

I. Introduction

1. Background
2. Objectives
3. Research Framework
4. Research Methods

1. Background

In APEC member economies, small and medium enterprises (SMEs), especially micro enterprises,¹⁾ play a vital role in enhancing the stability and competitiveness of an economy.

According to a report published by the APEC SME Working Group,²⁾ SMEs make up over 98 percent of all enterprises, accounting for around 60 percent of the private sector employment in the APEC economy. Moreover, they generate about 30 percent of direct exports and 50 percent of sales and added value. APEC and its member economies are well aware of the potential of SMEs and thus make great efforts to support SMEs and increase their competitiveness.

In general, SMEs face a number of different kinds of barriers, including the lack of information, limited financial and technical resources, and absence of the well-trained work force. Information and Communication Technology (ICT) can be an effective tool for SMEs to overcome such limits. SMEs have also gradually recognized the positive impact of ICT on their business. Both at the firm and inter-firm levels, ICTs can offer benefits for a wide range of SME business processes.³⁾ A number of business solutions can improve management within a firm, leading to more efficient business processes and performance. At the inter-firm level, use of the Internet and e-commerce can help to reduce transaction costs and increase transaction speed and reliability while deriving maximum value from the SME value chains. In this regard, the informatization of SMEs (for example, e-business and ICT use)⁴⁾ will not only strengthen corporate competitiveness, but also contribute to the stable growth of each APEC economy.

At the APEC level, some discussions have been made regarding how to promote APEC SMEs to use ICT. At the APEC SME Seventh Ministerial Meeting in Bandar Seri Begawan on June 22-23, 2000, ministers discussed how to enable APEC SMEs to access ICT easily and to utilize electronic commerce. This issue was one of the four main agendas of the meeting where there was a broad consensus that governments could and should assist SMEs in overcoming the problem of high initial costs of investment in ICT by creating a favorable environment for e-commerce. Moreover, ministers stressed the needs for collaboration with relevant APEC fora including the APEC Electronic Commerce Steering Group and the Telecommunication Working Group.⁵⁾ At the 2001 SME Ministerial Meeting in Shanghai, ministers shared their ideas on the governments' efforts to facilitate the development of science and technology, particularly information and communication technologies, to enhance SME growth and development. At the 2002 SME Ministerial Meeting in Acapulco, the ministers emphasized that member economies needed to continuously develop the policies that are closely relevant to the informatization of micro-enterprises, financing and human resources development in order to achieve the balanced economic development and enhance the social security net.

1) This study, SMEs are taken as companies with fewer than 50 employees, thus this term can be used as a substitute for used by MES. However, each APEC economy has different definitions on SME and micro enterprises. This study considers every category of SMEs found in APEC economy regardless of the different definitions used by each economy

2) Hall, C. 2002. "Profiles of SMEs and SME Issues in APEC 1990-2000", APEC SME Working Group, pp. 1.

3) OECD. 2002. "Promoting ICT Use and E-Business Adoption by SMEs", DSTI/IND/PME 7/REV3, pp. 8.

4) SME informatization can be defined as an SME's adoption and use of ICT for business processes and practices. This definition encompasses computerization, e-commerce, and e-business. A detailed explanation of this will follow in the subsequent sections.

5) Telecommunications Working Group (TEL) initiated a survey and study on electronic commerce adoption, uptake and use by SMEs in all 21 APEC member economies. The final report "SME Electronic Commerce Study", was released in September 24, 1999. The TEL Working Group also initiated another study on technical issues of electronic commerce, "APEC e-Business: What Do Users Need?" which was carried out by CSIRO (2001).

Despite these combined efforts and the ICT projects⁶⁾ underway in some APEC economies, there has not been much progress in improving SMEs' utilization of ICT. The discussions on promoting ICT use by APEC SMEs have been concerned with technical issues such as the coordination of standards and regulatory and security measures for e-commerce. There has been relatively little comparative discussion on the current status and influential entities for SME informatization in each member economy. Against this backdrop, Korea proposed the "APEC SME Informatization Project (Enabling e-MES Environment - Through Survey and E-Community-Based Capacity Building)" in 2003 to help develop an e-APEC strategy for SMEs, which can contribute to the diffusion of ICT among SMEs in the APEC region. This study is the first phase of our APEC SME Informatization Project, which will proceed through three sub-projects.⁷⁾

2. Objectives

This study aims at contributing to promoting the informatization of APEC SMEs by sharing good practices and policies among member economies. Supporting mechanisms and implementation issues regarding SME informatization will also be discussed. SME informatization issues may vary among APEC member economies due to the different levels of economic development and various business environments. On top of looking into such issues, this study will suggest various alternatives for APEC member economies to enhance their SME informatization and provide the direction for related entities including SMEs, governments and supporting organizations.

The more specific issues of this study can be listed as follows:

- To analyze issues and entities responsible for the success of SME informatization
- To identify good supporting policies on SME informatization in APEC member economies by examining not only the government agencies in charge of SME informatization, but also other important public and private institutions involved
- To assess the levels of SME informatization and identify the impediments to informatization by conducting empirical case studies and surveys.

The study results will provide the ground for the policy forum for SME informatization and the subsequent training program of the APEC SME Informatization Project.

6) The previous projects launched by the APEC SME Working Group included the following: An e-commerce symposium on SMEs (2001), an electronic commerce impact study for SMEs (2000), Wa workshop on electronic commerce (2000), an APEC SME network (1999), and an APEC human resource management symposium (1999).

7) The APEC SME Informatization Project has three sub-projects: (1) conducting a survey on SME informatization (July-December 2003); (2) holding a policy forum (a two-day forum planned in 2004); and (3) organizing a training program for relevant government officials, dedicated managers and leaders from business associations and NGOs (two-week program planned in 2004).

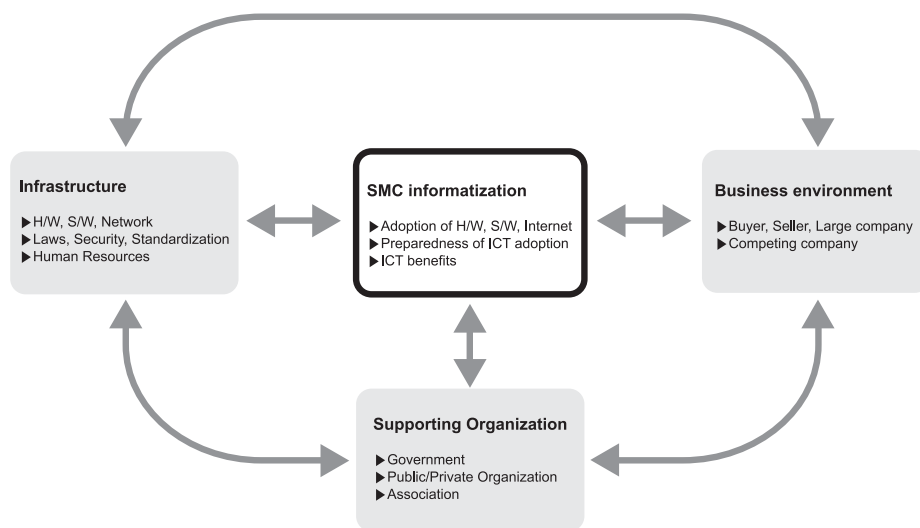
8) For designing this framework, the following articles were used: Lyytinen, K. and J. King (2002); Benbasat, C.I. and A.S. Dexter (1998); Cragg P.B. and M. King (1993); Grover, V. and M.D. Goslar (1993); Iacovou, C.L., Benbasat, I. and A.S. Dexter (1995); Kaplan, R.S. and D.P. Norton (1996); Loh, L. and N. Venkatraman (1992); Lyytinen, K. and J. King (2002).

3. Research Framework

A research framework was developed regarding external entities that are important for SME informatization (Figure 1-1).⁸⁾ Three external entities are recognized in the model: infrastructure, the business environment, and ICT supporting organizations.

Each entity is explained in detail below.

<Figure 1-1> Research Framework



ICT Infrastructure

While it is quite difficult to provide a single definition of the national ICT infrastructure, it is widely accepted that the national ICT infrastructure includes the computer and network infrastructure, trust infrastructure and ICT industry/market. In terms of SME informatization, the level of *the computer and network infrastructure* indicates whether SMEs can use computers and access the Internet at affordable prices. Affordable PC prices and broadband connectivity are key components for ICT adoption and use by SMEs. Many SMEs in member economies cannot implement advanced computer systems or services due to inferior Internet infrastructure and poor logistics. *Trust infrastructure*, such as security, privacy, and consumer protection, is another important component for SME informatization for it provides a stable, secure and transparent environment for SMEs to use ICT.

The ICT industry/market affects the availability and development of software, hardware, and networks in the ICT market. The liquidity, quality, and size of the ICT market are strongly related to the levels of SME informatization. Governments support the development of the ICT market in many different ways (such as offering subsidies and conducting projects) because well-developed ICT industries/markets, along with the development of a national ICT infrastructure, are prerequisites for the effective use and adoption of ICT by firms, especially SMEs.

Business Environment

The business environment that influences SME informatization can be understood through the SME value chain. The SME value chain is composed of vendors, buyers, large firms and mother companies that influence or force SMEs to implement informatization for business-oriented purposes. For example, many SMEs inevitably use certain types of computer systems in order to maintain business relationships with strong business partners. In this regard, reviewing the relationships between vendors (suppliers), buyers (customers), large-sized companies and mother companies is needed for the accurate analysis of the SME informatization issues. Industry characteristics such as market growth, competitiveness and entry barriers need to be studied as well.

Supporting Organizations

There are various supporting organizations that can directly and indirectly facilitate the use and adoption of ICT by SMEs in the APEC member economies. They are either governmental or non-governmental organizations. *Governmental supporting organizations* include the national steering committees, related ministries, and related administration offices within the government. Non-governmental supporting organizations (also called *intermediaries* in our study) act as a bridge between the government and SMEs in promoting SME informatization. They can be further categorized into public intermediaries (various government-funded organizations, partnerships between government and non-governmental organizations, and government-funded research and education institutions) and private intermediaries (industry and trade associations, private sector initiatives, private research and education institutions, and some private companies). In many cases, intermediaries are mandated by the government to facilitate SME informatization. They take many approaches and various measures toward promoting SME informatization.

Informatization of SMEs

The levels of SME informatization can be identified by assessing the types of hardware, software and networks implemented and used. The benefits and the user's attitude towards the use of ICT are also factors affecting ICT decisions. For this study, we examined not only the current status of ICT, but also the various factors that facilitate or inhibit informatization which should be reflected in future ICT policies of governments in APEC.

In order to understand the influence of entities in the research framework on SME informatization, we raised the following research questions:

- What roles do the government organizations play in promoting SME informatization? What policies and approaches have been adopted by APEC member economies?
- What kinds of intermediaries are supporting SME informatization?
- What is the impact of the business environment (such as vendors, buyers and large companies) on the informatization of SMEs?
- What is the relationship between the supporting organizations and other influential entities in improving ICT for SMEs?
- What are the factors inhibiting SME informatization, and what are the roles of government and other supporting organizations to overcome such barriers?

4. Research Methods

The Korean research team had two different research agendas. The first one, “SME Informatization Policies and Approaches in APEC Member Economies”, looks into the policies and approaches each government uses to promote and improve SME informatization and reviews the intermediaries supporting SME informatization.

The other agenda, “APEC SME Informatization: Case Studies and Survey”, reviews the current status, characteristics and major issues of SME informatization from the perspective of ICT consumers (SMEs). The research methodology for each agenda is explained in detail below.

4.1. SME Informatization Policies and Approaches

The following three research methods were used: (1) a literature review, including the Web search; (2) a survey using a well-designed questionnaire for a focus group of government officials; and (3) site visits and interviews with government officials in charge of SME informatization.

This well-structured questionnaire was distributed to all focal points of the APEC SME Working Group by e-mail and fax. The questionnaire dealt with the major policies of member governments, progress in policy implementation, types of related agencies, major supporting governmental organizations or intermediaries, and information about SME informatization related projects and personnel.⁹⁾ The questionnaire was distributed to all 21 member economies, but only seven member economies replied.¹⁰⁾

The interviews were conducted in the selected 12 member economies due to time and budgetary constraints. According to the National Informatization Index (NII),¹¹⁾ the research team categorized the APEC member economies into the following two tiers (See Table 1-1 below) and selected six member economies from each tier:

- U.S., Canada, Japan, Korea, Australia, and Chinese Taipei from the high tier in the NII; and
- Malaysia, China, Indonesia, Mexico, Russia and Thailand from the low tier in the NII.

<Table 1-1> The NII and Selection of Member Economies for Interviews

National Informatization Index	Stage	Member Economies
60 - 100	Growth or maturity stage: High tier in the NII	U.S. , Hong Kong, Canada , Singapore, Japan , Korea , New Zealand, Australia , Chinese Taipei
0 - 60	Introduction stage: Low tier in the NII	Malaysia , Chile, China , Peru, Indonesia , Mexico , Philippines, Russia , Thailand , Vietnam, Papua New Guinea, Brunei

Notes: The member economies listed in bold type were those visited for interviews.

9) For details of the questionnaire, see Appendix A.

10) Those member economies are Canada, Hong Kong, Japan, Korea, Philippines, Russia and Chinese Taipei.

11) For the categorization according to the level of national informatization, see NCA (2003).

The interviewees were from government bodies and intermediaries, for example, expert groups or SME industry associations deeply involved with planning and implementing policies for SME informatization.

The findings from the interviews are well summarized in Appendix B in the following sequence: (1) Trends of Informatization; (2) Definition of Small and Medium Enterprises; (3) Strategy and Progress of SME Informatization; (4) Government Organizations for SME Informatization; (5) Major Policies and Projects for Enhancing SME Informatization; (6) Efforts for SME Informatization from the Private Sector; and (7) Overall Assessment of SME Informatization

4.2. APEC SME Informatization: Case Studies and Survey

Two empirical studies were conducted: (1) case studies in 10 member economies; and (2) a questionnaire survey of the Korean SMEs.¹²⁾ The comparison of cases among the member economies produced meaningful implications that help to take successful approaches to the informatization of APEC SMEs.¹²⁾

Case Studies

The following 10 member economies were selected for the case study - Australia, China, Indonesia, Japan, Korea, Malaysia, Mexico, Chinese Taipei, Thailand, and the United States.¹³⁾ Two cases (companies) from each member economy (except for Australia and Korea) were selected and analyzed, equalling 18 cases in total.

In choosing the industries for the case studies, the research team initially planned to select one or two industries common in the member economies surveyed for the sake of easy comparison using two criteria: the industry's contribution to GDP; and the informatization levels. However, these criteria were difficult to apply.¹⁴⁾

As an alternative, the team suggested three industries to focus on: (1) electrical and electronics equipments; (2) machinery and transport equipment; and (3) wholesale and retail sales. These industries were recommended because they commonly existed in all 10 economies. If a member economy could not find any appropriate case in these industries, the team suggested that the focal points find appropriate cases in other industries. As a result, the cases were chosen from a wide range of industries, making accurate comparison difficult. The SMEs that the team targeted for the survey were those located in large cities or urban areas.

The case study surveyed the following issues:¹⁵⁾

- The business environment: buyers, vendors, large firms, alliances, and industry characteristics
- Attitude towards ICT: Attitudes of CEOs and ICT organization

12) The Korean research team originally had planned to conduct surveys on four member economies: Korea, Canada, Japan and Chinese Taipei. However, due to difficulties in data collection, only Korea was chosen for the survey.

13) The case study was not carried out in Russia and Canada, in which the on-site interviews for the SME informatization policies were made.

14) Some member economies did not provide detailed information of some economic indicators. For example, very few member economies provided a breakdown of GDP by industry. We concluded that it was impossible to choose and study the industries that commonly exist in all APEC member economies.

15) For details of the questionnaire of the case study, see Appendix C.

- The current status regarding ICT adoption: hardware (HW), software (SW), and networks (NW)
- Benefits of ICT introduction
- ICT facilitators and barriers: funds, training and education, experiences and knowledge, consulting, and technologies
- Gender consideration in SME informatization

The results of the case studies are summarized in Appendix D in the following sequence: (1) Company Introduction; (2) Status of ICT Adoption; and (3) Factors influencing ICT Adoption.

Questionnaire survey of the Korean SMEs

The questionnaire survey of the Korean SMEs was conducted by KIMI (Korea Information Management Institute for SMEs) using a statistical sampling method to choose SMEs representative of the various business clusters and informatization levels. Samples were 334 small and medium manufacturers with the number of employees between five and 50. The survey period was one month from June to July 2003. Face-to-face interviews and site visits were conducted together with data collection by email. The survey covers the current status of ICT utilization, ICT benefits, ICT adoption and application, and barriers to ICT use. The results are introduced in Appendix E.

