APEC 회원국의 중소기업 정보화 정책에 관한 연구

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Small & Medium Enterprise's Informatization Policies and Approaches in APEC Member Economies

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Abstract

We conducted an explorative study about the types of APEC government's policies for SME(Small and Medium Enterprise) informatization. Informatization means the process whereby information and communication technologies shape cultural and civic discourse. By using qualitative study methods such as interviews and case studies, we identified the influential factors for the effectiveness of government policies on SME's informatization. Based on the implementation levels of these factors, we also developed the typology of government policies for SME informatization. Our conclusion ends up with the suggestion of a contingency approach for SME informatization of underdeveloped and developing countries.

Keywords : SME Informatization, APEC Member Economy, Informatization Policy

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1. Introduction

The APEC(Asia-Pacific Economic Cooperation) Leaders' Meeting was held in November 2005 in Korea. APEC leaders demonstrated the willingness to improve the economic cooperation in this region, including the reduction of digital gap and the spread of informatization benefits. Informatization can be defined as follows.

> "Informatization is the process whereby information and communication technologies shape cultural and civic discourse. This would include not just computers and the Internet, but other related technologies that have as their primary characteristic the transfer of information, including more traditional media technologies, such as film, satellite television, and telecommunications. As societies and economies re-orient themselves around technologies, there are inevitable consequences." [Kluver, 2000]

In terms of informatization, APEC member economies[2] have suffered from the aggravating digital inequalities. <Table 1> demonstrates the advanced and under-developed APEC economies based on NII(National Informatization Index) published by NCA(National Computerization Agency, 2002).

<Table 1> Grouping of APEC Member Economies by NII

NII	Stage	APEC Member economies
60~100	High Tier in NII	U.S., Hong Kong, Canada, Singapore, Japan, Korea, New Zealand, Australia, Chinese Taipei
0~60	Low Tier in NII	Malaysia, Chile, China, Peru, Indonesia, Mexico, Brunei, Philippines, Russia, Thailand, Vietnam, Papua New Guine

As an effort to understand the reasons of such discrepancy in this region, we investigated the hitherto efforts of governments to promote the informatization at each country of APEC. Especially, we are interested in SME(small and medium sized enterprise) informatization policies and approaches of APEC economies.

First, we drew the meaningful factors that strongly influence the policy for SME informatization in a country and then compare the policies of APEC member economies. In particular, we identified and compared the characteristics of supporting organizations, their roles, and specific programs among APEC member economies. After the comparison, we explored the types of strategic approaches of APEC economies for SME informatization policy, and classified them into four groups. This research framework was introduced in the research methodology section. Through this process, we could make practical suggestions for SME informatization within APEC economies, especially for SMEs in under-informatized member economies.

The eventual objective of this study is to reduce the digital gap in the APEC region. In

2) The current membership of APEC consists of 21 members, which includes most countries with a coastline on th Pacific Ocean. By convention, APEC uses the term *member economy* to refer to one of its members. See the web site www.apec.org.

this area, governments still maintain strong influences on many economic activities. So, investigation onto the informatization policies of governments could help bring up ideas to improve the informatization status in this region.

The current study consists of four sections. After introduction, literature is reviewed regarding what kinds of factors influence the government's informatization policies. Third section introduces the research method in terms of schedule, visiting countries, sources of references and materials, etc. Fourth section describes our analysis and findings regarding the current practices of informatization policies of each APEC member and the comparative features of each policy. The last section summarizes and provides the general implications from our analysis and findings.

2. Literature Review

2.1 Characteristics in SME's Adoption of Information Systems

SMEs are well aware of the potential benefits of IS(information systems) for their overall operations, especially in regards to efficiency rather than strategic value [Morrell and Ezingeard, 2002; Love and Irani, 2004; Sharma and Bhagwat, 2006]. However, SMEs are deficient in the following couple of aspects in informatization compared to large companies [Caldeira and Ward, 2002] :

- Management perspectives and attitudes towards IS adoption and use;
- The development of internal IS competencies.

Due to such deficiencies, SMEs are heavily dependent upon external forces for their informatization. Mehrtens, Cragg and Mills [2001] identified the external pressures from customers, suppliers, or employees as one of three important factors that influence SME's adoption of Internet technology. External pressures can also include third party software vendors [Levy, Powell, and Galliers, 1999] and government bodies [Levy, Powell, and Yetton, 2002]. SMEs are more concerned about operational efficiencies from investment in IT rather than strategic value such as future growth stage, and need consultation and help from such external sources in this regard (Levy, Powell, and Yetton, 2002). Due to resource constraint, limited expertise in IS, and senior managers' lack of skill, time, and motivation in IS, support from external expertise is unavoidable and actually desirable [Levy and Powell, 2000]. For the same reasons, SMEs are sensitive to heavy expenses in IT investment [Stefansson, 2002]. For example, SMEs still depend on fax and telephone for business communications with business partners. They hesitate to invest in EDI(Electronic Data Interchange) for the reasons that they have to change input and output process as well as communication process; they delay investment until customers severely require EDI; and, transaction volume through EDI is so small. Such sensitivity to investment expenses adds the necessity of external help. Among such diverse ex-

ternal help, this study focuses on government bodies. In the next section, we review the influential factors for government policy of SME informatization.

2.2 Influencing Factors for the Policy Structure of SME informatization

Although policy patterns for SME informatization seem alike, specific measures and their accomplishments over a certain period of time are diverse among APEC member economies [APEC Telecommunication Working, 1999; OECD, 2002]. The differences can be attributed to many factors, including historical experiences and cultural backgrounds of the APEC economies [Grover and Goslar, 1993].

(1) Economic Level and Literacy

First of all, the policy for the SME informatization of a member economy is not free from the economic level and the literacy of its people [Cragg and King, 1993; Iacovou, Benbasat and Dexter, 1995; Hall, 2002]. Financial and educational affordability for the adoption and usage of ICT(Information and Communication Technology) facilities in businesses and households altogether is the basic starting-point as well as the limit of the informatization policy. In the member economies with low level of economic development and literacy, it is quite difficult to find out the meaningful policies for SME informatization. In those member economies, there seems to be no room for the government to have attention to the issues of SME informatization. The priority for SME informatization policy is low in the policy agenda of the low developed economies.

(2) Telecommunication Infrastructure and ICT Industry

The level of telecommunication infrastructure and ICT industry is a crucial factor for the policy structures of SME informatization (Cragg and King, 1993; Iacovou, Benbasat and Dexter, 1995; Hall, 2002). The policies to promote SME informatization require the well-development of telecommunication infrastructure and the ICT industry in an economy. In an economy where the traditional telephone mainlines are not sufficiently available, it is still not easy for an SME to be connected to the Internet and use the web-based services. Without broadband fiber-optic lines, high-speed communication through the Internet is hardly available. Most of the economies without broadband infrastructure have a time-based fee system, which is usually expensive.

(3) Who Sits in the Steering Seat

Who sits in the steering seat is another important factor in understanding policies for SME development and SME informatization [Cragg and King, 1993; Iacovou, Benbasat and Dexter, 1995; Hall, 2002]. In an economy driven mainly by the private sectors, firms individually or collectively determine whether to adopt and use ICT to their interests. A government stays away from the direct support of enterprises, instead providing information about the trend of business technologies and supporting legislations to facilitate e-comme-

rce and e-business. On the other hand, in an economy where a government has a great voice, a government sometimes forces firms to take actions such as adopting an ERP system with financial incentives or strong directions. There are many intermediate cases located between these two extremes regarding the policies for SME informatization.

(4) Direct or Indirect Support

What kinds of approaches or instruments that a government prefers to use for facilitating SME informatization can also explain the policies in a member economy [Cragg and King, 1993; Iacovou, Benbasat and Dexter, 1995; Hall, 2002]. In member economies where a government plays an important role in helping SMEs adopt and use ICT in their businesses, there are basically two different approaches : direct and indirect support. The direct support of government includes providing financial support for a firm to adopt an ERP system. The indirect support tries to create favorable environment where a SME may feel interest in adopting and using ICT. Indirect support includes bringing about network effects among vertically and horizontally related SMEs by forming an e-commerce between suppliers and customers or by nurturing the ICT industries such as software industry and hardware industry. Flowering software and hardware industries with government support makes it affordable for SMEs to adopt ICT equipments and programs because such an environment lowers the prices of ICT-related goods and services or improves their qualities.

(5) Number of Supporting Organization

Whether there are single or multiple government organizations for SME informatization is also of interest here. In some economies, there is a government body assigned to facilitate SME informatization, while many other economies have assigned multiple government bodies to work for the mission. In the case of multiple organizations for SME informatization, those government bodies sometimes have the overlapped roles in a systematic scheme.

3. Research Methodology

Qualitative research method is used for this study. Qualitative study is appropriate when researchers rely on a few cases and many variables. There are five popular qualitative research methods, which have different characteristics and appropriate situations : biography, phenomenology, grounded theory, ethnography, and case study [Creswell, 1998]. Phenomenology is interested in understanding and developing a concept, whereas grounded theory is interested in developing theory. Other three methods are rather interested in portraying a situation. Biography is interested in individual; ethnography is interested in cultural group; and, case study is interested in a case [i.e., bounded system]. Case study can investigate a single or multiple cases [Yin, 1994], and uses theory after data collection compared to ethnography, phenomenology, and biology especially when the study purports to develop a theory [Creswell, 1998]. Data colle-

ction is recommended to draw on multiple sources of information such as documentation, archival records, interviews, direct observations, participant observations, and physical artifacts (Yin, 1994). The ultimate goal of case study is to develop the lessons through assertions or interpretations of cases. Multiple case analyses proceed through within-case analysis and cross-case analysis before generating lessons.

We knew that the bounded system in our interest is the government policy and organization for SME informatization, and that there was limited number of countries in APEC member economy. For the sake of construct validity (i.e., ontological definition and epistemological method) and internal validity (i.e., causality), we collected data and information from the following three sources : (1) literature review and web search; (2) survey using a structured questionnaire for a focus group of government officers (August 1-September 15, 2003); and (3) visits and interviews with government agents in charge of SME informatization [September 16-October 31, 2003].

The structured questionnaire was distributed to 21 focal points of the APEC SME Working Group by e-mail and fax. The questionnaire included questions about the major policies of government and related agencies, the progress of policy implementation, the supporting government organizations or intermediaries, the features of their efforts for SME informatization, and the personnel committed to SME informatization (see <Appendix A>).

We were also concerned about external validity and reliability. External validity means the generalizability of the findings from a case, so that we planned to conduct interviews with APEC member economies. Reliability means the repeatable interpretation and conclusion of the findings, which can be assured by participation of multiple numbers of researchers and interpretations. Four researchers were all involved with both data collection and interpretation. According to NII, research feasibility, region, and population <Table 1>, the research team categorized the APEC member economies into the following two tiers and selected six member economies from each tier:

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

The interviewees were working for the government bodies and intermediaries : for example, expert groups or SME industry associations in charge of planning and implementing policies for SME informatization.

4. Analysis

Based on literature review, survey, and interview, we summarized the current government policies that APEC member economies put into practice for the promotion of SME informatization (see <Table 2>). In order to extract general patterns, APEC member economies were categorized into high and low tier in the NII. The first column of <Table

〈Table 2〉 Policies and Approaches for SME Informatization

Group	Member Economy	Government Organization for National Informatization	Government Organization For Generic Support of SME	Other related Government Organizations for SME informatization	Policies and Approaches
High Tier in NII	Australia	Department of Communi-cations, Information Technology, and the Arts	Office of Small Business	• National Office of Information Economy • State governments	1*/abe**
	Canada	Industry Canada	Industry Canada	Provincial governments	1/ab
	Hong Kong	Commerce, Industry and Technology Bureau	Small and Medium Enterprises Office	• Industrial Support Division of Trade and Industry Department • The Information Technology Services Department	1/abd
	Japan	Ministry of Economy, Trade, and Industry	Small and Medium Enterprise Agency	Prefectural Governments	2/abcd
	Korea	• Ministry of Information and Communication, • Ministry of Commerce, Industry, and Energy	Small and Medium Business Administration	• Ministry of Information and Communication • Ministry of Commerce, Industry, and Energy	2/abcde
	New Zealand	Electronic Commerce Action Team	Ministry of Economic Development	n/a	1/ab
	Singapore	Infocomm Development Authority of Singapore	SPRING Singapore	Ministry of Trade and Industry	1/abcd
	Chinese Taipei	Ministry of Economic Affairs (MOEA)	Small and Medium Enterprise Administration	Commerce Department of MOEA, In-dustrial Development Bureau of MOEA	2/abcd
	U.S.	Department of Commerce	Small Business Administration	• Department of the Treasury • FTC • Federal Communications Commission • National Telecommunications and Information Administration of the Department of Commerce • Office of Management and Budget	2/abcd
Low Tier in NII	Brunei	BIT Council	Promotion and Entrepreneurial Development Division	Ministry of Industry and Primary Resources	0/a
	Chile	Ministry of Transportation and Telecommunications	Chilean Economic Development Agency	n/a.	0/a
	China	• National Informatization Promotion Office of the State Council • Ministry of Information and Industry	Department of Small and Medium-Sized Enterprises	n/a	0/ab
	Indonesia	Ministry of Industry and Trade	Ministry of Cooperatives and Small and Medium Enterprises	Ministry of Research and Technology	0/a
	Malaysia	Ministry of Energy, Communication, and Multimedia	• Ministry of Industry Development Authority • Small and Medium Industries Development Corporation	n/a	2/ab
	Mexico	Ministry of Trade and Industrial Development	National Council for the Mexico Small and Medium Enterprises	• Ministry of Economy • Ministry of Trade and Industrial Development	0/a
	Papua New Guinea	Office of Information and Communication	n/a	n/a	0/ n/a
	Peru	• Committee for the Expansion of Computers • National Council of Science and Technology	n/a	n/a	0/a
	Philippines	Department of Trade and Industry	• Bureau of Small and Medium Enterprise Development • Department of Trade and Industry	Department of Science and Technology	0/a
	Russia	Ministry of Economic Development and Trade	Ministry of Antimonopoly Policy and Support of Entrepreneurship	• Ministry of Telecommunications and Informatization • Ministry of Education • Ministry of Science and Technology	0/a
	Thailand	Ministry of Information and Communications Technology	Office of Small and Medium Enterprises Promotion	Department of Industrial Promotion	2/ab
	Vietnam	Department General of Post and Telecommunications	Vietnam Chamber of Commerce and Industry	n/a	0/a

Note) 1. * 1 = Scattered policy, 2 = Distinctive policy, 0 = No noticeable policy.
2. ** a = Information, b = Infrastructure, c = Financial support, d = ICT training and consulting, e = e-Business network

2> lists APEC member economies, the second column introduces the government organization in charge of the overall national informatization, the third column shows the government organizations in charge of generic policies for SMEs, the fourth column lists other related government organizations for SME informatization, and the fifth column summarizes the policies and approaches to support SME informatization.

As for the influencing factors introduced above, we compared and analyzed the policy and supporting systems for SME informatization over APEC member economies. Through the comparison analysis, we could identify four issues : characteristics of SME informatization policy, driving forces of SME informatization, target and type of support programs, and SME informatization approaches.

4.1 Type of SME Informatization Policies

As a result of the comparison of SME informatization polices in APEC member economies, the SME informatization policy can be classified into three : scattered policy, distinctive policy, and no noticeable policy (see <Table 3>).

Scattered policy means that the government organizations related to SME informatization take limited roles in delivering ICT information and constructing favorable ICT infrastructure. Such roles are focused on basic and common infrastructure and are thus generic. The examples of scattered policy are Australia, Canada, the United States, Hong Kong, New Zealand, and Singapore. These member economies are interested in overall ICT, including SME informatization. And this interest is reflected in various policy measures.

Distinctive policy means that a particular government organization takes up a distinctive role for SME informatization and covers every aspect of SME informatization such as financing, technical consulting. Therefore, these organizations have a comprehensive policy framework for SME informatization and care about not only the ICT environment, but also individual SME adoption of ICT. The examples of distinctive policy are Chinese Taipei, Japan, Korea, Malaysia, and Thailand. These member economies force SME to adopt ICT and a government organization to implement the policy.

If neither of these policy types are relevant, the policy of APEC member economy is classified as *no noticeable policy*. The examples of no noticeable policy are Indonesia, Russia, Vietnam, and Mexico. These member econo-

〈Table 3〉 Type of SME Informatization Policy

Group	Scattered Policy	Distinctive Policy	No noticeable policy
High Tier in NII	Australia, Canada, U.S., Hong Kong, New Zealand, Singapore	Chinese Taipei, Japan, Korea	
Low Tier in NII		Malaysia, Thailand	Chile, Brunei, China, Indonesia, Mexico, Russia, Vietnam, Papua New Guinea, Peru, Philippines

mies do not have or cannot afford to have a specific SME informatization policy, though they are more or less interested in the general informatization level of their economies.

Combining these findings with <Table 1>, we could find a strong correlation between the national informatization level and the presence of an SME information policy (see <Table 3>). Member economies of high tier in NII have policies for SME informatization, regardless of whether they are distinctive or scattered. Malaysia and Thailand, even though they are in low tier in NII, have a distinctive policy for SME informatization with strong leadership of government organization. The economies of low tier in NII have characteristics of insufficient telecommunication infrastructure, low income, and political instability. These factors are related to insufficient budget for SME informatization, lack of proper policy, and failure in coordination of government bodies. Russia and China, even though these two economies experience significant growth in ICT industry, have deterrent factors for SME informatization such as lack of experience in dealing with private firms.

4.2 Driving Forces of SME Informatization

After the SME informatization policy is established, the roles of government organizations or other related institutions are very important (Cragg and King, 1993; Iacovou, Benbasat and Dexter, 1995; Hall, 2002). In terms of the driving force for SME informatization, APEC economies can be classified into three types : government pull, government pull, and mixed (see <Table 4>). The economies with no noticeable policy were not considered here.

〈Table 4〉 Driving Forces of SME Informatization

Driving forces	APEC member economies
Government push	Japan, Korea, Malaysia, Thailand, Singapore
Government Pull	Canada, USA, Hong Kong
Mixed	Australia, Chinese Taipei

Government push means that government organizations lead SME informatization and SMEs follow the government policies. Japan, Korea, Malaysia, Singapore, and Thailand can be classified into this type. It is well known that these economies, especially Korea and Japan, have forced the private sector to adopt certain actions as dictated by the government. In these member economies, it is easy to identify the direct support programs that aid the adoption of ICT by SMEs. Even though these member economies adopted various policies to create favorable environments for SME informatization, the main policy orientation may push SMEs to adopt ICT in their businesses.

Government pull means that government organizations manage to derive SME's voluntary initiatives under the favorable environments where the government provides various supports for the private sector. The examples of this type include Canada, Hong Kong, and the United States. Canada and the United States are special because the support for SME informatization comes from the central

or federal government as well as from regional government.

Mixed type means that SME informatization policies take both government push and government push, finding balance between both orientations. The government can take a mixed position of the two extremes. The two remaining member economies, Australia and Chinese Taipei, can be classified into this group.

4.3 Target and Type of Support Programs

SME informatization policy confines both target and type of support programs. The economies with no noticeable policy are not considered here.

〈Table 5〉 Targets of Support Programs

Target	APEC Member Economies with High Tendency
Individual SMEs	Japan, Korea, Malaysia, Thailand
Inter-Organizational Network	Australia, Chinese Taipei

<Table 5> shows individual SMEs and inter-organizational network as targets of support programs in APEC member economies. The target of *individual SMEs* means that the target of the support programs for SMEs is individual SMEs. For example, Korea and Japan support individual SMEs to adopt ICT. These economies that adopted the target of individual SMEs have also adopted other programs that facilitate a group of SMEs to establish an inter-organizational ICT network or a marketplace for e-commerce. The target of *inter-organizational network* means that a government organization focuses more on the inter-organizational SME network of the selected industries than on the individual firms. SMEs within an industry can make alliance and establish an e-business network by virtue of technical and financial support from government organization. Supporting the inter-organizational networks has diverse approaches. In Australia, for example, ITOL(Information Technology Online) Funding program selects a project through competition. In Chinese Taipei, the government selects the project by itself.

〈Table 6〉 Type of support programs

Type	APEC Member Economies with High Tendency
Provision of Information	Australia, Canada, New Zealand, U.S.
Technical Assistance and Training	Canada, U.S.
Financial Support	Chinese Taipei, Japan, Korea, Malaysia

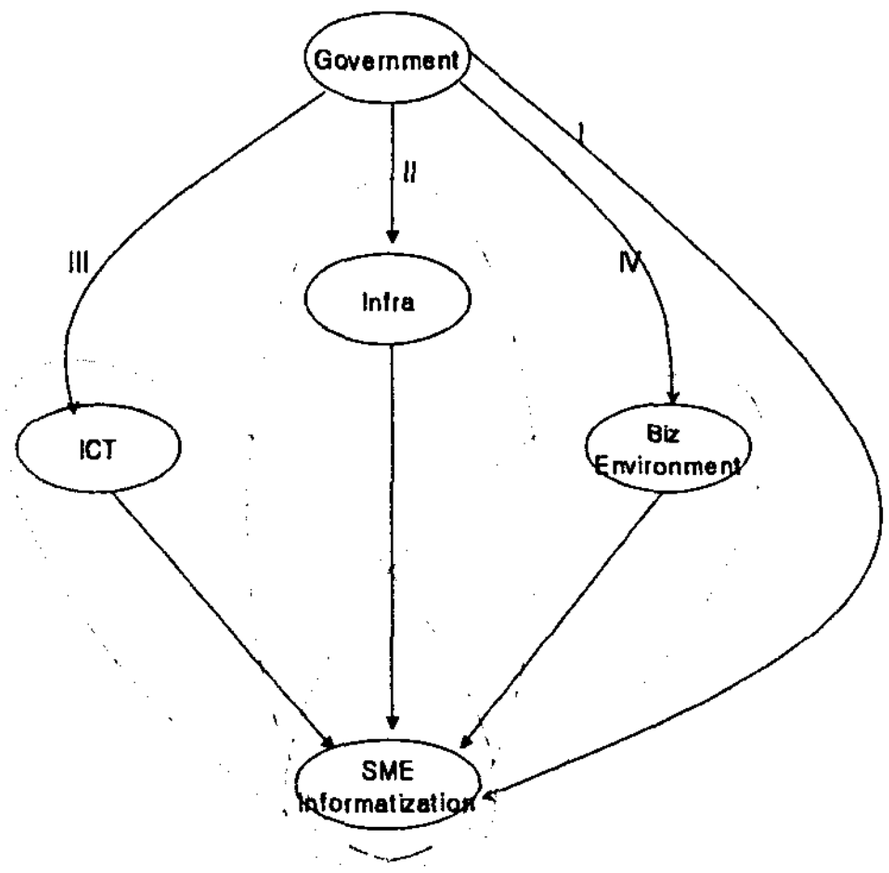
The type of support programs can be classified into three : provision of information, technical assistance and training, and financial support (see <Table 6>). *Provision of information* means that government organizations provide the information about governmental support programs or run web portals about information such as benefits, usage method, and cases of ICT adoption. This type is characterized by the provision of ICT information for the purpose of facilitating firm-level decision-making. Australia, Canada, New Zealand,

and the United States are highly interested in providing useful information on SME informatization. *Technical assistance and training* means that a government organization nurtures the skilled labors for SME informatization and helps SMEs overcome various problems they face during ICT implementation. Canada and the United States can be the benchmark for providing these promoting programs. *Financial support* means that a government organization gives the support programs such as cash grants, loans, leases and tax reductions for SMEs that introduce ICT technology or equipment into business. This approach is for SME to alleviate all or some of the financial burdens purchasing software and hardware for informatization. Financial support is available in Chinese Taipei, Japan, Korea, and Malaysia.

It is noteworthy that most of the member economies with the characteristics of government push and individual SME have financial support programs. On the other hand, the member economies with the characteristics of government pull and inter-organizational network tend to be interested in supporting programs such as provision of information, technical assistance and training.

4.4 Approaches of Government for SME Informatization

Through a comparative analysis, we could develop a typology about the strategic approaches of government for SME informatization in all APEC economies : SME support, infrastructure support, ICT industry support, and business environment support. <Figure 1> was developed based on the research framework of Lyytinen and King (2002) and shows the relationships of the factors that affect the levels of SME informatization. The component of "Government" is placed at the top of the figure, and the component of "Infrastructure" is divided into "ICT industry" and "Infrastructure."



<Figure 1> Framework of Government Approaches for SME Informatization

(1) SME Support

A government can directly support individual SME's informatization. This support includes not only providing information about ICTs through seminars, workshops, and periodicals, which are available in most APEC countries, but also, includes proactive support such as financing and tax benefits. Economies taking this approach include Korea, Japan, Malaysia, and Chinese Taipei. The Taiwanese and Japanese governments provide tax incentives such as tax credit for SMEs to invest

in their computerization. The Japanese government also provides loans to SMEs with lower interest rates for investment in informatization facilities.

(2) Infrastructure Support

A government can construct or upgrade infrastructure that in turn will lead to the improvement of SME informatization. Detailed policies include the launch of academic research funds for SME informatization, the subsidies for education programs for SME IT employees, the establishment of public institutions in charge of SME informatization and the investment in upgrading the ICT infrastructure. Abundance and availability of infrastructure, especially ICT infrastructure, can motivate SMEs to implement and upgrade ICT. Even when infrastructure is poor, government may well encourage SMEs in remote areas to improve informatization. The examples of this approach include Korea's heavy investment in broadband Internet access. Korea is ranked as the number one country for a broadband Internet access among OECD countries. These advanced facilities encourage SMEs to create and run Web-based e-commerce businesses. Another impressive example is Malaysia. With MSC (Multimedia Super Corridor) project, the Malaysian government invests in the telecommunication infrastructure and fosters trust in infrastructure by enacting various cyber laws.

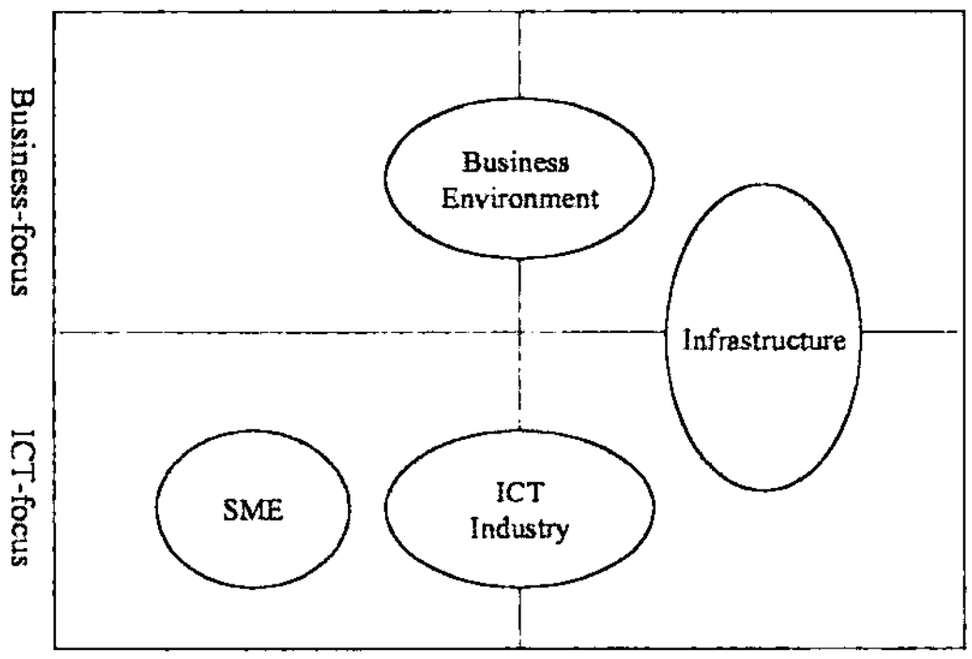
(3) ICT Industry Support

A government can promote both ICT industry and SME informatization simultaneously. In infrastructure support, SME informatization may not be listed as the primary concern of the government's informatization plans. However, governments would rather support ICT industry directly in various forms. For example, a government helps ICT companies make money by launching businesses for SME informatization. Korean government supported SME implementation of ERP using matching funds. This policy could boost a particular software industry such as ERP package market. Vietnamese government supports firms in the ICT industry, particularly software firms, with the expectation of promoting the informatization of SMEs. Technical support was also devised in the Korean government's policies, including education programs for programmers and Web masters.

(4) Business Environment Support

A government can facilitate the business environment where high level of informatization is indispensable or desirable. The detailed support programs include the enforcement of computer-based business-to-government transactions, tax reductions for computer-based (B2B) business-to-business transactions, and support for industrial communities such as associations, alliances, or consortiums to help coordinate the informatization of their members. An example is Korean government's financial support for (ASP) Application Service Provider network for SMEs to be coordinated by an industry consortium. Korean government subsidized the industry associations for ASP network projects for three years. Wher-

eas Korean government has focused on supporting individual companies, the Australian government focused on e-business transactions among companies to reduce transaction costs. B2B transactions of SMEs are also within the interest of the Australian government. In this case, SMEs and government equally share the costs of establishing B2B systems.



<Figure 2> Relationship between Approaches and Contents of SME Informatization Policy

These four approaches can be compared in two dimensions : direct support vs. indirect support; and business-focus vs. ICT-focus (see <Figure 2>). This typology of four fundamental approaches can help generate comprehensive government policies for SME informatization. For example, a government can launch the support program that combines infrastructure support and ICT industry support. The combination of infrastructure support and business environment support is also possible. A government can also launch the most comprehensive policy by combining approach infrastructure support, ICT industry support, and business environment support.

5. Conclusion

The economies of high tier in NII can be seen as possible benchmarks for the economies of low tier in NII. The economies of high tier in NII with SME informatization policies can be divided into three groups : Group I, the economies with distinctive SME informatization policies; Group II, the economies with scattered SME informatization policies, but not with the city government (i.e., Australia, Canada, New Zealand and the United States); and Group III, the economies with scattered SME informatization policies and city governments (i.e., Singapore and Hong Kong).

Economies in Group I are characterized by a government-driven SME informatization policy that targets individual firms, groups of related firms or selected industries with a full set of supporting programs. These countries are highly populated and were recently ruled by authoritarian governments with visionary and charismatic political leaders. Generally, the geographic size of the countries is not large.

Group II consists of economies that adhere to a free market system with little government intervention. These economies are generally large and sparsely populated. They have highly autonomous federal governments. For example, Australia, as a late-runner, has some policy programs to support the selected consortium of firms financially but in a very limited way.

Group III consists of city economies, the experiences of which have limited applicability to other economies of low tier in NII. Hong

〈Table 7〉 Possible Benchmark Paths for Under-informatized Economies

	Group I	Group II	Group III
High Tier in NII	Chinese Taipei, Japan, Korea,	Australia, Canada, New Zealand, U.S.	Hong Kong, Singapore
Low Tier in NII	Malaysia, Papua New Guinea, Peru, Philippines, Thailand, Vietnam	Chile, China, Indonesia, Mexico, Russia	Brunei

Kong and Singapore are very different to each other, except for their characteristics as city economies.

We now suggest a recommendable path for an economy in low tier in NII in Table 1 to facilitate SME informatization in the near future with little trial-and-error costs (see <Table 7>). For the Philippines, Vietnam, Peru, and Papua New Guinea, the path of the Group I might be recommendable. The strong and stable central government needs to push the small firms in the private sector to adopt IT technology. On the other hand, Russia, China, Mexico, Chile, and Indonesia would be better-off by taking the path of Group II. For Brunei, the experience of Singapore and Hong Kong could be helpful for the policy making of SME informatization.

Our study has several limitations. Because we adopted qualitative method, our interpretations could have been exposed to subjective judgment short of diverse and objective evidences. Future studies can take statistical approaches to confirm the theoretically-induced hypotheses about the influential factors for the different level of SME informatization in APEC economies. Our empirical evidences are confined to APEX areas, so that future studies may well expand the sources of evidences to Europe. If the ultimate objective of our study is to make suggestions to reduce the digital gap of SMEs in APEC economies, investigation into and comparisons of the SME cases in Europe with APEC economies could bring in more insightful suggestions. Finally, even though we contacted many officers in APEC economies in charge of SME informatization, we are suspicious that they can remember or authorize all the histories and policies of SME policies in their countries. Some officers were replaced with new one, and some principal officers were not in office nor available for our contact. Regardless of such limitations, we still believe that our study is one of the rare and early efforts to investigate the current status of SME informatization and government policies to come up with the suggestions to reduce the digital gap in APEC economies.

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<Appendix A> : Research Questionnaire

1. Briefly describe the nation-level structure of and the cooperation among different organizations responsible for SME informatization policies or projects.

2. List the government or public organizations dedicated to informatization of SMEs and briefly describe the major policies and projects of each organization.
   2.1 Name the government (central and local) organizations related to SME informatization and describe their major projects. Name the departments and personnel for each project (including their contact points: e-mail, fax, phone).
   2.2 Describe the nature of the public organizations responsible for SME informatization and their major projects and name the departments and personnel dedicated to each project (including their contact points).

3. List the non-government organizations and SME-related associations in various industries that support SME informatization, and briefly describe their major policies and projects.
   3.1 Describe the nature of the non-government organizations and the industry-specific associations and their major projects for SME informatization. Name the departments and personnel dedicated to each project (including their contact points).
   3.2 Describe the major relevant projects of large companies or their partners that lead SME informatization. Name the divisions and personnel in charge of each project (including their contact points).
   3.3 Describe the nature and major projects of non-government bodies (NGOs, universities, etc.) that support SME informatization. Name the divisions and personnel in charge of each project (including their contact points).
   3.4 Describe major projects of international organizations and related bodies that support SME informatization in your country, if any. Name the departments and personnel committed to each project (including their contact points).

4. Briefly outline the overall strategy and progress of SME informatization in your country.

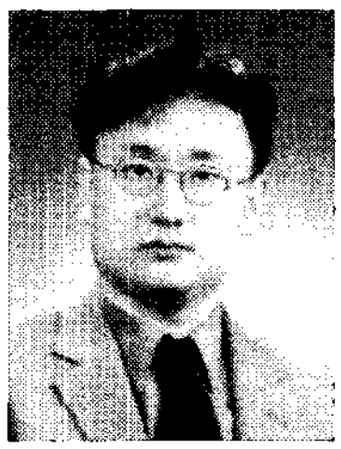
5. Explain if there are priorities, by industry or region, in your strategy and projects for SME informatization. If so, explain the rationale for such priorities.

6. Describe how SME and micro enterprises are defined in your country in regard to the statistical regulations.

■ 저자소개

권 순 동

현재 충북대학교 경영정보학과 조교수로 재직하고 있다. 서울대학교에서 박사학위(경영정보학 전공)를 취득하였고, 서울대학교 시간강사, 이화여자대학교 겸임교수, 목포대학교 전임강사를 역임하였다. 주요 관심분야는 B2B e-Marketplace, e-Procurement 등의 SCM 분야와 Web 2.0 등의 e-비즈니스 분야 그리고 중소기업 정보화 분야이다. 경영정보학연구, 한국경영과학회지, JITAM, British Journal of Management 등의 저널에 논문을 발표하였다.



양 희 동

이화여자대학교 경영대학 부교수로 재직 중이며, 서울대학교 경영학과(학사, 석사), 미국 Case Western Reserve University(MIS 박사)에서 수학하였다. 삼성 SDS컨설턴트와 University of Massachusetts, Boston에서 조교수를 역임하였다. 정보기술 채택 및 구축, 모바일/유비쿼터스 비즈니스, 기술혁신, ERP, GSS 등에 관하여 현재 연구를 진행 중이며, Information and Management, European Journal of Information Systems, Decision Support Systems, Journal of Strategic Information Systems, International Journal of Electronic Commerce, Journal of Human-Computer Studies, Journal of Information Technology Management, Journal of Computer Information Systems, British Journal of Management, Human Relations 등에 논문을 게재하였다.

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