ministry of Economy's Economic Development Agency (CORFO).

Description of Policy

CORFO's mission is to improve the competitiveness of Chilean businesses, particularly SMEs. The Agency has an SME-focused framework for technology adoption as a way of increasing the competitiveness of Chilean SMEs. For instance, through the Supplier Development Program (Programa de Desarrollo de Proveedores), the government enters partnerships with large companies whose supplier network consists mainly of SMEs. The goal of such partnership is to pass on good practices, including good uses of technology, to SMEs serving as suppliers to large companies. CORFO also implements associative programs, where SMEs with a similar business problem are brought together to promote the adoption of good practices through consulting services. This association-based approach allows for the introduction of new technologies.[42]

CORFO's Technical Assistance Funds have also been adjusted to include an ICT-based self-evaluation platform so that the first step in identifying competitiveness gaps within SMEs is conducted by SMEs themselves, after which the government can assist with specialized consulting solutions. In this case, ICT can serve as both a diagnostics tool and a consulting solution for the improvement of the competitiveness of a particular SME. In order to improve SME access to credit, CORFO has also offered loan guarantees (up to 80% of the borrowed amount) to banks that lend to SMEs.[43]

In 2001 the Ministry of Economy created the Technology Development and Innovation Program (Programa de Desarrollo e Innovación Tecnológica), also known as InnovaChile, to help increase the competitiveness of the production sector by promoting innovation, technological development and technology transfers in strategic economic areas,

[41]Other objectives include: to promote a new culture for the use of ICT to improve transparency and citizen participation, to promote the development of a quality E-Government system, and to increase the degree of ICT use by students and civil society. (*IADB*, "Fortalecimiento de Estrategia Digital," URL: http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=1649100)
[42] Piera, Juan Pablo, "ICT and rural SMEs in local and global markets," October 25, 2011
[43] Piera, Juan Pablo, "Members' Experiences Discussion," October 26, 2011

especially among SMEs that produce goods and services. This program has contributed significantly to creating opportunities for interaction between government agencies through which the program has operated—CORFO, the Chile Foundation and the National Commission of Scientific and Technologic Investigation (CONICYT), Agrarian Innovation Foundation (FIA), National Institute for Standardization (INN) and Fundación Chile. In addition, it has helped to set priorities for science and technology policies.

The inter-institutional interaction and dialogue on technology and innovation promoted by InnovaChile has facilitated the coordination and effective financing of activities related to R&D and technology transfers, training professional researchers and technicians, developing science and technology infrastructure, and promoting the diffusion of R&D throughout the manufacturing sector. [44] All these efforts aim at advancing the modernization of Chilean companies, especially SMEs.

InnovaChile received funding from the Chilean government, the private sector and an Inter-American Development Bank (IADB) loan. The program's work was structured around 5 specific subprograms or action items to support projects and applied research in areas such as biotechnology and genetics, ICT, cleaner production management, and quality management of processes and products. These subprograms were implemented by transferring funds for the execution of specific actions to a number of institutions linked to innovation and technological development in Chile. The subprogram on ICT (Subprograma de Tecnologías de Información y Comunicaciones) aims to develop the ICT sector and promote the use of ICT, especially among SMEs. [45]

The ICT subprogram falls under the jurisdiction of the Sub-secretariat of Economy (SSE), through its ICT Division. SSE headed a Committee for the Coordination of the Subprogram, involving CORFO, the Technical Cooperation Service (SERCOTEC), the Chilean Foundation, and CONICYT.

One of the components of the ICT Subprogram sought to facilitate and support the adoption of ICT by SMEs, particularly by providing them Internet access. To this end, SSE has worked with SERCOTEC [46] to provide SME entrepreneurs Internet access and

[44] *OECD*, "Reviews of Innovation Policy: Chile," 2007, URL: http://www.minhda.cl/english/documents/reports-on-chile/oecd-reports/oecd-reviews-of-innovation-policy.html

[45] *Ministerio de Economía,* "Informe Final de Evaluación Programa Desarrollo e Innovación Tecnológica. Subprograma de Tecnologías de Información y Comunicaciones," June 2005, URL: http://www.dipres.gob.cl/574/articles-14930_doc_pdf.pdf

[46] SERCOTEC is a state institute that operates under the supervision of the Ministry of Economy and whose mission is to support and fund initiatives to improve the competitiveness of micro-

software training through the National Program of Infocenters. In addition, CORFO is responsible for providing technical assistance to SMEs for the adequate adoption of ICT and business models based on these technologies (i.e. electronic commerce).

For the latter initiative, SMEs submitted proposals to receive technical assistance for projects such as the introduction of electronic factoring,[47] cloud computing, or the installation of electronic systems for accounting, production and sales management. CORFO's intermediary agents evaluate the individual or collective projects for technical assistance, select promising business plan proposals, and then make the logistical and financial arrangements necessary to deliver the respective consulting services or subsidies to SMEs.[48]

These infocenters are community centers equipped with a computer, printer, scanner, photocopy machine, and fax in order to provide free services including Internet access and computer training to SME employees and entrepreneurs.[49]

In each infocenter, users are trained to use computer hardware and software tools, conduct online transactions, use online communications services, access valuable information channels, access online teaching materials, search potential business opportunities, and design websites for their businesses.

Current Status and Results

Chile continues to make steady progress expanding the use of ICT in households and businesses. Through the All of Chile Connected program (Todo Chile Comunicado), a public private partnership, the goal of bringing broadband to all rural areas is becoming a reality. This program, which is 80% completed, will reach 1,470 rural municipalities. Through the economic support of the Ministry of Agriculture, CORFO also expects to help

enterprises and small firms and to strengthen the management capacities of their entrepreneurs.

[47]Factoring is a growing source of external financing for SMEs. It is a type of supplier financing in which firms sell their creditworthy, low-risk accounts receivable at a discount and receive immediate cash. Factoring is electronic when transactions are completed through a web-based platform. Mexico's "Cadenas Productivas" is featured in this report as an excellent electronic factoring program that benefits SMEs financially while incentivizing their use of ICT.

[48]*Ministerio de Hacienda,* "Programa Desarrollo e Innovación Tecnológica. Subprograma de Tecnologías de Información y Comunicaciones," June 2005, URL: http://www.dipres.gob.cl/574/articles-14963_doc_pdf.pdf; *Chile Innova*, "Innovar en Chile: Programa de Desarrollo e Innovación Tecnologica 2001-2006," 2005, URL: http://www.centroiniciativa.udp.cl/archivos/Innovar_en_Chile_2001_2006.pdf

[49]*Yasushi Ueki,* "Information and Communication Technology (ICT) for Development of Small and Medium-Sized Exporters in Latin America: Chile," December 2005, URL: http://www.eclac.org/publicaciones/xml/3/26933/SW-Chile-48.pdf

approximately 3,000 rural SMEs in 2011 to improve their competitiveness by, among other things, introducing new technologies through associative programs.[50]

In partnership with the Ministry of Economy and the Social Investment Fund (FOSIS), SERCOTEC has established over 100 infocenters for micro-enterprises and small firms nationwide by means of a subsidy program implemented through a competitive system.

SERCOTEC called for two national competitions for public and private organizations interested in creating a National Network of Infocenters for Micro and Small Enterprises (Red MyPE). Partnerships established through this mechanism include municipalities, governorships, industry associations and NGOs.

As a result of this initiative, 25,000 entrepreneurs have been aided and 15,000 have been trained or certified. SERCOTEC also organized the first national infocenter conference (Encuentro Nacional de Infocentros) to share experiences and information. In addition, the infocenters for micro and small enterprises have benefited local women organizations and SME associations.[51]

Chile is also attempting to expand electronic factoring beyond large companies to reach more SMEs. While electronic factoring has been widely used by large enterprises, the government's goal is to expand this service to all Chilean SMEs. Training will accompany this diffusion process.

An important incentive for Chilean SMEs to use electronic factoring is the wide range of business opportunities, mainly with large companies, available through the use of this system. In addition, a deadline extension of 10 days for the payment of the Chilean value added tax is available to all electronic factoring users. Other benefits include a 32% increase in factoring effectiveness and more liquidity for the business. For this reason, electronic factoring can also make it easier to start a business.

Government efforts have also succeeded in streamlining processing for SME entrepreneurs to establish new businesses, reducing the average time required from 28 days to 7 days. The government continues to work toward an ultimate goal of 2 days.[52] E-government platforms and the ICT readiness of the Chilean population have been essential toward achieving this goal.

[50]Piera, Juan Pablo, "Members' Experiences Discussion," October 26, 2011
[51]*Chile Innova*, "Innovar en Chile: Programa de Desarrollo e Innovación Tecnologica 2001-2006," 2005, URL: http://www.centroiniciativa.udp.cl/archivos/Innovar_en_Chile_2001_2006.pdf
[52]Piera, Juan Pablo, "ICT and Rural SMEs in Local and Global markets," October 25, 2011

Key Findings

Municipalities where infocenters are located have been instrumental in maintaining the *National MyPE Infocenter* Network. According to a study conducted by the Sub-secretariat of Telecommunications (SUBTEL), 11 of the 16 infocenters studied between 2003-2007 were still in operation a year after they stopped receiving support (both technical and financial) from SERCOTEC and FOSIS. The infocenters that had maintained their operations were those in which the municipality took ownership and assumed the operational costs after the implementation of each project.[53]

Case Study

Through CORFO's technical assistance program and supplier development initiative, SMEs supplying products to Almacenes París, a chain of department stores in Chile, were able to carry out a project to incorporate 30 products for indirect sale (such as chocolates and flowers) into the web portal of the chain. Thanks to this initiative, SME suppliers were integrated into company's electronic product catalog and were able to improve coordination with their main client. As a result, Almacenes París went from 100 to 3,000 SME products offered per year and was able to increase its sales and attract new clients.[54]

5.1.2. ICT advisory services

Background

In 2006, a new pro-innovation law was passed,[55] whereby mining companies are charged a royalty to support an Innovation and Competitiveness Fund. Several programs are supported through this fund, including initiatives for the promotion of entrepreneurship and innovation among private companies. In order to specifically target SMEs, in 2007 the government launched a policy agenda called Compromiso Chile Emprende Contigo (CCEC - Chile undertakes with you).[56]

[53] *Subsecretaría de Telecomunicaciones,* "La Desigualdad en la Sociedad de la Información: La Experiencia de la Red Nacional de Infocentros (chile)," November 2008, URL: http://www.eurosocialfiscal.org/uploads/documentos/20081118_111103_Marcello_Frattasio_BD_Tax.pps

[54] *Chile Innova*, "Innovar en Chile: Programa de Desarrollo e Innovación Tecnologica 2001-2006," 2005, URL: http://www.centroiniciativa.udp.cl/archivos/Innovar_en_Chile_2001_2006.pdf

[55] *Agrupación de Universidades Regionales*, Antecedentes Para el Estudio de Propuestas en el Marco dela Discusión de la Educación Superior," September 2007, URL: http://www.auregionales.cl/documentos/informe_comisionaur.pdf, p. 159

[56] *OECD*, Studies on SMEs and Entrepreneurship, "SMEs, Entrepreneurship and Innovation," 2010

Description of Policy

Chile Emprende Contigo contains 21 specific measures to support SMEs in five areas: improving regulations, strengthening financing, helping business people with debts, improving access to markets, and improving conditions for entrepreneurship, innovation and training.[57] The total resources committed for the period 2007-2010 amounted to USD $620 million, and implementation involved agencies such as the Ministry of Economy and CORFO.[58]

CORFO, through InnovaChile,[59] was the entity responsible for the execution of projects related to entrepreneurship, innovation and training of SMEs. In this capacity, InnovaChile designed a program entitled "Innovation in intervention models for SME digitalization" (Innovación en modelos de intervención para digitalización de PYMES). CORFO held a competition in 2008 through which it chose 9 projects on SME digitalization spanning various Chilean regions and industry sectors. The beneficiary digitalization projects covered industries such as lumber, fruit processing, graphic design, hotel management, transportation and agriculture.[60] These projects would provide advisory services and technical support to SMEs on the use of ICT as a tool to improve their businesses by reducing transaction costs, improving financial management and planning, and improving the quality of their products and services.[61]

Current Status and Results

The latest progress evaluation of the agenda Chile Emprende Contigo was conducted in July 2008; a little more than a year after the government announced its launch. While the policy program as a whole received a poor grade in terms of the results accomplished to

[57] *Diario Pyme, "*Cinco Manos Para Dar un Empujón al Sector Pyme," May 2007, URL: http://www.diariopyme.com/2007/05/cinco-manos-para-dar-un-empujon-al-sector-pyme/

[58] A breakdown of the funding for Chile Emprende Contigo can be found at *Ministerio de Economía, "*Compromiso Chile Emprende Contigo," November 2005, URL: http://www.Economía.cl/1540/articles-187163_recurso_1.pdf

[59] InnovaChile is a committee/program established in 2005 and hosted by CORFO to provide support to private enterprise's efforts in a wide range of activities: i) pre-competitive and public interest innovation; ii) business innovation; iii) technology diffusion and transfer; and iv) entrepreneurship.

[60] Each of the 9 projects are described here: *InnovaChile,* "Proyectos Adjudicados Concurso Innovación en Modelos de Intervención para Digitalización de Pymes," URL: http://www.corfo.cl/incjs/download.aspx?glb_cod_nodo=20080901124459&hdd_nom_archivo=Descripcion_de_proyectos_ganadores.pdf

[61] *Ministerio de Economía, "*Compromiso Chile Emprende Contigo," October - November 2008, URL: http://www.innovacionagraria.cl/LinkClick.aspx?fileticket=nQ%2FgSVJZOQI%3D&tabid=64&mid=590

date, a total of USD $5 million was mobilized by InnovaChile to support projects under the areas of entrepreneurship, innovation and training "to improve the levels of digitalization of SME operations, and conduct a technology support program for this group." [62] The program was expected to reach 1,500 SMEs in 2 years through projects selected via competitive and "open window" type processes.[63]

Key Findings

CORFO-InnovaChile realized that SMEs were not taking advantage of investments made in ICT hardware and connectivity because of the costs associated with adopting ICT and the perception that these technologies were not useful or necessary. In this context, the objectives of the InnovaChile contest were to increase the use of ICT among SMEs by generating digitalization models that could be easily replicated in a given industrial sector and create ICT-based business and production models. [64]

Case Study

"Introduction of new ICT for the management and administration of agricultural SMEs in southern Chile" was one of the nine projects supported under the "Innovation in intervention models for SME digitalization" initiative seeking to improve connectivity and minimize the digital gap among farmers in southern Chile. [65] This project was executed by the Institute of Informatics and the Institute of Agrarian Economics of the Department of Agrarian Sciences at the Austral University of Chile (UACh), in partnership with the Livestock and Agricultural Business Association of Valdivia (SAVAL F.G.). InnovaChile provided 75% of funding.

The project offered training services at three different levels according to the digital ability of the farmer and the needs of the respective SME. Services included on-site individual and group lessons on basic computing, Internet use, Microsoft Office (Word and Excel) and more advanced programs specific to the operations of agricultural SMEs. By the time this project ended in March 2011, ICT training had been delivered to 308 agricultural and livestock SMEs and more than 1000 people. [66]

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[62] *Instituto Libertad, "*Evaluación del Cumplimiento de las Agendas en Pro de la Inversión, del Emprendimiento, y de las Empresas de Menor Tamaño," July 2008, URL: http://www.institutolibertad.cl/ie_193_cumpl_ag_pymes.pdf

[63] Compromiso Chile Emprende Contigo, Estado de Avance, October-November 2008.

[64] *IBERPYME,* "Novedades: En Chile se presenta concurso para Digitalizar a las pymes," URL: http://www.iberpymeonline.org/interna.asp?sec=3&step=1&id=603

[65] Introducción de Nuevas TICs para la Gestión de PYMES Agropecuarias del Sur de Chile

[66] *InnovaChile, "*Tecnologías para de Infocomunicacion para el Agro del Sur de Chile" URL: http://www.produccionbovina.cl/web/index.php?option=com_content&view=article&id=99&Itemid=89 ; *NOTICIAS UACH, "*Proyecto sobre TIC supero la meta de 300 PYMES Agropecuarias," May 2011, URL: http://noticias.uach.cl/principal.php?pag=noticia-externo&cod=32118

5.1.3. ICT training financial support

Background

In 2003, the Ministry of Education launched the Digital Literacy Campaign. This aimed to provide 500,000 people over 15 years of age and outside the education system (especially workers, entrepreneurs of micro-enterprises, and housewives) with practical training in ICT through the National Infocenter Network and other training programs operated by public institutions.

The National Training and Employment Service (SENCE)'s tax incentive scheme for company-based training has been an important component of the Digital Literacy campaign, as tax exemption can be applied to labor training in relation to IT capacity building.[67]

Description of Policy

The SENCE tax incentive system (known in Spanish as *franquicia tributaria*) allows companies that directly provide training programs for their workers, or contract registered training providers (called Technical Training Organizations—OTECs), to deduct training expenses from their tax liabilities. The system allows companies to deduct the costs incurred in training their workforces from their annual taxable income up to a maximum of 1% of their total payroll, or more in the case of small firms.[68] In addition, the National Training Fund (FONCAP) finances efforts to train workers, managers, and entrepreneurs in small firms. It does this through nonprofit intermediaries that organize and competitively contract training services for groups of small enterprises that would not have the capacity to do this by themselves.[69]

Current Status and Results

The SENCE incentive scheme is widely used by SMEs, which account for more than 70% of the total number of firms using SENCE.[70] In 2004, 15% of all Chilean employees

[67] *Yasushi Ueki,* "Information and Communication Technology (ICT) for Development of Small and Medium-Sized Exporters in Latin America: Chile," December 2005, URL: http://www.eclac.org/publicaciones/xml/3/26933/SW-Chile-48.pdf

[68] *OECD*, "Reviews of Innovation Policy: Chile," 2007, URL: http://www.minhda.cl/english/documents/reports-on-chile/oecd-reports/oecd-reviews-of-innovation-policy.html

[69] *The World Bank*, "A Review of National Training Funds," November 2009, URL: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.159.1607&rep=rep1&type=pdf

[70] *Yasushi Ueki,* "Information and Communication Technology (ICT) for Development of Small and Medium-Sized Exporters in Latin America: Chile," December 2005, URL: http://www.eclac.org/publicaciones/xml/3/26933/SW-Chile-48.pdf

received training, one quarter of them in science and computing and ICT.[71] Between 2003 and 2005, this system allowed 132,000 people to receive computing training.[72]

More than 1 million people were trained through the SENCE tax incentive system in 2009. That year the number of businesses taking advantage of the program was 16,397, which represented an increase of 6% from the year before.[73] In 2007, "business administration" was the most demanded category for training (34.3% of employees). However, "computing and IT" was the second most popular category with 13.2% employees receiving ICT training.[74]

In addition, the number of people who received E-Learning training (i.e. distance learning via Internet) grew by 94.7% between 2005 (28,200 e-learners) and 2007 (55,000 e-learners). Even though this trend is indicative of an increasing number of workers using ICT tools for training, e-learners still only represent 5.4% of Chilean workers who receive training via SENCE mechanisms.[75]

Key Findings

Chilean SMEs have responded positively to government incentives seeking to promote the training of Chilean workers in areas critical for the economy's productivity and competitiveness. The SENCE tax incentive system has effectively supported the Digital Literacy campaign, allowing thousands of Chilean workers to receive ICT training. A better knowledge of ICT tools gives these employees the opportunity to more actively contribute to the growth and competitiveness of their businesses.

5.2. Survey Results and Analysis

The high costs of adopting ICT seem to be a more pressing concern in Chile than in other Latin American economies such as Peru and Mexico. One possible explanation is that the relatively small size of the Chilean ICT market has not generated enough competition to push down ICT costs, but the government has attempted to cover part of the capital investment for ICT hardware through competitive grant schemes.

[71] *OECD*, "Reviews of Innovation Policy: Chile," 2007, URL: http://www.minhda.cl/english/documents/reports-on-chile/oecd-reports/oecd-reviews-of-innovation-policy.html
[72] *Nagel, José and Camilo Martínez*, "Chile: Agricultores y Nuevas Tecnologías de Informacion," 2006
[73] *DiarioPyme*, "Aumentan Capacitados por Franquicia Tributaria," February 2010, URL: http://www.diariopyme.com/2010/02/aumentan-capacitados-por-franquicia-tributaria/
[75] *Sence*, "La Franquicia Tributaria 2007 en Cifras," 2008, URL: www.sence.cl
[75] *Sence*, "La Franquicia Tributaria 2007 en Cifras," 2008, URL: www.sence.cl

The majority of Chilean SMEs describe government efforts to promote ICT acquisition and usage by SMEs as moderately effective. Although many survey respondents were not aware of any ICT-related government initiatives for SMEs, around 30% identified specific government agencies and initiatives to promote the use of ICT by SMEs. Overall, survey respondents believed that the government has been highly effective at improving the availability of ICT education and training for SMEs and improving the confidence in the security of online transactions. These views reflect the efficacy of Chile's Digital Literacy campaign and E-Government initiatives.

The government agencies and programs most commonly mentioned by Chilean SMEs as playing a role in their adoption of ICT include a Seed Capital program for innovative entrepreneurial projects, implemented by the CORFO and SERCOTEC.

Chilean government officials stated that the top priority of the government ICT promotion policy is to provide valuable E-Government services to encourage SMEs to adopt ICT. SMEs identified the government E-Procurement system ChileCompra and other E-Government services as the most useful types of government ICT promotion initiatives for their businesses.

Table 8: Chile survey responses

Summary of responses to surveys of SME use of ICT in Chile	
Overview	As the most sophisticated ICT user in Latin America, SME use of ICT is sophisticated and nearly on the level of the U.S. and Korea.
Company background	The SME respondents represented a wide range of industries, notably professional services, retail trade, information technology, and construction. 80% of SMEs had 10 or fewer employees.
Significance of gender, ethnicity, and location	Minority-owned and rural-based SMEs were rare, but close to 30% were women-owned. In general, women-owned SMEs indicated the same level of ICT usage as other SMEs.
ICT usage	56% of SMEs reported that more than 80% of their staff uses ICT on a daily basis, and 50% reported having dedicated ICT staff. Most common SME uses of the Internet included email, getting information about goods and services, interaction with government, and financial transactions.
Role of ICT	SMEs cited improved access to market information, improving customer relations, and increasing visibility in the marketplace as the major benefits realized from ICT. Percentages of respondents citing each benefit can be seen in Figure 5 below.
Obstacles to purchasing and using ICT	The largest obstacles cited were lack of ICT education programs, high upfront costs, and inadequate legal framework for E-Commerce. Percentages of respondents citing each obstacle can be seen in Figure 6 below.
Effectiveness of government ICT Promotion Policies	Most SMEs considered government prioritization of ICT promotion for SMEs to be moderate, and viewed the success of related government policies to also be moderate. SMEs cited improved availability of ICT education and training for SMEs, improved confidence in the security of online transactions, and expanded access to information and markets as the key contributions of government policy. Main benefits of government policies can be seen in Figure7 below.
Assessment of interaction with ICT industry and government	SMEs stated interactive activities such as conferences, training sessions, and collaboration with other SMEs were useful for improving understanding of ICT and increasing communication with the ICT industry.

Figure 8: Benefits of ICT use to SMEs in Chile

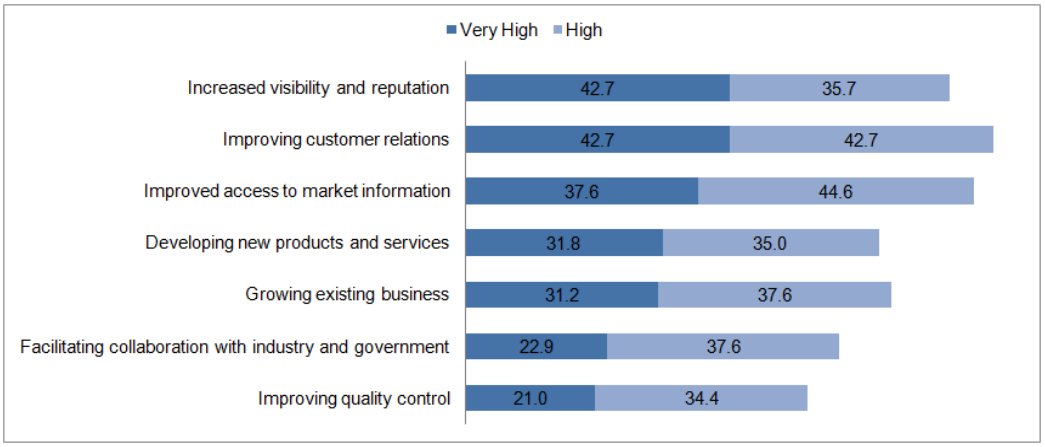


Figure 9: Obstacles to ICT adoption for SMEs in Chile

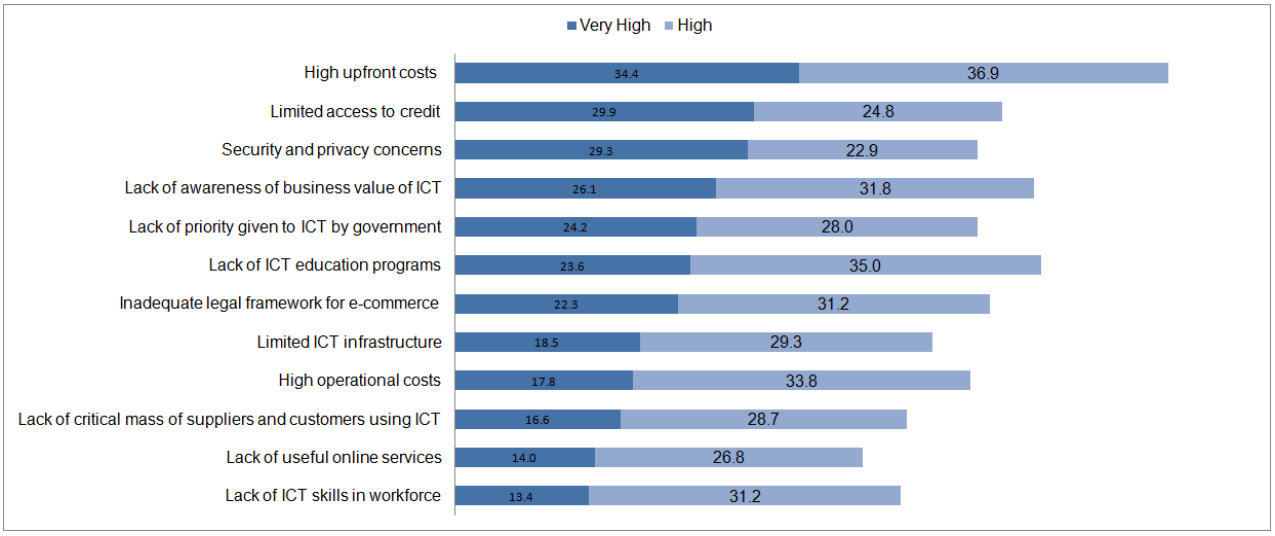
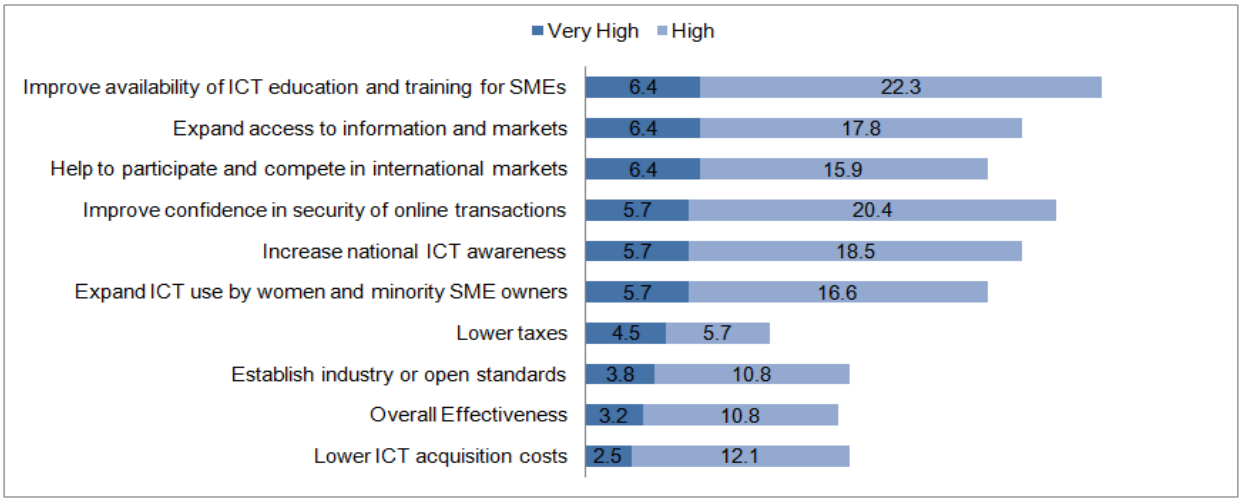


Figure 10: Effects of government policies to promote ICT for SMEs



6. Mexico

6.1. Government Policies and Case Studies

6.1.1. ICT industry promotion

Background

The National e-México System (*Sistema Nacional e-México*) was established in 2000 when then President Vicente Fox instructed the Ministry of Communications and Transportation (*Secretaría de Comunicaciones y Transporte*s) and other government agencies to implement a digital economy policy in order promote initiatives to jumpstart, conduct and integrate all necessary efforts to include the majority of the population within the information and knowledge society.[76]

The main goal under *e-México* is to drive and facilitate Mexico's transition into the digital age, by designing the digital and social services for 21st century citizens and reducing the digital divide nationwide between governments, industries, households and individuals.[77]

Following these developments, and recognizing ICT as a global market with high growth rates, the Mexican government enacted the 2001-2006 National Development Plan (NDP), seeking to increase economic growth through the development and use of ICT. In order to achieve the objectives of the NDP and e-México, the government created the National Program for the Software Industry Development (PROSOFT) and *Fundación México Digital*—designed to support PROSOFT.

Description of Policy

Identifying the ICT industry as a key factor for increasing national competitiveness and productivity, the Ministry of Economy created PROSOFT in 2002, following a 10-year plan. PROSOFT focuses on the development of the ICT industry by integrating public and private funding, promoting collaboration among private industries, federal and state

[76] *e-México* has three guiding axes: connectivity, contents and systems. Under content, the government's goal is to promote initiatives in the areas of E-Learning, e-health, E-Government and e-economy—the last one to improve the competitiveness of the Mexican economy.

[77] *Secretaría de Relaciones Exteriores,* "Pendiente una Vida Mejor en las Comunidades Rurales con las TIC," May 2011, URL: http://mision.sre.gob.mx/oi/index.php?option=com_content&view=article&id=473%3A17-May-pendiente-una-vida-mejor-en-las-comunidades-rurales-con-las-tic&catid=18%3Acontenidointervenciones&Itemid=79&lang=es

governments, and institutions of higher education.[78] Importantly, it was designed to target micro and SME enterprises as well as large firms that either produce ICT services and software or need support adopting ICT for internal use.

Fundación México Digital (FMD) was created in 2003 as a private non-profit organization to support the PROSOFT campaign in its strategic goal to develop the domestic ICT market while promoting the incorporation of ICT in production processes, especially among SMEs.[79]

The Ministry of Economy invited private institutions and business associations to invest in the development of projects to set up value chains within Mexico's digital economy. The government matches private investments, but the entity is intended to remain an autonomous, private institution. Founding members of FMD include Cisco Systems de Mexico, Hewlett-Packard de Mexico, IBM de Mexico, Telmex, Procter & Gamble, Intel Tecnologia de Mexico, Microsoft de Mexico, the Mexican Association of the IT Industry (AMITI), the Electronics and IT Industrial Union (CANIETI) and Normalization and Certification in Electronics (NYCE).

The following are FMD's objectives as laid out by the Mexican government[80]:

- Identify, evaluate and prioritize opportunities in production chains in order to promote and develop projects in specific chains.
- Conduct comprehensive studies in select chains considering: deployment of technological solutions, integration, legislation, education, marketing, financing, and standardization.
- Promote, coordinate and support the execution of projects that serve as solutions in the previously identified areas of opportunity.

[78] *Managing Worldwide Operations & Communications with Information Technology*, "Promoting the Economic Development Through the IT Industry in Mexico: the PROSOFT program," 2007, URL: http://www.irma-international.org/viewtitle/33297/

[79] Besides the development of the domestic ICT market, the PROSOFT program is organized around another six strategic goals: Promotion of exports and investments in the software sector; Education and training of competent personnel in the development of software, as well as the required quantity and quality; appropriate legal framework in place promoting this industry; strengthening of the local industry; achieving international levels in process capability; and promoting cluster development throughout Mexico.

[80] *Secretaría de Comunicaciones y Transportes*, "PROGRAMA DE TRABAJO: Sector Comunicaciones y Transportes," 2003, URL: http://www.cft.gob.mx/work/models/Cofetel_2008/Resource/3814/Programa_Trabajo_2003.pdf

FMD contributes to the development of the domestic ICT market through the execution of digital integration projects in value chains, and promotion of the acquisition and use of ICT in Mexico's production economy. Working in conjunction with the Ministry of Economy, the first four projects for digital integration undertaken by FMD targeted the grocery, processed food, textile, and hotel industries, given their impact on employment, economic growth and exporting potential.[81]

After identifying these industries, the first operative stage consisted of using PROSOFT financing to identify SMEs that were representative of and significantly involved in each industry, and also a sample of their main suppliers in order to understand the processes involved in a given production chain and identify opportunities for digitalization in each sector.

The second stage funded with public-private resources, consisted of creating a free software solution capable of grouping companies or industries with their respective supply chains in order to improve SMEs' administrative and production processes and optimize the timing of operations. The software solutions would then be implemented in pilot projects and then replicated in cities throughout Mexico via business partnership models. The last stage would consist of offering the industry-specific software solution to all interested companies. [82]

Current Status and Results

Incorporating some suggestions about the PROSOFT program provided by evaluations from academic organizations in 2008, the Ministry of Economy launched PROSOFT 2.0. The program was strengthened with a new set of ICT-related policies to support activities not previously included, such as business process outsourcing, embedded software and contact and call centers.

According to a progress report issued in 2008 by the Ministry of Economy, the overall impact of PROSOFT was "excellent" due to the growth that the ICT sector experienced between 2003 and 2006. However it rated the impact of FMD as "low" due to its limited outreach to economic sectors. [83]

[81] Fundación México Digital, A.C, "Evento PROSOFT," August 2006, URL: http://inf166.wikispaces.com/file/view/mexico+digital.pdf
[82] *Política Digital,"* ¿Qué es la Fundación México Digital?," 2010, URL: http://www.politicadigital.com.mx/?P=leernoticia&Article=1390&c=111
[83] *Secretaría de Economía,* " PROSOFT 2.0," March 2008, URL: http://www.scribd.com/doc/58023271/4/IV-AVANCES

The report pointed out that the Phase I of the digital integration projects in the grocery, processed food, textile, and hotel industries concluded in 2004 and was successful. However, the implementation phase of Phase II only reached a few SMEs in 2005, pointing out the need to identify models for the broad adoption of the knowledge and tools produced by FMD.[84]

Key Findings

PROSOFT has consolidated in one program the development of the ICT industry and the adoption of ICT by SMEs. While *Fundación México Digital* has not yet reached its full potential, SMEs have seen the benefits of bringing together private sector technical expertise and public funding with the purpose of generating industry-specific digital solutions to boost productivity, efficiency and competitiveness.

6.1.2. E-Government – Cadenas Productivas and the Intelligent Administration System

Background

In Mexico, approximately 80% of new SMEs shut down after two years of existence. This has been the result of increased international competition. Mexico, the second most open market in the world, is engaged in 12 trade agreements with more than 40 economies. Other challenges for SMEs include a lack of financing, high operational and administrative costs, and a lack of strategic planning and market intelligence. In other words, Mexican SMEs have struggled to be internationally competitive. Two government initiatives based primarily on ICT tools have been introduced as potential solutions to these problems: the Intelligent Administration System (Sistema Inteligente de Gestión) and Cadenas Productivas.

Description of Policy

Developed by the SME Subsecretariat and General Directory of Exports of the Secretary of the Economy, the Intelligent Administration System is a comprehensive repository of information provided by Mexican government agencies and SMEs. The system uses a methodic and customer friendly electronic platform that matches the business needs and challenges of SMEs with relevant information solutions that help increase their competitiveness in international markets. The IAS is scheduled to be made available to the

[84] 2006 progress report on FMD's activities and digital integration projects: Fundación México Digital, A.C, "Evento PROSOFT," August 2006, URL: http://inf166.wikispaces.com/file/view/mexico+digital.pdf

public in late 2011 and it is expected that it will significantly improve the diagnostics and traceability of SMEs' business conditions, progress and export potential.

In the IAS platform, each SME will have an account which will allow it to access a variety of business management tools including enterprise resource planning, business process management, customer relationship management, and a balance scorecard to track and benchmark progress.[85]

Similar to the other economies mentioned in this report, access to financing is a major hurdle for the growth of SMEs in Mexico. The typical Mexican SME receives less than five percent of its working capital from banks.[86] A particular challenge for SMEs is financing their production cycle, since after goods are delivered most buyers demand 30 to 90 days to pay.

A factoring system could improve the financing options available to SMEs. Factoring is a type of supplier financing in which firms sell their credit-worthy accounts receivable at a discount (generally equal to interest plus service associated with managing and collecting the receivable) to a third party and receive immediate cash. The third party "factor" that purchases the receivables assumes the credit risk for the buyer's ability to pay.

In developing economies, however, traditional factoring faces two key challenges: the lack of readily available credit information and insufficient protection against fraud. In the absence of credit information on each of the supplier's customers, it is difficult, if not impossible, for the factor to adequately assess the risk of a customer failing to pay an invoice. Additionally, fraud, in the form of fake receivables and customers is not uncommon. In Mexico, the state-owned development bank, Nacional Financiera (NAFIN) has demonstrated how traditional factoring can be successfully adapted to the characteristics of developing economies by deploying an electronic platform and encouraging its use among SMEs.

Since September 2001, NAFIN has provided SME suppliers with automated (reverse) factoring services through its Cadenas Productivas (Production Chains) program, which links small suppliers to "big buyers." Reverse factoring differs slightly from traditional factoring in that the lender only purchases account receivables from certain very

[85] Garza, Carlos and Graciela Bravo, "Mexico's Strategy to promote ICT access for SMEs for their internationalization," October 26, 2011
[86] *USAID,* "Value Chain Finance: Primer Diagnostic Checklist and Model Scope of Work," September 2009, URL: http://pdf.usaid.gov/pdf_docs/PNADU684.pdf

creditworthy buyers, as opposed to purchasing an entire portfolio of account receivables from an individual seller.

Cadenas Productivas works by creating 'chains' between 'big buyers' and small suppliers. The buyers are large, credit worthy, and often foreign firms that are low credit risks. Registered with the Cadenas Productivas program, big buyers provide NAFIN with lists of their suppliers (i.e., the small firms holding their accounts receivables), who are then invited to register for the factoring service for their respective large, low-risk buyers. As a result, factoring services facilitated through NAFIN are provided "without recourse."[87]

The sale of receivables from the supplier to the factor and the transfer of funds from the factor to the supplier are done electronically. Over 98% of all services are provided electronically.

Current Status and Results

Over 2 thousand SMEs were consulted in the design and development of the Intelligent Administration System, which is expected to be officially launched in the near future.

NAFIN has succeeded in providing financial services to Mexican SMEs. As of 2010, *Cadenas Productivas* had 68,000 registered SMEs and conducted an average of 10,000 transactions per day.[88] As of 2004, Cadenas Productivas had helped established production chains with 190 big buyers and 70,000 SMEs. Approximately 20 banks, independent finance companies, and other domestic lenders were participating in the factoring program. During the first four years since its inception, Cadenas Productivas brokered over 1.2 million transactions – 98% by SMEs.[89]

Key Findings

The Intelligent Administration System is expected to save SMEs time and money as they will no longer need to deal with tedious and confusing bureaucratic procedures and middlemen to obtain the information necessary to abide by the regulations associated with participating in international markets. Although the system has not been officially launched,

[87]In addition, NAFIN requires that all factoring services it brokers are offered without additional collateral or service fees, at a maximum interest rate of seven percentage points above the bank rate (five percentage points, on average), which is about eight percentage points below commercial bank rates.
[88]*Ideas para Pymes,* "Destaca Nafin Apoyo del Programa de Cadenas Productivas a PYMES," October 2010, URL:
http://www.ideasparapymes.com/contenidos/noticia2101.html
[89]*The World Bank Group, "*Access Finance*,"* December 2006," URL
http://siteresources.worldbank.org/INTACCESSFINANCE/Resources/AFIssue15.pdf

there is much anticipation for what its future holds and whether there will be interest to implement it in other economies. [90]

Cadenas Productivas demonstrates how electronic channels can be used to reduce costs and provide SMEs with greater access to financial and nonfinancial services. Given the financial benefits available through this program and the number of SMEs involved, Cadenas Productivas appears to have been successful in incentivizing the use of ICT by SMEs.

The electronic platform also allows all commercial banks to participate in the program, which gives national reach, via Internet, to regional banks. Online banking services also allow lenders to penetrate rural areas without banks and provide incentives for SMEs in the informal sector to register and take advantage of financing opportunities. In addition, the NAFIN factoring program is used as a model in Mexico for the automation of other government agencies and service providers.

The existence of a supportive legal and regulatory environment has also been a key success factor. Mexico has electronic signature and security laws that should serve as models for other economies. The key factor for replicating this success appears to be a supportive enabling environment for electronic transactions in which laws give data messages the same legal standing as written documents.[91]

Case Study

A small supplier in the agribusiness sector (which has asked to remain anonymous) sells processed food to large Mexican supermarkets. The firm began operations in 2002 and as of 2006 it had about 30 employees. Prior to factoring with NAFIN, the firm factored its receivables with a factor partner that required the supplier to physically collect its receivables from the buyers and deliver its receivables to the bank. This supplier reports that factoring on-line and using electronic document transfers allows for quick payments and lower costs, all while using an Internet-based platform.[92]

[90] Garza, Carlos and Graciela Bravo, "Mexico's Strategy to promote ICT access for SMEs for their internationalization," October 26, 2011.
[91] *USAID,* "Value Chain Finance: Primer Diagnostic Checklist and Model Scope of Work," September 2009, URL: http://pdf.usaid.gov/pdf_docs/PNADU684.pdf
[92] *The World Bank*, "The Role of "Reverse Factoring in Supplier Financing of Small and Medium Sized Enterprises," URL: http://www.ifc.org/ifcext/gfm.nsf/AttachmentsByTitle/BL-SupplierFinancing-LKlapper/$FILE/BL-SupplierFinancing-LKlapper.pdf

6.1.3. SME skill training

Background

According to the National Autonomous University of Mexico, the key elements needed for SMEs to adopt and leverage ICT for business success are:[93]

- Digital inclusion – providing fundamental ICT skills and network access
- Innovation support – advising SMEs on how to deploy ICT in their businesses
- ICT market development –promotion of ICT supply and demand

In response to the need for upgrading the technological capabilities of Mexican SMEs, the Ministry of Economy launched in 2007 the program "Mexico Emprende" (Mexico undertakes) an initiative specifically aimed at enhancing the competitiveness of Mexican SMEs.[94]

In 2008, a national plan was announced to create a network of centers for Mexican entrepreneurs (Mexico Emprende Centers - CMEs) in order to consolidate in one location the coordination of a variety of consulting, training and financing services offered by the Ministry of Economy to support the growth of existing SMEs.

Because of its experience and capacity, the Mexican Construction Industry Chamber was designated to carry out the remodeling work and to provide equipment for the first twenty CMEs.

Description of Policy

The CME program is operated by the Ministry of Economy (Secretaría de Economía) in coordination with business associations and chamber of commerce where the CMEs are located. The CMEs provide services and public or private support to SMEs, according to their size and potential. A network of certified consultants works with interested SMEs to assess their business development needs and identify the appropriate programs and services to address them. SMEs learn about the programs or services that suit their needs by communicating with a CME location directly or using the CME website.[95]

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[93] Abitia Rodríguez, Guillermo. "Industry-Academic-Government Co-operation: Best practices to promote ICT among SME," October 25, 2011

[94] *United Nations Conference on Trade and Development Creating Business,* "Creating Business Linkages: A Policy Perspective," 2010, URL: http://www.unctad.org/en/docs/diaeed20091_en.pdf

[95] *El Universal,* "Arrancarán Centros México Emprende en Marzo," November 2008, URL: http://www.eluniversal.com.mx/articulos/50694.html; video: *YouTube Clip, "*Mensaje del Presidente Felipe Calderon sobre los Centros Mexico Emprende," December 2010, URL: http://www.youtube.com/watch?v=0GAczCXaM1g

In 2011 the Sub-Secretariat for SMEs partnered with Intel, Microsoft, computer manufacturers and business organizations to create the MiPyme CreSE (my SME grows), a program aiming at closing the digital divide in Mexico's SMEs by facilitating their access to ICT. This will also enable SMEs to improve their production and business processes while boosting the SME sector's productivity and competitiveness.

MiPyme CreSE provides financing and technical support for ICT adoption and training. SMEs typically struggle to cover the costs of software and training on their own. MiPyme CreSE provides discounts on computer equipment to registered companies, which can also take courses on business management and ICT literacy. CMEs are in charge of assessing the ICT needs of interested SMEs and their consultants determine what kind of solution is more suitable given the size and nature of their business.

According to the National Autonomous University, the adoption of software as a service and cloud computing are being encouraged as means of substantially reducing the cost of operations for SMEs. In addition, SMEs can benefit by leveraging the cloud to provide new online services with minimal initial investment.[96]

Current Status and Results

There are currently 163 CMEs throughout 68 Mexican cities. According to government figures, these Centers have served more 20 thousand businesses and more than 5 thousand entrepreneurs through financing and training. In 2010, CMEs carried out 598,000 company diagnoses to identify problems in their production processes and offer them specialized consulting assistance. A CME call center is also available to SMEs and entrepreneurs, and over 9,000 businesses used this service in 2010. There is also a network of 1,200 financial and business consultants certified to serve CME users, matching their needs with the different programs offered by the Sub-Secretariat for SMEs of the Ministry of Economy.

With the support of the CME network, MiPyme CreSE is expected to assist 300,000 SMEs in 2011 and more than 1 million by 2013 through loans with low interest rates and generous payment timetables, and discounts (of up to 35%) on ICT products. [97]

[96] Abitia Rodríguez, Guillermo, "Industry-Academic-Government Co-operation: Best practices to promote ICT among SME," October 25, 2011

[97] *Pymempresario,* "Artículos en Tema: MiPyme CreSE," August 15, 2011, URL: http://www.pymempresario.com/temas/mipyme-crese/

Key Findings

Consolidation in the delivery of SME-specific government services can significantly expand the outreach and impact of public policies and programs designed to promote the use of ICT by SMEs. MiPyme CreSe, for instance, will be more effective at reaching its target audience because the program is being executed through a well-established framework of SME users, on-site technicians and community supporters who are familiar with local CMEs.

6.2. Survey Results and Analysis

Mexican SMEs stated that the biggest obstacle to ICT adoption is the lack of priority given to ICT by the government. This result indicates that the impact of major national ICT promotion programs in Mexico on SMEs may not be as great as expected, despite the Ministry of Economy's very positive 2008 progress evaluation of the National Program for the Software Industry Development (PROSOFT)—a program agenda to target micro and SME enterprises as well as large firms that either produce IT services and software or need support adopting ICT.

Nevertheless, half of the Mexican SMEs surveyed to date highly rated the effectiveness of government policies in improving the availability of ICT education and training for SMEs, and expanding access to information and markets. It is possible that this trend is directly related to the effectiveness of the services offered through a network of centers for Mexican entrepreneurs called Mexico Emprende Centers (CME). The government has sought to use the CMEs to consolidate in one location the coordination of a variety of consulting, training and financing services offered by the Ministry of Economy to support the growth of existing SMEs.

Table 9: Mexico survey responses

Summary of responses to surveys of SME use of ICT in Mexico	
Overview	SME use of ICT in Mexico is moderately advanced and growing, partly driven by the strong growth in Mexico's software industry.
Company background	The SME respondents represented various industries, notably professional services. The majority of SMEs had 10 or fewer employees.
Significance of gender, ethnicity, and location	No SMEs were minority-owned, and most were based in urban areas, so the impact of ethnicity and location on answers is difficult to judge. Half of SMEs were located in women-owned, which appears to have little correlation with level of ICT usage.
ICT usage	75% SMEs reported that over 80% of their staff use ICT on a daily, basis, but only 25% reported having dedicated ICT staff, which can be explained by the very small size of the respondents' companies. Most common SME uses of the Internet included email, conducting research, customer service, and E-Commerce.
Role of ICT	SMEs cited improved customer relations, followed by development of new products and services, improved quality control, and increased visibility in the marketplace as the major benefits realized from ICT. Percentages of respondents citing each benefit can be seen in Figure 8 below.
Obstacles to purchasing and using ICT	The key obstacle noted was lack of government prioritization of ICT promotion, followed by lack of ICT skills in the workforce, high upfront costs and a lack of critical mass of suppliers and customers using ICT. Percentages of respondents citing each obstacle can be seen in Figure 9 below.
Effectiveness of government ICT Promotion Policies	SMEs were generally neutral on the effectiveness of government efforts to promote of ICT use for SMEs. SMEs cited expanded access to information and markets and improved availability of ICT education and training for SMEs as the key contributions of government policy. Main benefits of government policies can be seen in Figure 10 below.
Assessment of interaction with ICT industry and government	Out of all economies, Mexican SMEs showed the least interest in interactive activities such as conferences, training sessions, and meetings. The majority of respondents answered that such activities were not significantly helpful.

Figure 11: Benefits of ICT use to SMEs in Mexico

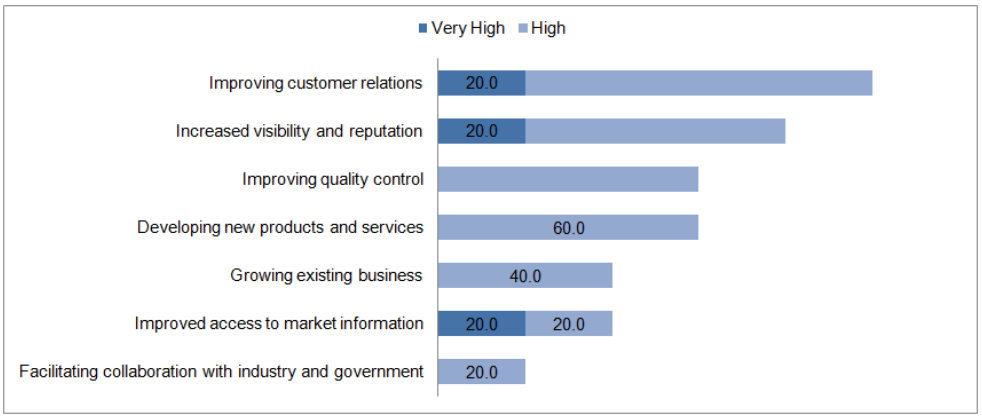


Figure 12: Obstacles to ICT adoption for SMEs in Mexico

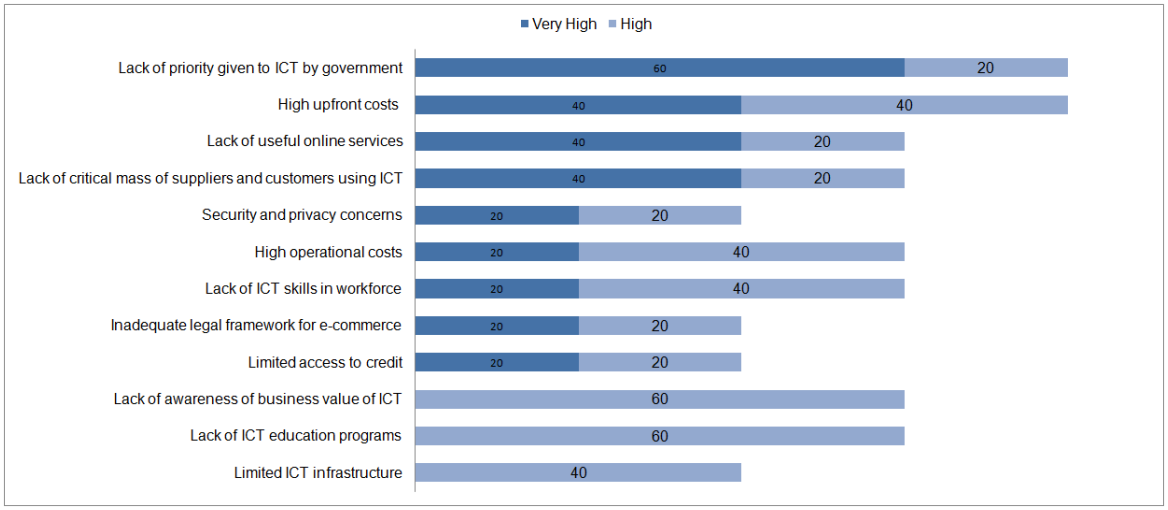
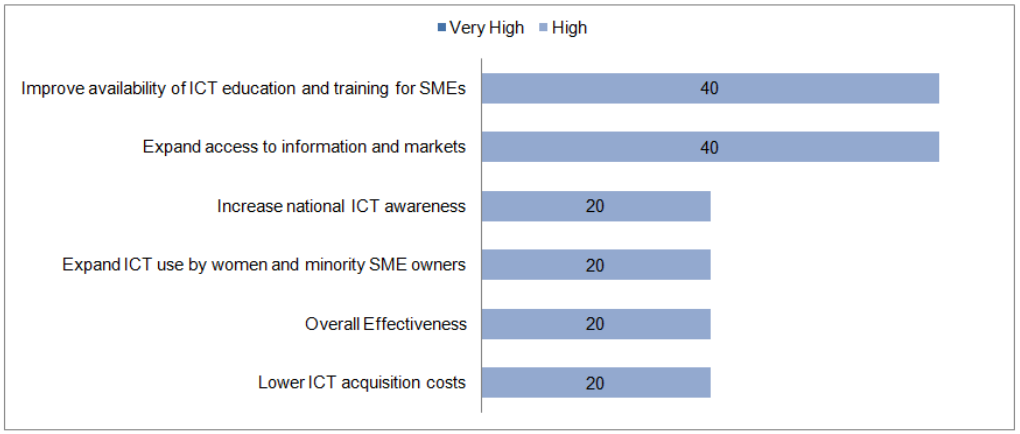


Figure 13: Effects of government policies to promote ICT for SMEs



7. Peru

7.1 Government Policies and Case Studies

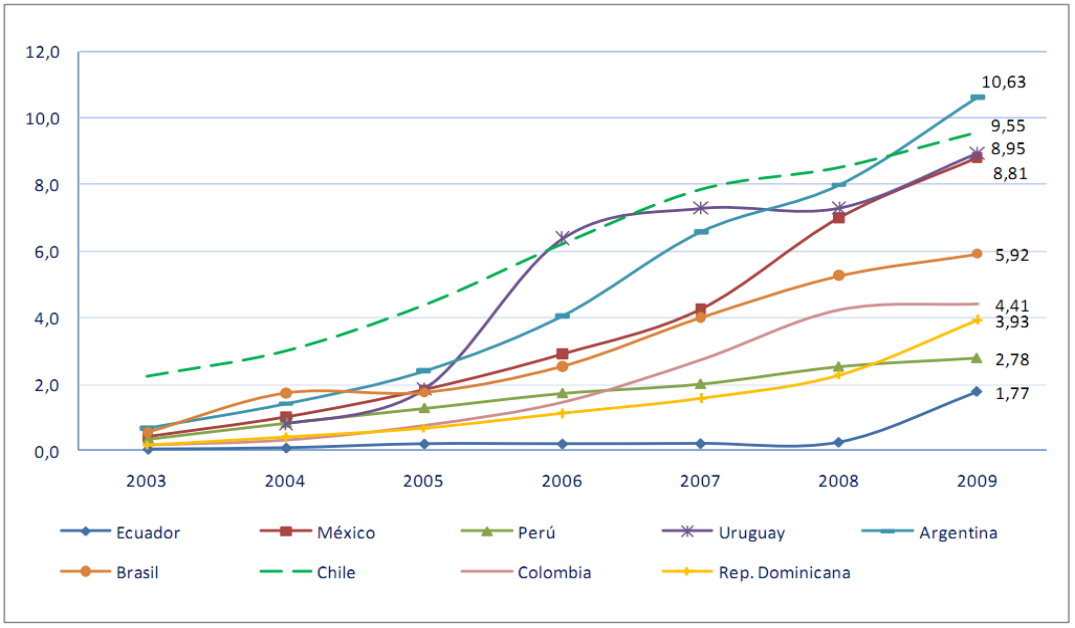
7.1.1. Infrastructure Development and e-Government

Background

The existence of adequate telecommunications infrastructure is a necessary condition for the adoption of ICT by SMEs and the use of these technologies to improve productivity and efficiency in business operations. While various government initiatives in Peru are directly or indirectly incentivizing the use of ICT by SMEs, the full potential of these programs has yet to be realized due to the lack of adequate network infrastructure for Internet access, particularly in rural and low-income areas.

Peru currently stands at an early stage of ICT development and sophistication. Among the Latin American economies, Peru currently has one of the lowest penetration rates of broadband internet at 2.8%.[98]

Figure: Broadband Internet Subscriptions for Every 100 People



Source: Peru's Supervisory Body for Private Investment in Telecom. (OSIPTEL)[99]

[98] *World Economic Forum*, "The Global Information Technology Report 2010-2011." 2011. p. 261 (Peru section)

[99] Thornberry Villarán, Guillermo, "Impacto Socieconómico de las TIC en las Américas," May 19 2011

Also, as of March 2011, the density of direct internet access in Peru was 4.39 users for every 100 people, indicating low rates of direct household and work-based access to the Internet. However, much progress has been made as this figure represents a 222.5% increase from the level of direct internet access in June 2006.[100]

Moreover, the Fund for Investment in Telecommunications (FITEL),[101] which finances telecommunications projects in rural and impoverished urban areas, will support the development of an additional 690 km of fiber optic Internet broadband network in mountainous and jungle areas.[102] The 2011 National Plan for the Development of Broadband lays out the synergies and strategies that can be created in order to continue moving Peru toward universal access.[103]

Besides ICT infrastructure development, Peru's Plan for the Development of the Information Society (also known as the *Agenda Digital Peruana, 2005*) developed by the Multisectoral Commission for the Development of the Information Society (CODESI), under the direction of the Presidency of the Council of Ministers, has also prioritized the development of human capital and the development and application of ICT in the service and manufacturing sectors. Peru has made E-Government the central pillar of the Peruvian Digital Agenda's strategy toward achieving these goals and SMEs have been actively involved in the process.

The National Office of Electronic Government and Informatics (ONGEI), the secretariat of CODESI, is the official organization which leads all E-Government initiatives. ONGEI is in

[100] *Government of Peru*, "Plan Nacional para el Desarrollo de la Banda Ancha en el Perú," March 2011, URL: https://www.mtc.gob.pe/portal/proyecto_banda_ancha/Plan%20Banda%20Ancha%20vf.pdf

[101] FITEL was created in 1993 and is operated by the Ministry of Transportation and Communication. FITEL PROINVERSION (Private Investment Promotion Agency) considers projects presented by entities and organizations such as local and regional governments, NGOs, telecommunications providers, among others, and selects the ones of highest impact. FITEL is financed by a levy on all telecom operators—1 % of gross operating revenues, as well as external and internal credits and third-party contributions. Various other countries have also adopted this financing model (*ICT Regulation Toolkit,* "Experience of the FITEL Payphone Program," June 2011, URL: http://www.ictregulationtoolkit.org/en/PracticeNote.3143.html

[102] *Government of Peru*, "Plan Nacional para el Desarrollo de la Banda Ancha en el Perú," March 2011, URL: https://www.mtc.gob.pe/portal/proyecto_banda_ancha/Plan%20Banda%20Ancha%20vf.pdf

[103] *Ministerio de Telecomunicaciones y Transportes,* "Plan Nacional para el Desarrollo de la Banda Ancha en el Peru," 2010, URL: https://www.mtc.gob.pe/portal/proyecto_banda_ancha/index.html

charge of, among other things, formulating E-Government strategies, developing key ICT projects, and providing training related to the use of E-Government.[104]

In 2006, ONGEI began the implementation of the National Strategy for Electronic Government (Estrategia Nacional de Gobierno Electrónico) in support of the Digital Agenda campaign and the State Modernization and Decentralization Program to develop a new public procurement policy.[105]

Description of Policy

The main purpose of the National Strategy for Electronic Government is to increase the transparency and administrative capacity of the Peruvian government in relation to E-Government procurement. As suggested by Maite Vizcarra, Senior Research Associate at Tecnalia Technology Corporation in Peru, the Peruvian government can help greatly to drive domestic ICT adoption and production by expanding its role as the main purchaser of ICT products and services in Peru. ONGEI deployed ICT tools to develop and implement the E-Government procurement system (SEACE), which intended, among other things, to create greater opportunities for the network of small firms and microenterprises located both in central and remote areas of Peru.

Since 2004, the Peruvian government has required that public organizations at all levels of government use SEACE. This platform centralizes in a single entry point all information concerning procurement opportunities, and it also includes a business opportunities link that enables registered providers to access information related to their business sectors.

SEACE was installed on a web platform, and therefore no on-site infrastructure (personal computers or client software) is needed to operate the system. Any contracting entity or provider is able to access the system through a commercial web browser over the Internet, even from public access booths if the user does not have his/her own personal Internet access.[106]

[104] *Journal of Technology Management and Innovation,* " ICT Policy and Perspectives of Human Development in Latin America: The Peruvian Experience," 2009, URL: http://www.scielo.cl/pdf/jotmi/v4n4/art14.pdf

[105] *Oficina Nacional de Gobierno Electrónico e Informática,* "Estrategia Nacional de Gobierno electronico," July 2006, URL: http://www.ongei.gob.pe/Bancos/banco_normas/archivos/Estrategia_Nacional_Gobierno_Electronico.pdf

[106] *The Inter-American Development Bank,* "State Modernization and Decentralization Program," September 2002, URL: http://idbdocs.iadb.org/wsdocs/getdocument.aspx?docnum=420537

An initiative whose primary mission involves promoting the use of ICT by SMEs is Mi Empresa, a program of the Ministry of Production. In 2007 the SME Promotion Center PROMPYME (Centro de Promoción de la Pequeña y Micro Empresa) was retired and its key responsibilities were transferred to Mi Empresa as part of a broader government reform program.[107]

The Mi Empresa government procurement website offers a wide variety of services and tools for SMEs, including all the procurement opportunities available in the SEACE database of government entities' Annual Purchase Plans (Plan Nacional de Adquisiciones) — to which PROMPYME had permanent access.[108] In addition, PROMPYME informed SMEs of demand mechanisms, goods and services supply, subcontracting programs, and centralized negotiation mechanisms. In order to continue this initiative, Mi Empresa also offers workshops to SMEs on the use of ICT.[109]

Current Status and Results

As a result of Mi Empresa's efforts to drive changes in Peru's legal framework in favor of SMEs, the 2003 law on The Promotion and Formalization of the Micro and Small Enterprise required all government entities to make at least 40% of total purchases from SMEs.[110] With the advent of SEACE in 2004, SMEs that have adopted ICT have realized a greater opportunity to sell goods and services to the government.

By 2007, the Mi Empresa website was registering 120,000 user visits per month. The number of micro and small size enterprises contracting with the government also increased from 64,000 in 2003 to 104,000 in 2007, and the participation of SMEs in government procurement increased by 44.49% [111]

[107] *MiEmpresaPropia,* "Ex Prompyme se Fusionó con Profece y Mi Empresa," November 2011, URL: http://www.miempresapropia.com/2011/ex-prompyme-se-fusiono-con-profece-y-mi-empresa/
[108] *SME Toolkit Peru,* "Centro de Promoción de la Pequeña y Micro Empresa," 2002 – 2011, URL: http://peru.smetoolkit.org/peru/es/content/es/2135/Convocatoria
[109] *USAID,* "Tics, Mipymes y Género en el Perú: Una Primera Aproximación," January 2007, URL: http://www.usaid.gov/our_work/cross-cutting_programs/wid/pubs/MYPES_Peru_full_document_01-07.pdf
[110] *Carlos Daniel Durand Chahud,* "Information and Communication Technology (ICT) for Development of Small and Medium-Sized Exporters in Latin America: Peru," December 2005, URL: http://www.eclac.org/publicaciones/xml/2/26932/SW-Peru-47.pdf
[111] *Oficina Regional para América y el Caribe,* "Crisis Internacional para las MYPES," October 2009, URL: http://redelaldia.org/IMG/pdf/b6cf4a4cf02118c44f57b7c3298088c3.pdf

Between January and August 2011, Peruvian SMEs received roughly US$1.8 billion in government contracts. At 50.2% of all contracts, this is the highest ever level of SME participation in Peruvian government procurement.[112]

Key Findings

Peruvian SMEs responded very positively to E-Procurement, seizing the opportunity to expand their businesses through the use of ICT. As a result, SMEs successfully obtained a relatively large share of government procurement through the specific online procurement programs launched by Mi Empresa.

7.1.2. ICT skills and entrepreneurial training

Background

Both the public and private sectors in Peru have recognized the high importance of enhancing the ICT capabilities of its people and businesses, particularly SMEs. On the government side, the Ministry of Production has determined that cooperation between industry sectors is critical to technological innovation. For this reason, the Ministry created the concept of a network of technological innovation centers called Red de CITEs (Centers for Technological Innovation) which enable the incorporation and testing of promising technologies in the production processes of firms, particularly SMEs. Enacted in the year 2000, the Technological Innovation Centers Act (Ley de Centros de Innovación Tecnológica), stipulates that: "CITEs facilitate equal access to technology and knowledge, supporting technological innovation for all businesses."[113] The Ministry of Production's Vice-Ministry of SMEs and Industry promotes and supervises the CITE network, which focuses primarily on the agriculture, wood and furniture, footwear, textiles, and software industries. The CITE Software initiative has been working on promoting ICT among SMEs, largely driven by the private sector.

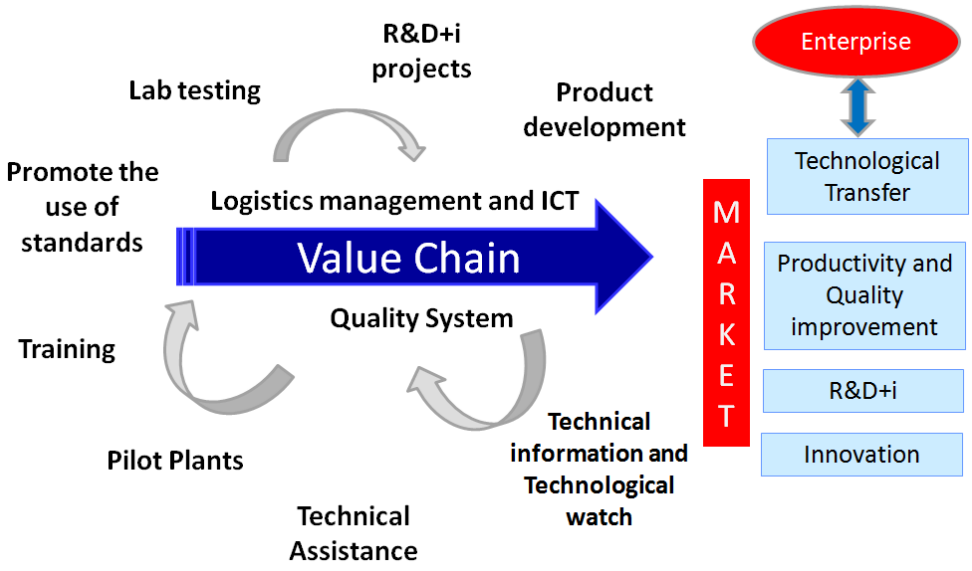
Outside government, the non-profit Internet Society (ISOC) is supporting ICT skills training in education through its ClickPE Initiative, which provides Internet skill training to school teachers in rural cities such as Cuzco so that they can pass this knowledge on to their students.[114]

[112] *Andina*, "Participación de Mypes en Compras Estatales se Sitúa en Nivel Récord de 50.2%," October 18, 2011
[113] "Ley Nº 28015 03/07/2003," URL: http://www.mintra.gob.pe/contenidos/archivos/prodlab/legislacion/LEY_28015.pdf
[114] Linares, Freddy, "ICT and Rural SMEs in Local and Global Markets," October 25, 2011

Description of Policy

The government's CITEs are best understood as instruments for the support of innovation and technology transfer. Operating in a national network, CITEs partner with companies and put them in contact with the public, academic and business sectors in order to facilitate technological innovation and greater efficiency, particularly amongst SMEs.

Figure 14: Role and Service of CITEs



Source: Ministry of Production

As seen above, the CITEs address technology transfer and innovation in a holistic manner. They focus on best practices tailored to SMEs' sectoral/regional situations. The CITEs offer the following services:[115]

- Training programs (tailored to improving the skills and know-how of technicians, professionals and entrepreneurs in accordance with their respective sector priorities)
- Technical assistance (developing plans for the improvement and incorporation of best practices for innovation in production and administrative systems)
- Standardization via laboratory services related to quality control of inputs and final products
- Product research and development (using innovative processes and new or better technologies)

[115] *Ministerio de la Producción,* "Instrumentos para Promover la Inovación," 2011, URL: http://www.ceplan.gob.pe/documents/10157/7e2c4e27-b1b7-4c63-9a97-7eb086450fe6

- Specialized information (via technical information centers—Centros de Documentación Técnica, and seminars about new production technologies)
- Production support (via pilot plants at each CITE to catalyze higher-quality production processes and products)

Peru has implemented a number of programs specifically targeting the development of the domestic ICT sector, including the Program to Support Competitiveness of the Software Industry (PACIS), the CREASoftware Peru Program, and CITE Software. While SME software producers are the main beneficiaries of these programs, the spillover effects of these initiatives on the usage of software by non-ICT SMEs can be significant.

Under accreditation by the Ministry of Production, the Peruvian Association of Software Manufacturers (APESOFT) - a non-profit group of the main software companies nationwide created in 2007 - runs the software-focused branch of the CITE network: CITE Software. CITE Software offers software services that help improve the competitiveness and productivity of software manufacturers. An important aspect about CITE Software is that it also provides support to promote the use of technology solutions and ICT tools to SMEs in other industry sectors, therefore contributing to the digitalization of the economy.

CITE Software finances itself through charging for services such as classes, talks and promotion forums. They also work with municipalities to reach SMEs. Their services include technological counseling for SMEs and Digital Literacy, which includes training for office automation, financial management software, and E-Commerce.

CITE Software has also raised awareness among SMEs about two major innovation competitive funds—FIDECOM (Research and Development Fund) and FINCyT (Science and Technology Program). [116] FIDECOM aims to co-finance up to 75% of the projects submitted by SMEs to develop technology-based applications to strengthen their production capacity and staff business management abilities. FIDECOM has 62 million dollars at its disposal to support through competitive and non-refundable grants the research and development of projects that promote innovation in a particular business's production processes.[117]

During the "International Seminar on SME Policies and Practices to Promote the Use of Information and Communication Technologies: Experiences in APEC Economies," the

[116]Humala Acuña, CEO/APESOFT (personal Communication), October 20, 2011; Carazo, Mercedes Inés, "Good Practices in TICs in Peru," October 26, 2011
[117]*Innóvate Perú, ¿Qué es FIDECOM?, URL:* http://www.innovateperu.pe/index.php/fidecom.html

director of the CITE Network pointed out that a number of projects with a clear focus on ICT for SMEs are being supported in Peru through FINCyT (Science and Technology Program), another major competitive innovation fund.[118]

FINCyT, created under a loan agreement with the Inter-American Development Bank in 2006, has US$36 million for innovation promotion projects and Peru is negotiating a phase II of US$100 million. As part of the last round of projects submitted for FINCyT funding, 25 ICT-oriented projects have been approved. The following are some of the ICT-based projects to be implemented:

- Developing an inexpensive long-range router to deploy wireless broadband networks in rural areas. Two successful pilot installations in the cities of Ica and Cusco have been completed. The router can reach distances up to 50 km and has had a speed performance of up to 18 Mbps.
- Design of low cost software for automation, traceability and process control for SMEs: A laboratory for ICT applications was established in northern Peru.
- Development and validation of an innovative ICT service for marketing agricultural products: through this service, farmers and business owners can obtain information from the service provider via phone and voicemail and in Spanish or Quechua about agricultural or technical issues (e.g. crop prices) relevant to the main agricultural markets in Lima, Cusco and Apurimac.
- Design and development of environmental monitoring and management software for mining SMEs: Almost 60% of Peru's exports belong to the mining sector. This initiative seeks to provide a software solution (Eco2biz) that facilitates the environmental monitoring, waste management and regulatory compliance activities of SMEs in the mining industry.[119]

Current Status and Results

According to the Director of the CITEs Network, there are currently 16 CITEs in 9 Peruvian departments. Services provided by the CITEs grew by 10% in 2009 compared with 2008. In 2010, the CITE Network served 3,823 companies and trained 6,872 people.[120]

[118]National Council on Competitiveness, "Fondos para la Competitividad," URL: http://www.perucompite.gob.pe/index2.php?option=com_docman&task=doc_view&gid=83&Itemid=6
[119]Carazo, Mercedes Inés, "Good Practices in TICs in Peru," October 26, 2011.
[120]*United Nations Conference on Trade and Development, " Science, Technology and Innovation Policy Review* ," http://www.unctad.org/en/docs/dtlstict20102_en.pdf

According to APESOFT, in 2010 CITE Software assisted 113 companies, including many SMEs. At the end of the Q1 alone, CITE Software had reached more than 50 businesses through ICT courses on financial management, software workshops, and a workshop raising awareness about FIDECOM.[121]

Key Findings

The CITE Network, particularly CITE Software, is a targeted and growing effort to promote the adoption of ICT to facilitate the production processes of SMEs in Peru.

Case Study

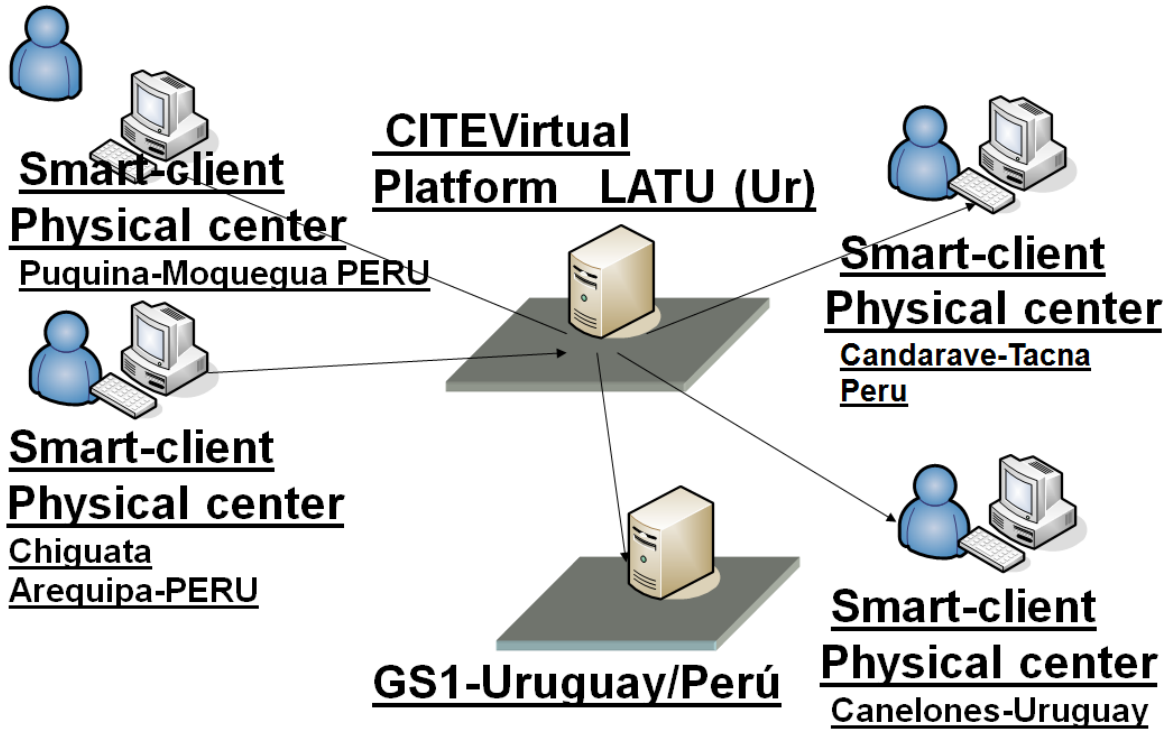
In 2008, the Technology Laboratory of Uruguay and the Ministry of Production's CITE Network partnered to improve the competitiveness and productivity of rural herb producers in Peru and Uruguay by integrating them into a virtual community.

Financed by the IDB/Multilateral Investment Fund (FOMIN)'s ICT Innovation for E-Commerce and SME Development Program (ICT4BUS),[122] CITE Virtual assisted SME rural aromatic herb manufacturers in remote mountainous areas of Peru and Uruguay with incorporating ICT in their operations.

CITE Virtual worked with associations of the herb producers in these regions to provide these SMEs with computers and basic training on ICT, as well as ICT solutions to improve their production, planning and management, marketing, and traceability processes.[123] For instance, through an intranet platform, these businesses gained access to technical and logistical assistance and valuable information about relevant events, suppliers, regulations and market opportunities (for example through forums, news releases, and databases of logistics providers, customs agents, and carriers). Virtual tools were provided to help SMEs monitor international markets for herbs in order to craft appropriate responses to global commerce trends. Through their Internet portal, these SMEs were also able to advertise their products broadly.

[121]Humala Acuña, CEO/APESOFT (personal Communication), October 20, 2011
[122]CITE Virtual was one of the pilot projects that benefited from the US$2.7 donation by IDB/FOMIN (announced in 2006) to support the adoption and use of ICT technology by SMEs in Latin America through the "ICT Innovation for E-Commerce and SME Development Program" (ICT4BUS). 150 proposals were presented by more than 200 organizations and 20 countries.
[123]Inter-American Development Bank, "Fondo del BID Aprueba Donaciones por US$2,7 Millones del Programa ICT4BUS para Proyectos Piloto en América Latina," June 2011, URL: http://www.iadb.org/es/noticias/comunicados-de-prensa/2007-06-11/fondo-del-bid-aprueba-donaciones-por-us27-millones-del-programa-ict4bus-para-proyectos-piloto-en-América-latina,3892.html

Figure 15: CITE Virtual - Architecture



Source: CITE Virtual[124]

CITE Virtual reached 9 associations, 261 producers from Canelones (Uruguay) and Tacna, Arequipa and Moquegua (Peru), and 29 SME producers of aromatic herbs. The utilization of E-Learning, E-Commerce and E-Government tools allowed these rural SME manufacturers to, among other things, consolidate their presence in the Swiss market with 2 tons of exports per month. It was expected that by 2011, their revenues would increase by 50%. [125]

According to the Director of the CITE Network, through targeted training of firms and consultants associated with the CITE Virtual project, this model could be expanded into other industry sectors such as natural fibers and textile products.[126]

[124]Carazo, Mercedes Inés, "Good Practices in TICs in Peru," October 26, 2011
[125]*Ministerio de la Produccion,* "La Incorporación de TICs en Zonas Altoandinas para el Desarrollo Productivo." 2010, URL: http://plataforma.inictel.net/uploads/materials/tic-para-desarrollo-productivo4bb2343ad6244.pdf
[126]Carazo, Mercedes Inés, "Good Practices in TICs in Peru," October 26, 2011

7.1.4. Telecentros Rurales

Background

Compared to the other Latin American economies, a large percentage of Peru's population depends on public Internet access points or *cabinas públicas*—public Internet cafes that emerged in the mid-1990s in urban areas as a private sector initiative.[127] Peru has about 35,000 *cabinas públicas* for its population of 29 million, and about 70% of all Internet users utilize the Internet at these access points.[128]

While many urban dwellers have benefitted from *cabinas públicas,* there has been no incentive for the private sector to set up these access points in rural and impoverished urban areas, as these areas do not produce enough income to support the profitable operation of *cabinas públicas*.

Recognizing the importance of Internet access as an important step toward digital literacy and promoting the use of ICT for more advanced purposes, such as running a business, the National University of Engineering National Institute of Research and Training in Telecommunications (INICTEL-UNI), in partnership with district municipalities, has been promoting rural telecenter projects since 2005. A telecenter is a government-sponsored public space that promotes the use of ICT, such as computers and telephony.

Description of Policy

The main goals of the telecenter network are to "promote social inclusion, reduction of the digital divide, ICT skill capacity building, learning in a new environment (virtual), and strengthening of small producers and/or supply chains."[129] The services offered by rural telecenters include ICT training, information search, communications, and talks and workshops.

In 2005, INICTEL-UNI created "Rural Incuba" to promote the creation of productive enterprises and technological application of ICT. This program leverages rural telecenters

[127] *Cabinas públicas*, aka *cybercafés*, allow people to access the Internet without having computers or Internet connections at home, work or study places. The first *cabina* was installed by the Peruvian Scientific Network (RCP) in May 1995.

[128] *Centro Peruano de Estudios Sociales (CEPES)*, "The Huaral Valley Agrarian Information System, Peru," 2008, URL: http://www.apc.org/en/system/files/APCProPoorKit_CommunityModule_CaseStudy_HuaralValley_EN.pdf

[129] Palma, Modesto, "A Better Life in Rural Communities Through the Use of ICTs," Oct. 25, 2011

to strengthen the business development abilities of entrepreneurs using the Internet as a business tool.

The purpose of Rural Incuba is to encourage the establishment and formalization of MSEs (Micro and Small Enterprises), through technological business models using technology and the Internet, with the support of governments and local organizations.

Incuba Rural's main services include

- Awareness talks on entrepreneurship, business incubation and life plans
- Advising and consulting on business plans, legal, tax and committed ICT entrepreneurs
- Temporary websites for entrepreneurs and their products or services
- Training workshops in business management and ICT entrepreneurship

Current Status and Results

Telecenters have empowered rural communities not only to access information available on the Internet but also to create online content. Over 36 web pages and an Internet radio station (Onda Rural) have been created through the telecenter network.

To date there are 36 telecenters in 9 regions. 11,544 rural dwellers have been trained in the use of ICT, and 1,050 people have received training in productive activities using ICT. The telecenters have also trained 64 people as network administrators and field assistants, and 58 have learned how to use platform projects. In addition, the Rural Incuba program created 11 companies in 2010.

Key Findings

In addition to SMEs in general, women have been empowered through the telecenter network. A sizable 41.2% of rural telecenter users are women.

Many public and private institutions understand the fundamental importance of the *cabinas públicas* and telecenters as providers of ICT connectivity and are implementing programs to use them as a bridge between citizens and the government or institutions. Various networks of these Internet access points are promoting E-Government activities, payment of taxes and fines, and facilitating the use of Internet by SMEs.[130]

According to representatives of INICTEL-UNI, while the current number of telecenters has

[130] *ICT Regulation Toolkit,* " FITEL's Telecentre Experience in Peru," June 2011, URL: http://www.ictregulationtoolkit.org/en/PracticeNote.3148.html

had positive results on ICT literacy in rural areas, a network of about 2,000 telecenters would be needed to make a truly transformational difference.[131] Nevertheless, the projects implemented to date provide valuable experience from which public policy can draw to promote the use of ICT in rural areas.

Case Study

The livelihoods of most of the population of Hural Valley on the coast of Peru depend on agriculture, which is largely reliant on irrigation. The Chancay-Huaral River Basin Irrigation Board (CHRBIB), a local community-based organization of farmers, is responsible for maintaining irrigation infrastructure, in part by coordinating among district irrigation commissions that draw water from one of the main channels extending from the river. CHRBIB charges farmers (about 6,000 registered "irrigation users") for the maintenance and use of irrigation infrastructure.

Financed by GTZ[132] and Peruvian public entities, including the Department of Agriculture and FITEL, HRBIB partnered with the Peruvian Center for Social Studies (CEPES) in 2000 to provide improved water management to farming communities in Hural Valley through an Agrarian Information System (SIA). This project consisted of installing telecenters in all 17 irrigation commissions throughout the Hural Valley. Computers were equipped with Linux operating systems and a web content management system.

In addition, SIA uses wireless technology to connect several points in the valley. It also incorporated locally developed software to provide locally relevant information on irrigation management and cultivation monitoring. Broader objectives include the adoption of ICT by farmers and the rest of the population in the valley, improving administration within the irrigation board, and allowing farmers to access useful and appropriate information.[133] The selling of telecommunication services would partially help finance the system.

Throughout the installation process, CEPES provided computer training to 280 farmers. During the final installation stages in 2004, the content platform was completed and by year-end, the irrigation commission and the irrigation board's central offices were

[131] INICTEL-UNI representatives' presentations and comments, Oct. 25-26, 2011.
[132] GTZ or Deutsche Gesellschaft für Technische Zusammenarbeit is a private international enterprise owned by the German Federal Government, specializing in, but not limited to, technical cooperation for sustainable development.
[133] Farmers are mainly interested in information on water scheduling in order to plan their farming activities; planned sowing cycles in the Huaral Valley and elsewhere to determine crop selection for sowing; market information to determine future selling prices; and technical information such as equipment specifications. Some also use web searching to identify business opportunities and new products.

networked and connected to the Internet. The system has been operating since 2005 and is maintained by the irrigation board, with professional support from CEPES.

As a result of the Hural Valley SIA and telecenters, HRBIB has doubled water storage and the region is recognized as having the most accurate information regarding its farming practices and water distribution; and farmers are empowered by the use of ICT tools for decision making.[134]

7.2 Survey Results and Analysis

Peruvian SMEs indicated they have benefited from government ICT training programs, but expressed concern that there has not been a grant or subsidy system to assist them in the adoption of ICT. Correspondingly, limited access to credit was identified by Peruvian government officials as a key obstacle to SME adoption of ICT. Peru remains focused on expanding broadband coverage, an initial stage of the ICT adoption process.

The majority of Internet users in Peru access the Internet through public Internet access points – also known as cabinas públicas. However, most cabinas públicas do not provide ICT training, and the surveyed SMEs pointed out lack of ICT education programs as a large obstacle to their ability to use ICT.

SMEs also indicated a surge of participation in E-Commerce, which may be driven by the rapid growth of the SEACE E-Government procurement system.

[134] Centro Peruano de Estudios Sociales (CEPES), “The Huaral Valley Agrarian Information System, Peru,” 2008, URL: http://www.apc.org/en/system/files/APCProPoorKit_CommunityModule_CaseStudy_HuaralValley_EN.pdf

Table 10: Peru survey responses

Summary of responses to surveys of SME use of ICT in Peru	
Overview	Out of this group Peru arguably faces the biggest challenges in terms of ICT infrastructure and knowledge, and SME use of ICT reflected these constraints.
Company background	The SME respondents represented a few industries, with the majority in manufacturing. The majority of SMEs had 50 or fewer employees.
Significance of gender, ethnicity, and location	No SMEs were rural, and few were woman- or minority-owned, so the impact of ethnicity, gender and location on answers is difficult to judge.
ICT usage	The majority of SMEs reported that 40% or less of their staff use ICT on a daily, basis, although surprisingly 40% of these companies reported having dedicated ICT staff. Since these are mostly manufacturing companies, it may be that most employees are production staff, and do not need to use ICT for their tasks. Most common SME uses of the Internet included sending email, getting information about goods and services, conducting research.
Role of ICT	SMEs cited growing existing business, increased visibility in the marketplace and improving customer relations as the major benefits realized from ICT. Percentages of respondents citing each benefit can be seen in Figure 11 below.
Obstacles to purchasing and using ICT	The key obstacle noted was lack of ICT education programs, followed by inadequate legal framework for E-Commerce, security and privacy concerns, and lack of useful online services. Percentages of respondents citing each obstacle can be seen in Figure 12 below.
Effectiveness of government ICT Promotion Policies	SMEs found the effectiveness of government promotion of ICT use for SMEs to be moderate or low. SMEs cited improved confidence in the security of online transactions as the key contribution of government policy. Main benefits of government policies can be seen in Figure 13 below.
Assessment of interaction with ICT industry and government	In general, SMEs found policy meetings and direct interaction with government officials to the most productive interactive activities, useful especially for improving understanding of ICT.

Figure 16: Benefits of ICT use to SMEs in Peru

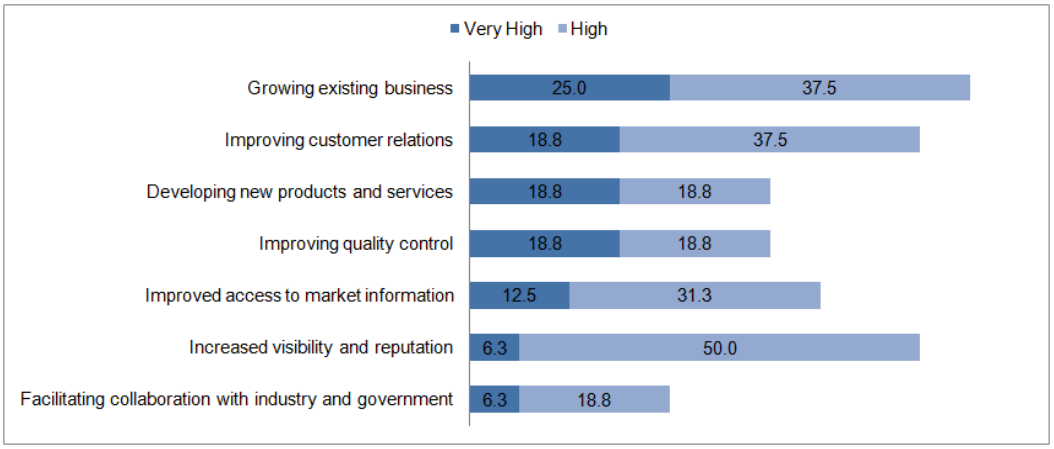


Figure 17: Obstacles to ICT adoption for SMEs in Peru

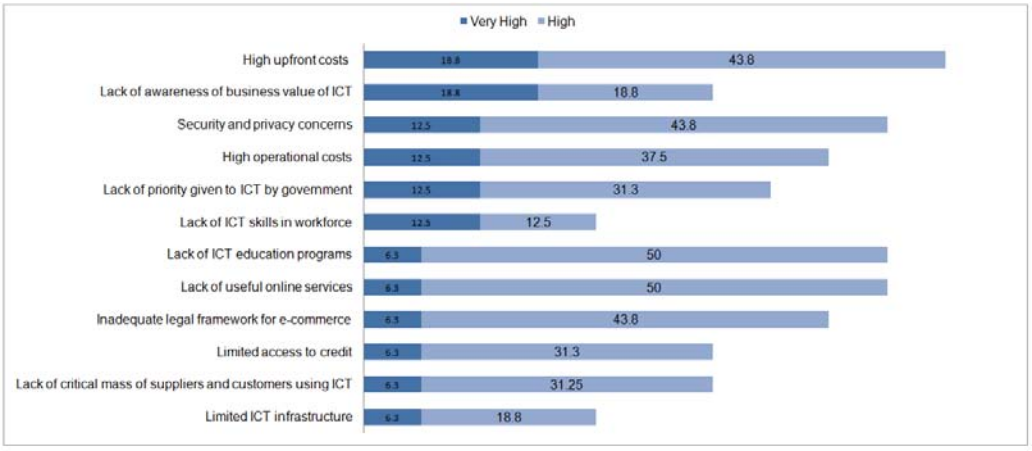
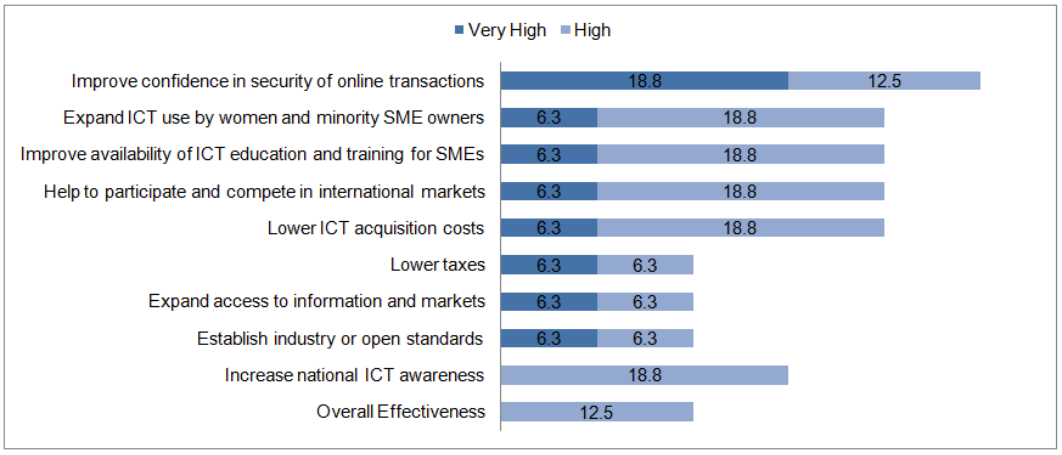


Figure 18: Effects of government policies to promote ICT for SMEs



8. Conclusion

The APEC economies of the United States, Korea, Chile, Mexico, Peru and Indonesia represent a diverse set of economic, educational, and geographic conditions, but are united in their focus on the importance of enabling SME growth through ICT adoption. The particular challenges and solutions surrounding this objective vary by each economy's circumstances, indicating that there is more than one way to achieve success. At the same time there are common themes for all economies, regardless of development status. The variety of economies covered in this study should provide relevant SME ICT promotion models to most other APEC economies.

8.1. Common challenges

As seen throughout this report, there are a number of common obstacles to SME adoption of ICT across the six economies, regardless of their varying levels of economic and ICT industry development. Concerns over the high costs of ICT acquisition were universal, and lack of ICT skills was cited as a top issue in all economies but the U.S.

8.1.1. Developed economies

Where ICT-based business models are well established, mainly in the U.S. and Korea, challenges shift from understanding how to apply ICT for communication and transactions to establishing standards to make such interactions uniform across markets and securing the data transmitted within.

Chile's rapid economic development since the early1990s has left it somewhere between the developed ICT leaders and the earlier stage developing economies, and thus it faces challenges on both ends of the spectrum. On the one hand, access to ICT education and training continues to be a concern, but on the other hand more advanced SMEs are already seeking a more thorough legal framework to support e-commerce.

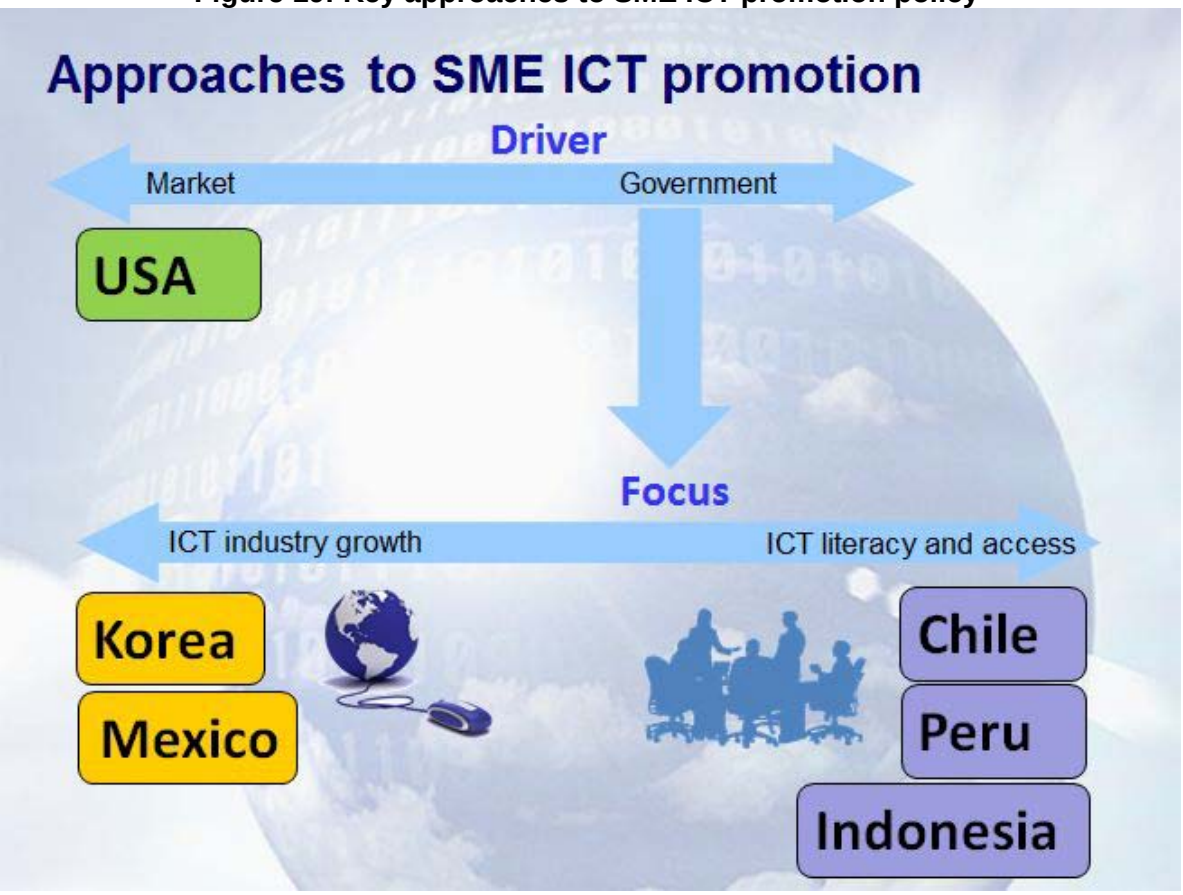
8.1.2. Developing economies

Urban Peruvian SMEs share the concern over the need for a stronger legal framework for e-commerce, their concerns exacerbated by a traditional distrust of public institutions, which they do not perceive as reliable guardians of the Internet. Nevertheless, along with Mexico and Indonesia the lack of ICT skills tops Peru's list of challenges. This problem is even more fundamental in Indonesia, where even basic awareness of the business value of ICT is limited.

Both Peru and Indonesia in particular also continue to struggle with limited broadband internet infrastructure that leaves large segments of the population, especially in rural areas, dependent on scarce public internet access points. Ongoing efforts to expand these

public access networks are an important first step that provides greater access to information, but until direct access is available in these areas e-commerce growth will likely be slow.

Figure 19: Key approaches to SME ICT promotion policy



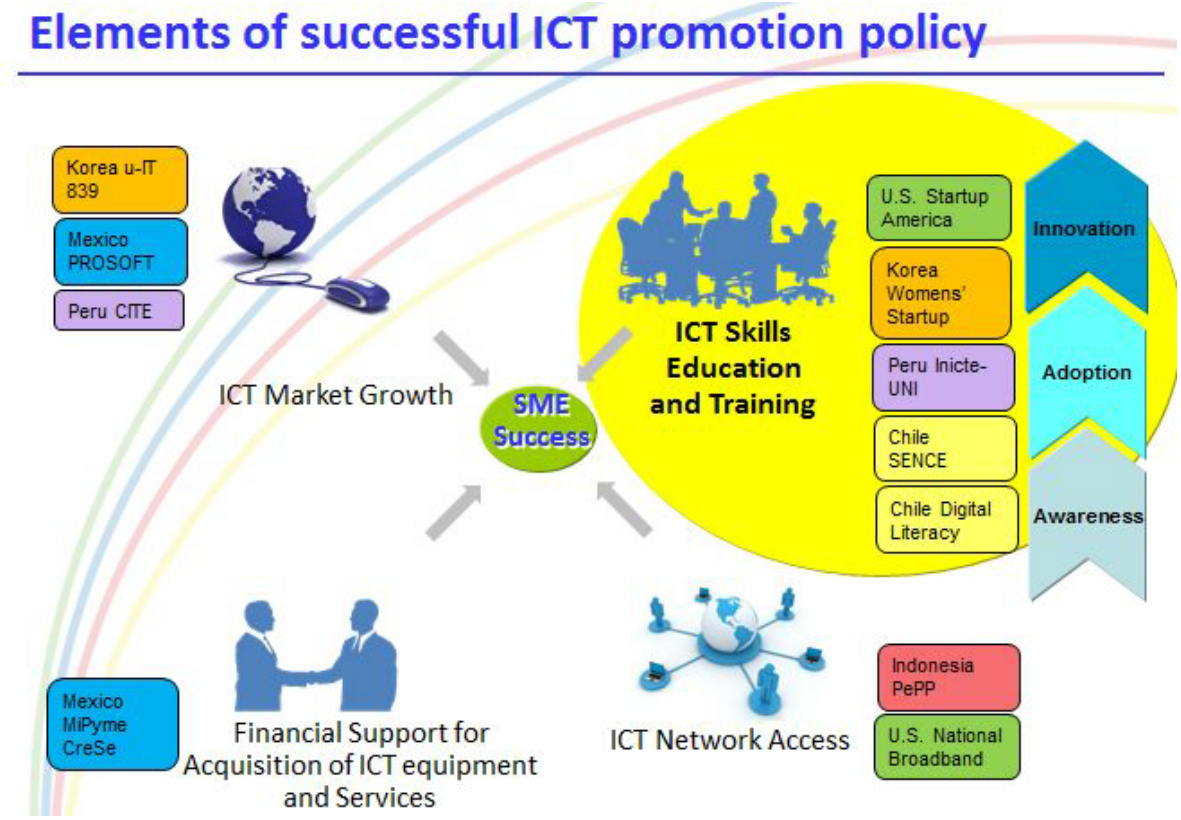
8.2. Solutions

As seen in Figure 15 above, government policy has a critical role to play in the promotion of ICT for SMEs in economies at all stages of economic development, whether the focus is more on growing the domestic ICT industry, as in Korea and Mexico, or increasing the population's ICT literacy and access to network infrastructure, as in Chile, Peru, and Indonesia. Even in the U.S., where SME adoption of ICT has been driven more by the rapid growth of the domestic ICT industry than by targeted government programs, SMEs look to government for regulations and guidelines to secure online transactions and establish a legal framework for the use of customer data.

Government responses to these challenges described in Section 8.1 have formed around the 3 key objectives of providing ICT education and related business skills training,

expanding Internet network access, and nurturing domestic ICT industry development. The core theme running through all 3 approaches is development of human capital.

Figure 20: Priorities of key programs supporting SME ICT adoption



As seen in Figure 16, regardless of which of the above three solution areas the economies are most focused on, nearly all of them have high profile programs dedicated to developing ICT skills. Ultimately, in tomorrow's knowledge-dominated economy it will be the economies with the strongest ICT aptitude that will succeed. Growing these skills is an evolving and neverending process. Once fundamental Internet and software skills are mastered, SMEs will need to develop entrepreneurial skills to use the technology to not merely make their businesses more efficient but transform them to deliver the innovative products and services that will lead tomorrow's markets.

8.2.1. ICT network access

Efforts to improve access to internet are the fundamental first step toward developing ICT skills and beyond that ICT industry and the quality of that network needs to keep up with advances in Internet services and corresponding traffic increases. For Peru and Indonesia, faced with geographic obstacles such as mountains and islands, providing

direct internet access to all citizens in rural areas presents a costly and time-consuming but necessary challenge. In the meantime, Indonesia's focus on providing greater information and services via mobile devices may be one effective way of bridging the wired network gap. Even the U.S. cannot be complacent, for despite its wide network coverage, the actual broadband network performance lags well behind economies like Korea and Japan.

Policy priorities

- Broadband wired network infrastructure should be built out to rural population clusters. Areas with lower population between clusters can be served with wireless broadband.

8.2.2. Skills development

In the case of the U.S., as basic challenges of fundamental ICT skills and, with the exception of highly rural areas, network access are generally non-issues, the policy focus is on providing SMEs with the entrepreneurial skills they need to grow existing businesses or create new ones by leveraging ICT. These efforts are bolstered in the U.S. by, compared to the other economies, the relatively easy access to venture capital to launch promising ICT start-up firms.

The example of Korea shows that simply providing SMEs with strong ICT tools, in its case world-leading broadband and mobile infrastructure and services, does not guarantee SMEs will use these tools to optimal effect. Korean SMEs' continued lag behind the U.S. in adoption of e-commerce indicates a need for concerted government or public-private efforts to build ICT entrepreneurial skills and a strong underlying legal framework.

While the U.S. and Korea both have very large domestic ICT industries, this is not a prerequisite to SMEs successfully adopting ICT, as seen in the case of Chile. Despite the relatively small size of the domestic ICT industry, the ICT sophistication of Chilean SMEs appears to be close behind that of the U.S. and Korea. In lieu of strong ICT industry demand, government e-procurement policies strongly favoring SMEs have driven SMEs to adopt ICT.

Policy priorities:

- Entrepreneurial skills training should be provided to teach SMEs how to grow by leveraging ICT.
- Targeted ICT training programs should be provided to women-owned, rural-based, and other SME segments underrepresented in online business.

- A nationwide network of training centers including government and academic institutions and certified private providers should be established to maximize accessibility to SMEs.
- Tax incentives should be provided to enable SMEs to provide ICT training to their employees.

8.2.3. ICT industry promotion

Once the domestic ICT industry has grown as large as those in the U.S. and Korea, targeted policies at expanding ICT use by SMEs become less necessary. In their place, the ICT industry will move aggressively to disseminate information about ICT products and services amongst all businesses, and establish ICT-enabled means of doing business such as e-commerce platforms that will drive SMEs to adopt whatever technology is needed to communicate and transact with customers.

For its part, Mexico is trying to replicate the ICT industry success of the developed economies through aggressive promotion of its software industry, which it hopes will similarly become a powerful engine to drive ICT adoption across other industries. Although it started from a very low baseline, the rapid growth of Mexico's software industry, supported by the PROSOFT program, and the relatively high level of SME ICT usage suggest Mexico is on the right track.

Policy priorities:

- Government should work closely with industry and academia to ensure that academic programs are producing employees with the skills ICT firms require.
- Provide training and/or financial support to both SME ICT producers and SME ICT users to help grow both supply and demand for domestic ICT products and services. As part of this effort government can work with the domestic ICT industry to provide discounted products/services to SMEs.
- Foster use of ICT in government support programs to SMEs. For example, if a program aims to increase access to financial services, the use of electronic and mobile banking should be promoted where possible.

9. Appendix

9.1. On-site SME survey at the APEC International Seminar

During the "International Seminar on SME Policies and Practices to Promote the Use of Information and Communication Technologies: Experiences in APEC Economies," held in Lima, Peru from October 25th-26th 2011, twenty Peruvian SMEs responded to a survey attempting to identify ICT benefits, challenges and general business needs.[135]

In terms of general obstacles to growing their businesses, these SMEs identified the lack of a qualified labor force and the high costs of labor and capital as the most critical obstacles, issues which fall in line with obstacles to ICT adoption cited by respondents.

The following are some of the business benefits of ICT identified by SMEs participating in the Seminar:

- Increase sales and marketing opportunities for products and services.
- Obtain information on new technologies and business trends in a particular industry.
- Ascertain credibility of SME by establishing its presence on the internet, particularly through company websites, social media and e-commerce platforms.
- Permanent contact with SME employees, clientele, and supplier network.
- Efficient handling of transactions and an increasing number of orders thanks to e-commerce.
- Quality control of all SME processes.
- Improved communication with government organizations in charge of implementing relevant regulations and programs.
- Greater participation in government procurement opportunities.
- Flexible work schedules and locations for some key employees thanks to cloud computing.

These benefits result in greater productivity and competiveness for SMEs. One business owner reported that since his SME, a chemical product company of 15 employees, started using the internet 8 years ago it has grown 6 fold. The internet also enabled this SME to find new suppliers and clients worldwide and acquire technical information useful for R&D purposes.

The following are some of the ICT-specific challenges listed by surveyed SMEs:

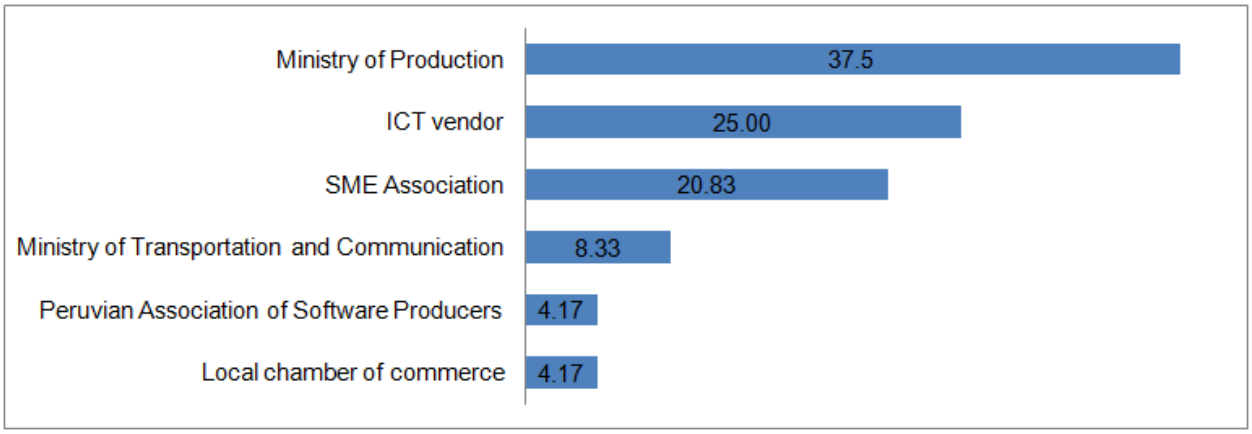
- Differing software versions make interoperability difficult.
- Obsolete ICT equipment.

[135] While the average size of the 20 SME respondents was 12.5 employees, 55% of them had 10 employees or less.

- Standardize business software does not always serve the needs of SMEs and less sophisticated users.
- Limited knowledge of domestic software developers.
- High software costs inhibit its use by SMEs for business management purposes.

Many SMEs seemed to be unaware of the different ICT-related initiatives implemented by the Peruvian government to assist ICT adoption, which have been effective in expanding ICT literacy in rural and poor urban areas. The fact that the respondents were concentrated in the Lima area probably accounts for this disconnect. Correspondingly, only 28% of respondents indicated they had benefitted from government-sponsored training sessions to develop ICT skills, and 35% said that they have not yet received any ICT-related assistance from the government.

Figure 21: Organizations Peruvian SMEs value for ICT advice



Nevertheless, in terms of where SMEs get information about ICT, as seen in Figure 14, most SMEs (37.5%) indicated that the organization they would choose to reach out to for ICT advice is the Ministry of Production, because of its unique ability to promote the use of ICT by SMEs via public policy and program efforts focusing on ICT awareness and training. 25% of SMEs said they would turn to ICT vendors because of their diagnosis capabilities and specialized solutions for the ICT needs of SMEs, and 20% said they would reach out to SME associations because of their proximity and knowledge of what SME entrepreneurs need.

Overall the responses seemed to indicate the need for a unified government policy framework to promote the use of ICT by SMEs in a focused manner. Still, Peruvian SMEs, in contrast to U.S. SMEs, do trust in the ability of the government to support their adoption of ICT, and the Ministry of Production, through the CITE network, Mi Empresa, and other

innovative programs, can make a substantial difference in improving SME ICT usage for economic growth.

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