

# The Impact of Government Sponsored Loan Programs for SMEs in IT: with a Focus on Case Studies in Korea

Kyungil Khoe<sup>1</sup> and Daeryong Kim<sup>2\*</sup>

<sup>1</sup>Department of Business and Commerce, Baekseok University, Korea;  
kyungil@bu.ac.kr

<sup>2</sup>Department of Business Administration, Delaware State University, United States;  
dkim@desu.edu

## Abstract

This study examined the frameworks of government sponsored loan programs in four advanced countries to see how the countries established special policies and structures to increase the efficiency of the usage of the government sponsored loans in order to support the technological innovation and development in IT SMEs. Then ten companies that were the beneficiaries of such sponsored loan programs in Korea were explored using Michael Porter's Diamond Model and Value Chain Model to see how government sponsored loans were effectively used to create competitiveness in the IT industry. The study attempts to find out how much important role the government sponsored loans in Korea played in promoting IT development and technological innovations in the Small and Medium Enterprises (SMEs). The analyses on the cases revealed that government-sponsored loan programs in Korea had a positive effect on strengthening the competitiveness of the companies in the industry and improving the development and management of IT in the companies. The result of the analyses also indirectly indicated that the government sponsored loan programs should be expanded to help various categories of applied IT technology.

**Keywords:** Diamond Model, Government Sponsored Loans, IT, SMEs, Value Chain Model

## 1. Introduction

Government sponsored loans refers to the government providing financial resources for corporations. Government sponsored loans for technological innovation and development in particular, refers to financial support provided as part of government policies to promote further investment by corporations in technological innovation and development. Preceding studies show that government sponsored funds form a policy where favorable conditions are given to loans by the central or local governments via methods of tax, budgets, public loans or issuance of bonds to provide support for corporations<sup>14,28</sup>. When defined in broader terms, government sponsored loans associated with technological development include R&D grants, loans, investments and equity, or guarantees but when defined in a narrower sense

to refer only to government sponsored loans, it only includes loans synchronized with the financial markets, equities or guarantees<sup>24</sup>. Moreover, government-sponsored loans for SMEs generally refer to loans provided to SMEs with special conditions on interest or repayment period for a limited amount of funds in order to reach certain government policy goals. In general, in terms of the availability of funds, some studies note that the term government sponsored loan refers to credit provided under more favorable terms than regular commercial financing<sup>9,15</sup>.

Such government sponsored loans have been used in various forms for various goals not only in emerging countries but also in advanced countries with highly sophisticated financial markets<sup>9</sup>. At present, local governments and public organizations offer them as well. In general, there are limits to government sponsored

\* Author for correspondence

loans, such as setting a limit to how much a single corporation can receive, or limiting the loan amounts in cases where the debt ratio is excessive. They also require a complicated implementation procedure. But despite such shortcomings, many corporations are benefiting from them<sup>1,5,10,31</sup>.

The economic function of government sponsored loans can be found in the correction of market failures, just as with various regulations. By making up for the shortage of funds provided by financial institutions, government sponsored loans complement commercial finance. It also plays a direct complementary role of lowering the price at which funds are supplied through interest rates or maturity<sup>9,15</sup>. However, more fundamentally, the need for government sponsored loans rises through the economic judgment that market failure in which the price in private financial markets is unable to realize efficient allocation of resources is imminent<sup>9</sup>.

The need for government sponsored loans for SMEs can be summarized as follows:

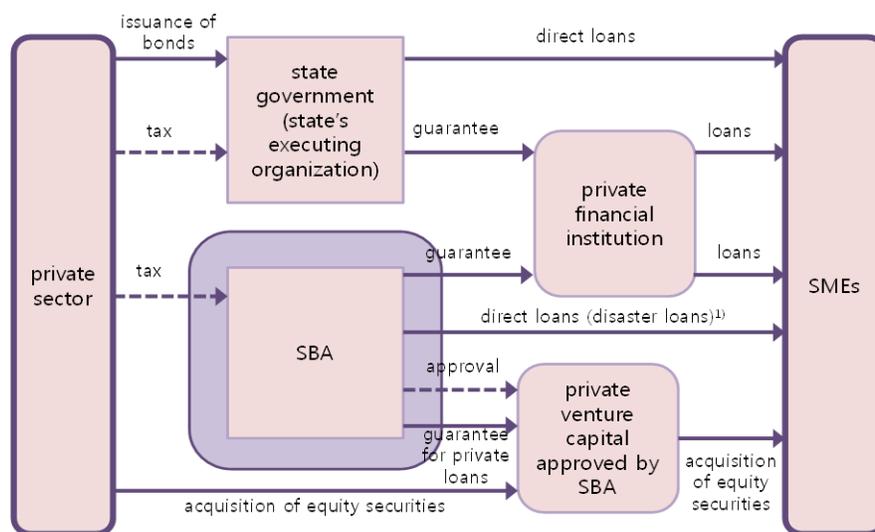
- Because the financial information of SMEs has low credibility and high asymmetry, accurate credit evaluations are difficult, making it hard for funds to be supplied to SMEs that would be sufficient to achieve efficient allocation of resources.
- Although loans by domestic banks to SMEs have continuously increased, the chronic shortage of funds experienced by these companies is persistent.
- Loans by domestic banks to SMEs are highly sensitive to the economic cycle, leading to increased instability

in supply of funds and management for SMEs.

This study seeks to review how government sponsored loans are established as policies in advanced countries and how such loans have corrected market failures in Korea while contributing to IT SMEs in particular. To that end, the policies of government sponsored loans for SMEs in the four countries of USA, Germany, Japan and Korea were investigated. A couple of companies that had been recent beneficiaries of the IT promotion fund loan project, which is Korea's leading government sponsored loans for IT SMEs, were reviewed to analyze how effective government sponsored loans have been in improving corporate competitiveness and adding more value to the company. For this analysis, the diamond model and value chain model were used to see changes in each category. In addition, based on the analysis results, the study seeks to provide a discourse on the benefits and legitimacy of Korea's government sponsored loans and present implications for government sponsored loans for IT SMEs moving forward.

## 2. Government Sponsored Loan for SMEs in Major Countries

This section looks at how major countries establish specialized policies to increase the efficiency of government sponsored loans, thereby identifying the areas that can be improved. In particular, the current status of government sponsored loans for SMEs in the U.S.,



Note : 1. Direct loans by SBA are limited to disaster loans. There are also indirect loans executed through regional development NPOs.  
Source : Reference<sup>11</sup>

Figure 1. Framework of government sponsored loans for SMEs in the US.

Germany and Japan was analyzed to acquire implications for areas of improvement and project evaluation indices in Korea where sponsored loans take up a large share of government-led finance.

### 2.1 Government Sponsored Loans for SMEs in the US

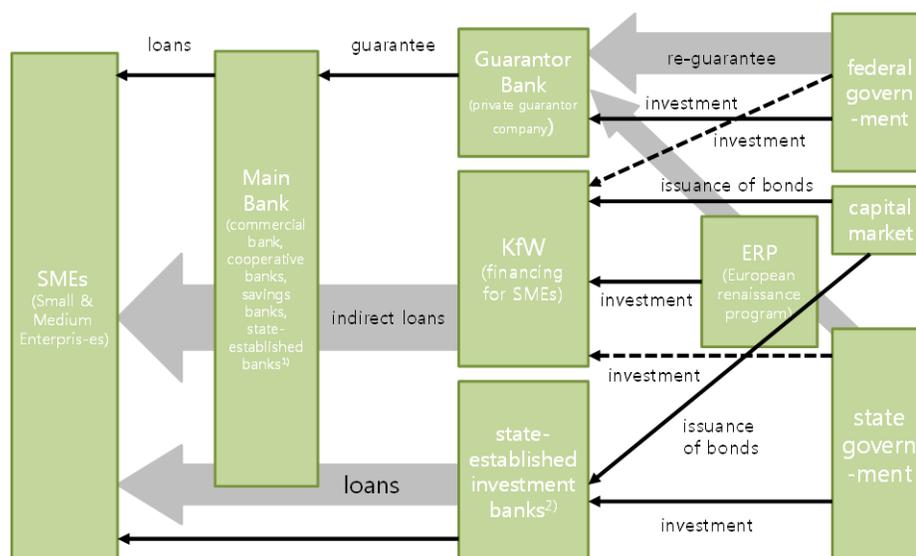
Government sponsored loans in the US are provided through a dual channel of the federal government and state governments. The federal government’s support centers around guarantees for loans from commercial banks or financial institutions through the SBA (Small Business Administration), while state governments use the policies to create employment and promoting their local community, thereby taking various approaches of focusing on loans, focusing on guarantees or combining the two. In particular, in many cases, the ‘number of jobs created through the implementation of the loan’ is used as a performance indicator for government sponsored loans. As such, programs determine the loan amount at around 25,000~35,000 dollars per employee. Figure 1 represents the framework of US government sponsored loans for SMEs<sup>11</sup>.

Guarantee programs through SBA (Small Business Administration) allow not only loans to high risk SMEs but has the advantage of immediately responding to the need of SMEs for funds. However, the disadvantages are

that the cost is high, the loan procedure is complicated and there is a guarantee fee in addition to the interest rate. Meanwhile, state government loans give access to corporations with low credit ratings who have a hard time getting loans from banks. They also offer more favorable terms than loans from private financial institutions, but the procedure is complex and time-consuming. For SBA, financial support through guarantees to SMEs takes up the majority. The guarantee is 75% of the borrowed amount and the fee for guarantees is set at 3.0% of the loan to be charged to the financial institution. State governments not only engage in guarantees, but also offer direct loans. The loan and guarantee period vary from three years (working capital) to 15 years (acquisition of buildings, business growth). The maximum loan amount ranges from 100,000 dollars (working capital) to 2 million dollars (acquisition of buildings, business growth). Interest rates also vary from 2.75% to 4.25%. Figure 1 shows the framework of the U.S. government sponsored loans for SMEs<sup>11</sup>.

### 2.2 Government Sponsored Loans for SMEs in Germany

In Germany, SMEs account for over 99% of total corporations (they account for over 40% in terms of total revenue). Given the equity structure where other people’s money, mostly loans from banks, take up the largest share,



Note : 1. State banks are public financial institutions in each state serving as the central bank for the state. They are involved in fiscal policies of each region. State banks offer practically the same services as private banks to the domestic and international financial markets and therefore are not included here as part of the institutions that offer government sponsored loans. 2. State-established investment banks include subsidiaries of the above mentioned state banks. Source : Reference<sup>12</sup>

Figure 2. Framework of government sponsored loans for SMEs in the US.

there is an urgent need for government sponsored loans for SMEs that have low credit ratings. The government sponsored loans for SMEs in Germany can be categorized into three: Indirect loans from the KfW (Kreditanstalt FUR Wiederaufbau), re-guarantees for the guarantee bank by the federal or state governments, and support through organizations specializing in government sponsored loans. At the core of German government sponsored loans are private loans that are lent to SMEs after a private financial institution takes out loans from KfW, adds a profit margin and executes review. The federal and state governments re-guarantee for guarantees through 16 private guarantee banks. The indirect loans of KfW have the advantage of offering long-term loans at a fixed rate to SMEs. However, there is no chance to directly talk to the person in charge at KfW, leading to a lack of mutual understanding. KfW is currently working on collaborating with private financial institutions to smooth over the supply of public funds so that a system can be established where the needs of private financial institutions and SMEs are identified.

KfW executes its indirect loans through a main bank, with the federal and state governments re-guaranteeing for the guarantees made on loans to SMEs. The lending method of KfW to SMEs is an On-Lending method, where KfW provides the funds for government sponsored loans to the private bank and the private bank reviews and

selects the beneficiary corporations to provide loans. One of the leading loan products is the Undernehmekredit where the maximum loan amount is 5 million Euros (approximately 7 billion Korean Won) with a maturity of 10 years (maximum of 20 years) and a grace period of two years (or three years). The funds are usually used for investment in facilities. Figure 2 represents the framework of German government sponsored loans for SMEs<sup>12</sup>.

### 2.3 Government Sponsored Loans for SMEs in Japan

The government sponsored loan system for SMEs in Japan underwent a massive revision since the Act on Administrative Reform took effect on May 26, 2006. Four institutions including JASME that had been playing a central role in government sponsored loans were integrated and newly re-launched under the Japan Finance Corporation Law as a new institution for government sponsored loans. The institution was established as incorporation and is the only government sponsored loan organization in Japan that promotes transparency in management, simplification and greater efficiency in organization and convenience for customers. The basic principles of government sponsored loans are limited to providing support, securing overseas funds and

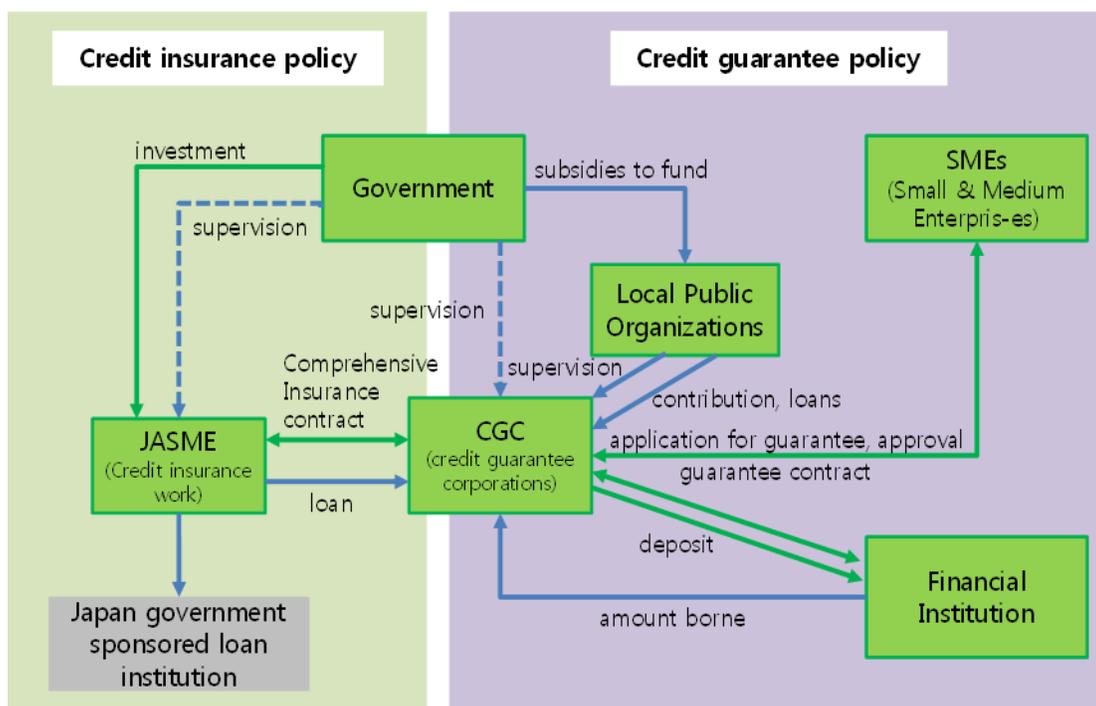


Figure 3. Framework of the credit complementary policy in Japan.

enhancing international competitiveness of the country. In order to realize a smaller but efficient government, government sponsored loans are reduced while the relevant institutions are being completely privatized. Government sponsored loan institutions implement partial guarantee policies, support for securitization and indirect loans as ways to make management more efficient. The credit complementary policy of Japan ensures that SMEs lacking in collateral can receive credit guarantees from 52 regional credit guarantee associations, while the SME financing institution provides credit insurance for the credit assurance association. In other words, it is a dual structure where the local government's credit assurance is combined with the credit insurance of the central government. The SME financing institution provides credit insurance through the credit guarantee of regional credit assurance associations and thereby covers for 70~80% of the credit risk. This indicates that the central government is proactive in providing financial aid to SMEs through a credit assurance policy. Figure 3 shows the framework of the credit complementary policy in Japan<sup>13</sup>.

### 2.4 Government Sponsored Loans for SMEs in Korea

Government sponsored loans in Korea in general take the form of depositing funds in a bank and indirectly lending it to SMEs. The bank evaluates the SME, offers the loans, and bears 100% of the risk of loss while receiving commission. While this is a market-friendly method, from the stance of the bank it feels the need to minimize risk of bad debt. Therefore measures to preserve its rights as a creditor are taken such as in the form of collaterals. This leads to loans being made mostly to financially healthy companies, undermining the original purpose of the policy to supply funds to corporations with low credit and little collateral but with high growth potential. As a result, there are concerns that the policy will just end up being subsidies for interests on financially solvent companies. Benchmarking of Germany's on-lending method is needed as this method allows the financial institution to select corporations, evaluate their credit, execute recollecting the loans, but at least 50% of the risk of loss is borne by the government. This makes it easier

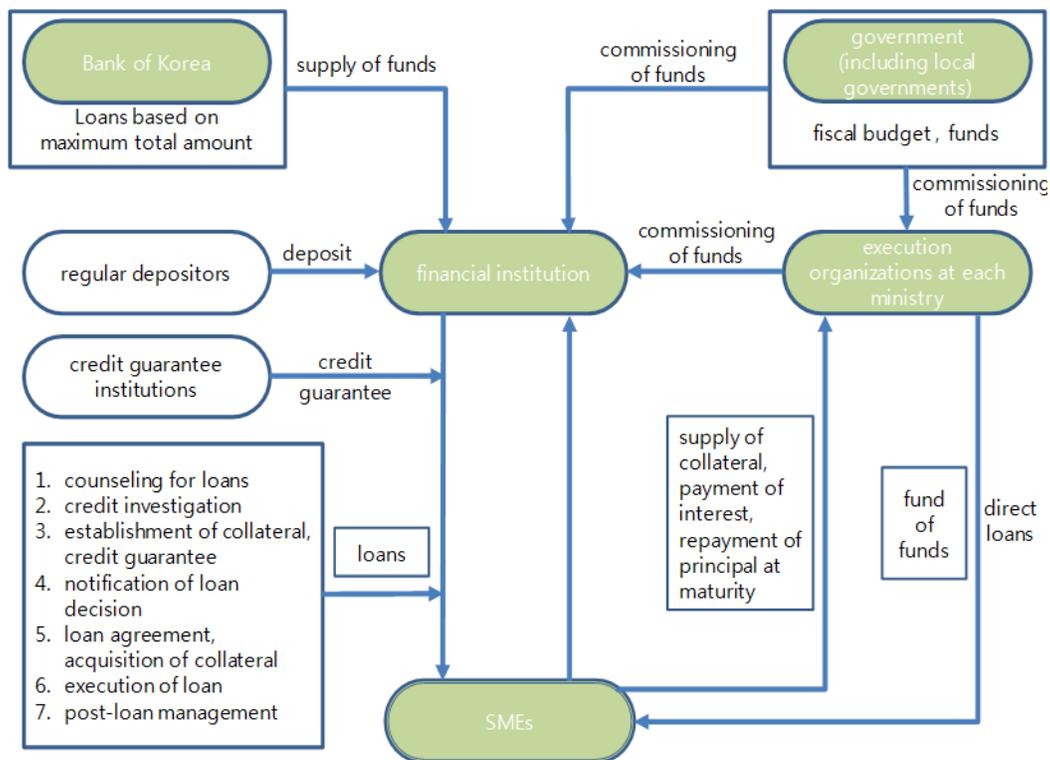


Figure 4. Framework of financial support procedure offered to SMEs in Korea.

for private banks to handle loans and select corporations that the policy was originally intended to help. While the indirect loan of SME Promotion Foundation is similar to the on-lending method, it is different in that 100% of the risk is borne by the private bank. At present, Korea's government sponsored loans can be categorized into the credit policies for SMEs executed by Bank of Korea, credit guarantee support, government sponsored loans and investment funds<sup>24</sup>. Figure 4 displays the framework of financial support procedure offered to SMEs in Korea.

### 3. Analysis of Effects of Korea's Government Sponsored Loans through Case Studies

#### 3.1 Overview of the IT Promotion Fund Loan Project

The IT Promotion Fund Loan Project aims at fostering IT SMEs that implement technological innovation for the eventual commercialization of such technologies. In doing so, the project has as its ultimate vision the improved technological competitiveness of the IT

industry and creation of innovative IT technologies<sup>7</sup>. More specifically, short-term technological development is supported through a connection with mid to long-term R&D in outstanding technologies or core technology fields to bring forth a new engine for growth and promote environment-friendly growth at the same time. By focusing on the support for SMEs who have difficulty in securing funds for technological development, the project promotes technological progress and entrepreneurship. The project is based on Article 44 (Purpose of the IT Promotion Fund) of the Act on Information Technology Industry Promotion. This year's project was implemented as a loan project to support technological development through the IT Promotion Fund in 1993. In 2002, through a work agreement with the Technology Guarantee Fund, a technology collateral policy was established to sponsor IT corporations with promising technology but little collateral. Relevant government departments are at the National Postal Office, Ministry of Information and Communication, Ministry of Knowledge Economy and Ministry of Science and Technology, ICT and Future Planning. From 1993 – 2013, a total of 2,565 billion won was provided and 6,648 initiatives selectively

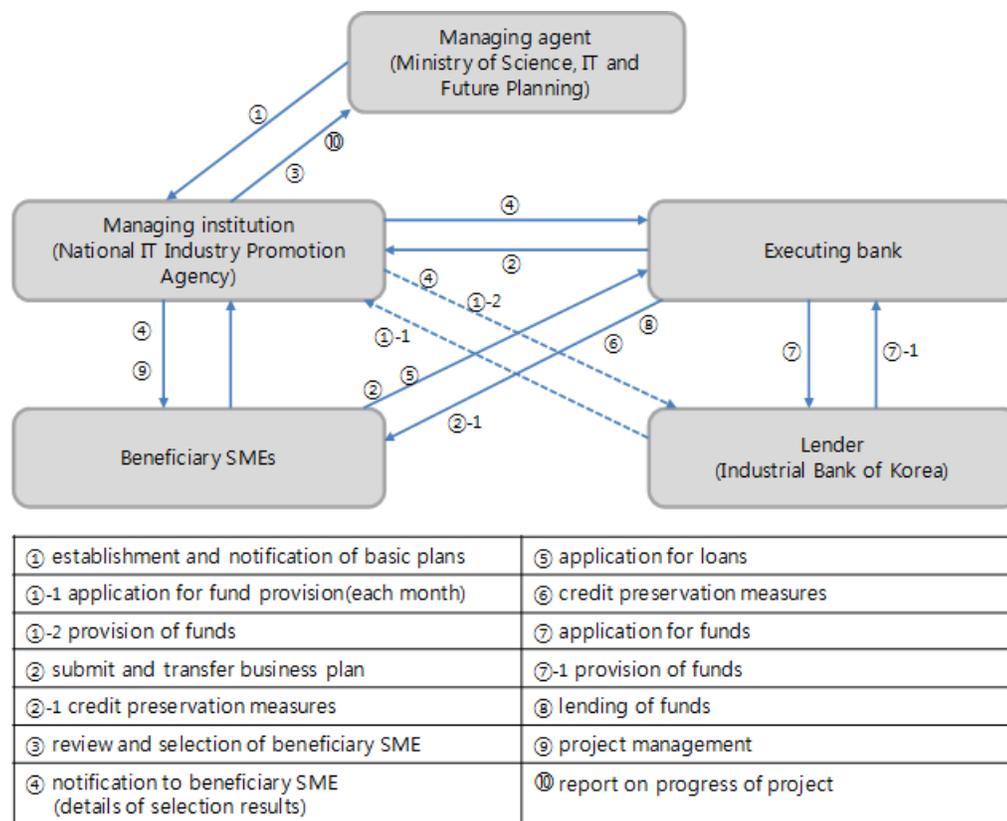
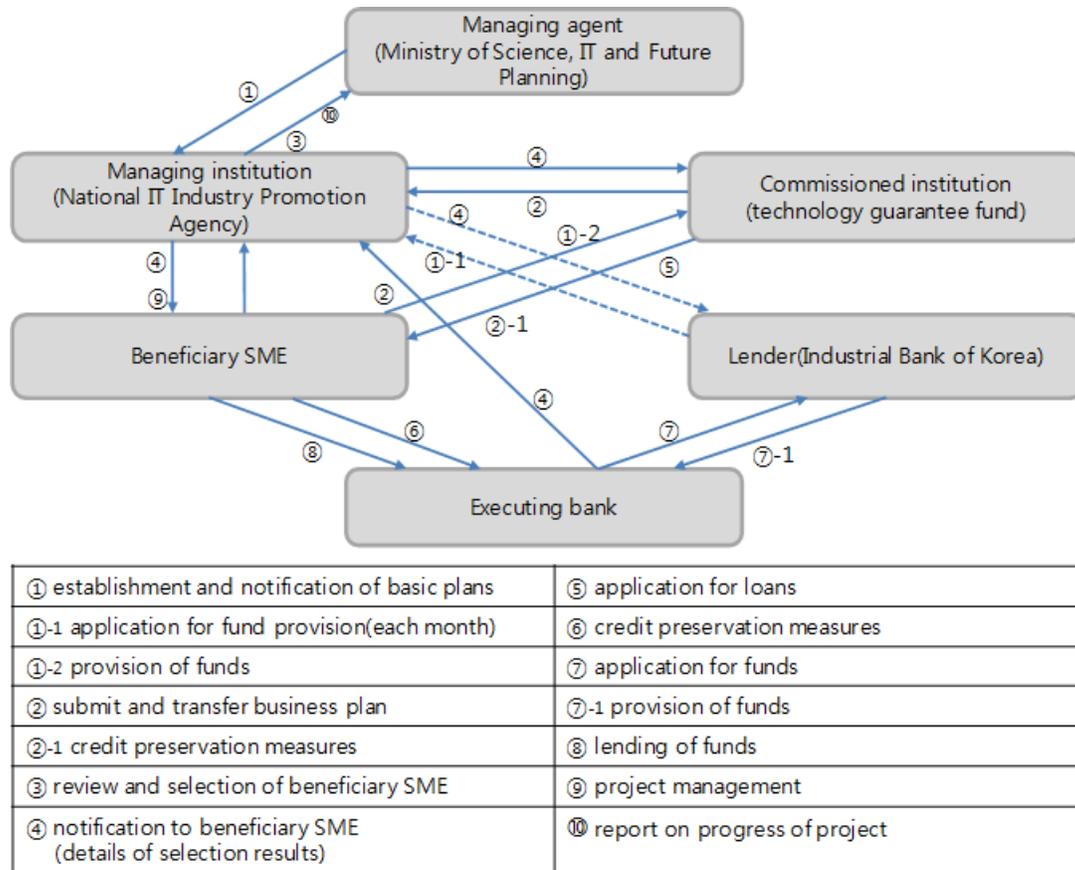


Figure 5. Flowchart of how government sponsored loans with general collateral is executed.



**Figure 6.** Flowchart of how government sponsored loans with technology collateral is executed.

implemented. Sponsored areas are as mentioned earlier; IT or IT-based comergence fields. The financial support is offered through indirect loans from commercial banks.

The government loans are dedicated funds to these banks and the banks execute the loans. For collateral, both general collateral in Figure 5 like real estate and technology collateral in Figure 6 can be used. Beneficiaries need to be SMEs that wish to invest the loan in technological development. A maximum of 2 billion won within 80% of the total R&D costs may be offered as loans. Maturity is two years after a three year grace period. A floating rate is used each quarter for interest rates applied.

### 3.2 Evaluation of Corporate Competitiveness through an Analysis of the Diamond Model and Value Chain

#### 3.2.1 The Diamond Model

This study used the diamond model to evaluate the competitiveness of a corporation. This is a strategy model

devised by professor Porter<sup>22</sup> of Harvard University and consists of the four inherent variables: Factor conditions, demand conditions, related and supporting industries and the business context (or corporate strategy, structure and competition), and two external variables of chance events and the government in Figure 7. Factor conditions refer to factors related to production and can be divided into basic factors such as natural resources or unskilled workers required to compete in a specific industry and advanced factors such as advanced technology and skilled labor. Demand conditions represent the characteristics of the domestic market demand for products and services. This can be divided into size and sophistication of the market. Related and supporting industries are the supplier industries or related industries that are internationally competitive. The cluster of related industries that are internationally competitive and the synergistic effects that these industries create are important. As for business context, it represents the overall structure and strategy used for a corporation to be established, organized and operated. The competitive relationship in the domestic

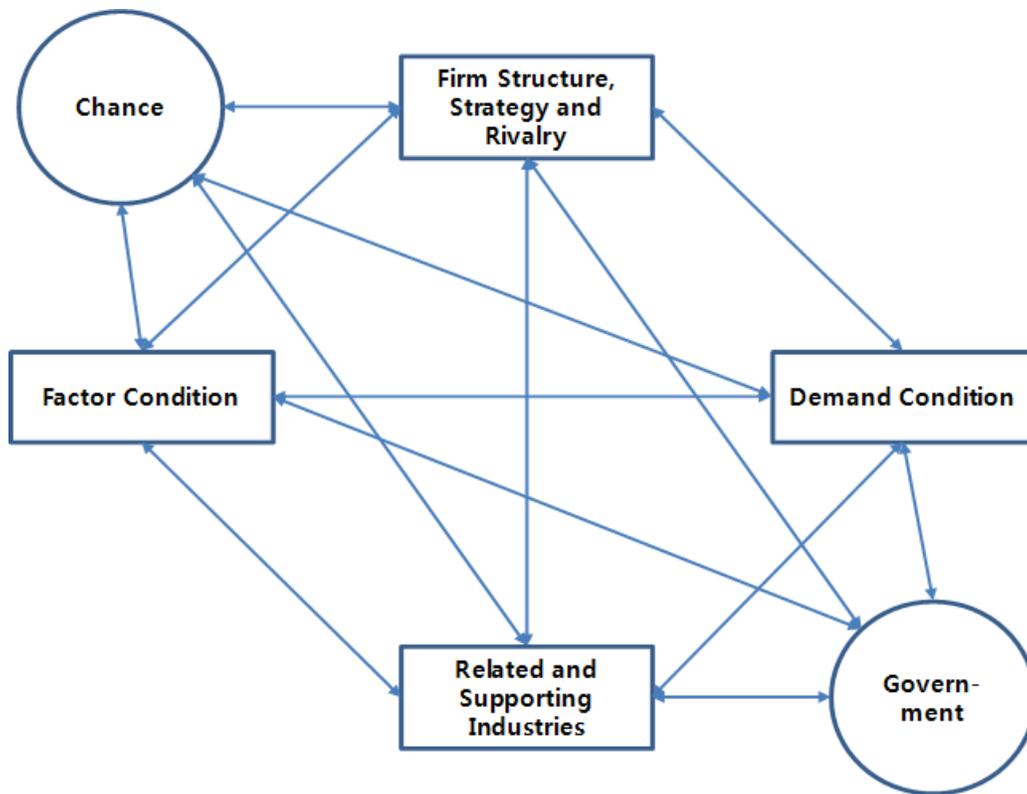


Figure 7. Porter's Diamond Model.

market is especially regarded as important and strategy and structure may vary depending on the situation. The fiercer the competition, the more likely it is for competitiveness to increase. In terms of external variables, the government promotes international competitiveness and chance events refer to external events that result in major changes in the environment, such as wars<sup>22</sup>.

Meanwhile, Reference<sup>17,23</sup> developed Porter's diamond model to include globalization and created a double diamond model. The diamond model was conceived to analyze national competitiveness but is used to analyze industries and corporations as well. In this study, the four inherent variables of the basic diamond model will be reviewed for corporations who were beneficiaries of government sponsored loans, but a review of the government will also be included.

### 3.2.2 Value Chain Model

Originally developed by McKinsey as a Business System, the concept of value chains was further developed by Professor Porter and is now widely applied<sup>21,22</sup> in business research. The value chain concept divides the overall

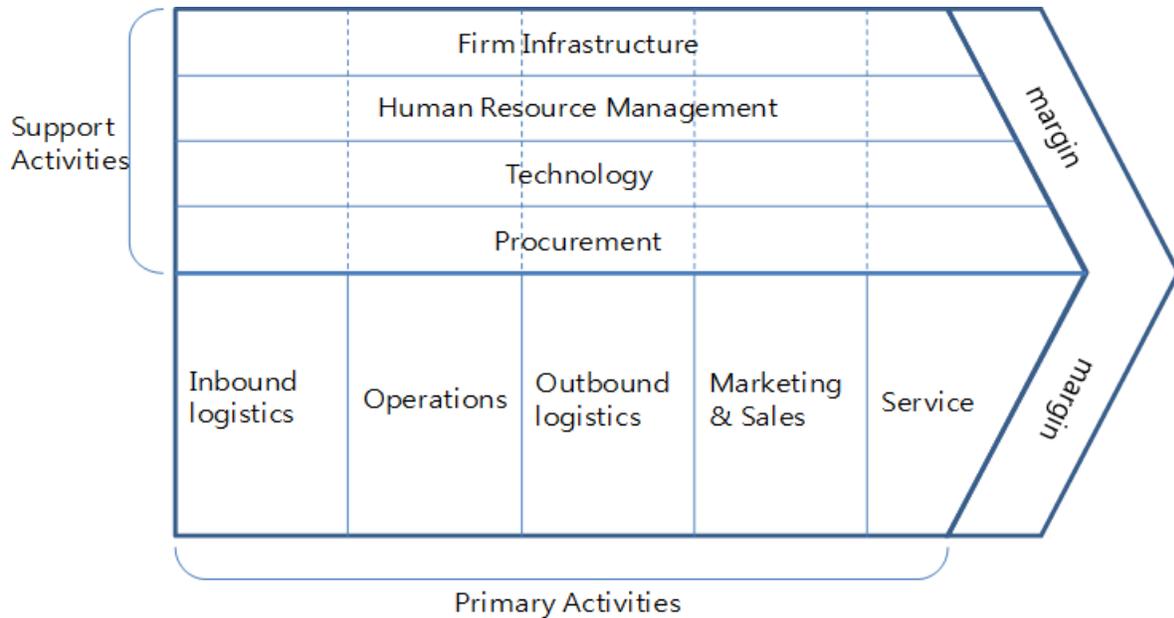
production activities of a corporation into primary activities and support activities and allows for a detailed analysis of how much cost and value added is involved in each stage from purchasing to inventory management, distribution, production, sales and after-sales service.

This study seeks to review what kind of benefits in terms of the value chain beneficiary companies of government sponsored loans received. If the value chain and the diamond model as mentioned earlier are used, a given corporation's strengths and weaknesses can be identified.

## 3.3 Analysis of the Competitive Edge of Corporations in the Cases and Areas that Benefited

### 3.3.1 Masangsoft Inc

By receiving loans, Masangsoft Inc. was able to reinforce their manufacturing and technological developments, which are factor conditions in the diamond model. The loans seem to have helped the company implement continuous investment in the update of its services



**Figure 8.** Value Chain Model.

content and entering the unique market of aero navigation simulation, which led to the reinforcement of demand conditions and the business context. Moreover, in terms of related and supporting industries, it is included in the cluster of a global game hub and a global network and can be expected to reap positive effects<sup>16</sup>.

In terms of the value chain, government sponsored loans seem to contribute to both primary activities such as manufacturing, production, sales, marketing and services, and support activities such as technological development. In particular, the project that was supported by the loan led to the development of Airways, an online game that focuses on aero-navigation simulation, foray into overseas markets (participation in expos) and continued improvement of services. It seems that the funds were also efficiently used for events related to the development and launch of new games.

### 3.3.2 ST Bend and Plant Inc

ST Bend and Plant Inc., too seems to have focused on reinforcing factor conditions through loans. The company specializes in technological know-how of connecting pipes and excellent human resources. In terms of the value chain, the loans contributed greatly to the establishment of MIS, which is part of support activities and the establishment of a comprehensive manufacturing system for pipe pieces using EJB, allowing the company to

overcome management challenges posed by the distance between company headquarters and the plant<sup>29</sup>.

### 3.3.3 Seyon E and S Inc

Seyon E and S Inc. seems to have reached a big opportunity in terms of the demand conditions in the diamond model. In particular, the company is expected to have a big impact on the aerospace industry. Moreover, the loans seem to have contributed to R&D investment and manufacturing management. In terms of the value chain, the loans have contributed to manufacturing, a primary activity and technological development, a support activity. The loans were intensively invested in the design and manufacturing of test facilities for the design of rocket engines, which led to positive results<sup>27</sup>.

### 3.3.4 Mugpeople Inc

Through government sponsored loans, R&D was reinforced and related and supporting industries which have been lacking were also strengthened. In terms of the value chain, the loans contributed to increasing technological development and had a positive effect on manufacturing. Meanwhile, through a joint development with East Summer Inc., a company specializing in drama, 'Tunneling' and an interactive drama adventure game for mobile devices based on story-telling was successfully

launched. This is testament to project items used appropriately for strengthened competitiveness<sup>18</sup>.

### 3.3.5 Nanointech Inc

The loans seem to have been used for the development of technologies required for the metal flake business for magnetic sheets. By linking new technological developments with beadmill manufacturing technologies, the loans seem to have been effectively used. During the process, the share of the company's funds for R & D was increased to enhance their competitive stance as a specialized company. In particular, in terms of the diamond model, by upgrading the beadmill manufacturing technology, factor conditions were strengthened and demand was created. In terms of the value chain, share of funds in technological development was increased, leading to reinforced R&D capabilities<sup>19</sup>.

### 3.3.6 Obigo Inc

Using the loans, the company developed infotainment software and web browsers for cars and supplied them to the Hyundai Motor Company's telematics system. This allowed them to commercialize its HTML5 browser for completed cars. The developed infotainment software and web browser contributed to strengthening factor conditions of the diamond model. By participating in many expos, new markets and strategies were developed and strengthened. This helped the company create new demand and improve the business context. Overall, loans seem to have contributed to technological development which is a support activity and manufacturing, marketing and sales which are primary activities in the value chain<sup>20</sup>.

### 3.3.7 Baiksan Mobile Inc

The loans helped develop the Radio Gateway and artificial intelligence devices and platforms by allowing the company to recruit the necessary human resources and strengthen their marketing and sales. Improved human resources and R&D functions are directly related to the strengthening of factor conditions in the diamond model. Moreover, through reinforced marketing, the loans contributed to the demand conditions. Meanwhile, smart phones becoming mainstream helped emphasize the demand conditions, and related and supporting industries for the company. In terms of the value chain, the loans seem to have contributed to marketing and sales<sup>2</sup>.

### 3.3.8 Aura Inc

The loans were used to develop programs to manage obesity and smoking among teenagers. Manufacturing conditions and technology conditions in the diamond model have benefited from the loans. Also, demand was created in the health market for teenagers and a new market was created where IT, medical services and education were merged. In terms of the value chain, the share of investment in technological development was increased. That is, the loans were used for continued development of programs for teenagers' health and can be seen as having contributed to the technological development category of support activities in the value chain.

### 3.3.9 HFR Inc

The loans were used to develop technologies for a Packet Transport System for larger amounts of data with the MPLS-TP-based Traffic Magger installed. This strengthened the factor conditions of the diamond model. With the progress of information technology and enhanced services, increased demand for intermediating devices was brought about. Along with the government's sponsor for the IT industry, it also contributed to related industries as can be seen by the supplier companies having been acquired by SK Telecom and SHN, which opened up opportunities with collaboration with KT. Meanwhile, the emergence of a new competitor will require prudence going forward<sup>4</sup>.

The loans were mostly used for technological development, marketing and sales and can be seen to have been effectively used for the company to chart its future course. That is, the use of loans promoted the development of IT communication devices and the strengthening of marketing and sales in the face of emerging competitors from China and Taiwan.

### 3.3.10 Futurenuri Inc

The loans were used to develop a comprehensive electronic library solution that is user-friendly and thus strengthened the factor conditions of the diamond model. Moreover, as the existing IT industry matured, the loans also helped related and supporting industries. However, in terms of business context, guarding against other conglomerates can later have a negative effect on the company. In terms of the value chain, the loans were used for investment in technological development and had a positive effect on manufacturing as well<sup>3</sup>.

### 3.3.11 *Shinheung Machine Co*

The loans seem to have helped reinforce technological development in the diamond model. Moreover, it also contributed to foraying into new markets and enhanced strategies in the business context. In terms of demand conditions, the emerging markets seem to be favorable to the company. More than anything, the high level of technology seems to be an important factor condition. In terms of the value chain, the loans helped increase the budget in technological development, contributing to development of new products, and this was also linked with sales and marketing. The loans were used in developing a communication module for motion control of multi-axis robots and for foraying into emerging markets (China, India and Brazil), leading to increased competitiveness of the company<sup>25</sup>.

### 3.3.12 *Shinheung SEC Inc*

The loans seem to have contributed to strengthening the R & D and HR factor conditions of the diamond model. With the increase in technology and demand related to the battery industry and government support, overall competitiveness has increased from the perspective of the diamond model. Meanwhile, competition against newly emerging Chinese corporations can have a negative impact. However, entering the small and medium-sized battery market simultaneously can be seen as positive. In terms of the value chain, loans contributed to technological development and product manufacturing. The company in particular focuses on ubiquitous data input system using wireless transmission technologies<sup>26</sup>.

### 3.3.13 *Uplexsoft Co*

For this company, the loans were mostly used for the technological development for manufacturing cloud computing operation management platforms in desk top virtualization technology. This has contributed to strengthened R&D and human resources in the diamond model. It is all the more promising given that factor conditions that were relatively weak in the existing diamond model were strengthened. Alliances with Samsung SDS or the development of the mobile IT industry are also expected to positively impact on the business. However, the fierce competition in the market indicates that there are risks inherent in the company. In terms of the value chain, the loans seem to have

contributed to technological development and securing of human resources<sup>30</sup>.

## 4. Conclusion

### 4.1 Discourse on Policies

Government sponsored loans in the US and Germany take on the form of banning subsidies in principle except for severely lagging areas and also limiting low interest loans in order to protect the market. Meanwhile, government sponsored loans in Korea run the risk of being perceived as a way of offering interest subsidies to already financially sound corporations and a discrimination against other corporations. There are concerns that such policies can disrupt the market and therefore the related policies are in need of revision. As for the loan sponsor project for applied technological development, the purpose of sponsoring the development of innovative information technologies should be reinforced, while a stricter evaluation of the innovation performance is applied so that it is widely known that the decision to offer financial aid is based on the assessment of how likely innovative IT would be developed. Meanwhile, the performance indices used to assess government sponsored loans in Europe or the US are employment maintenance and job creation rates. This shows that they perceive SMEs as a measure to create employment and secure new engines for economic growth and that the government is proactive in providing SMEs with the necessary funds for entrepreneur-ship and facilities investment. In recent years, Korea too has been starting to see the ripple effects on job creation, in addition to the technological and economic performance as a major indicator to assess the efficacy of loans. But this trend needs to be further strengthened. Moreover, there is a need to assess loan applicant corporations for their potential to create employment. As for projects to sponsor the development of applied technologies, technological evaluation must include the effect of job creation due to the technology being developed<sup>6</sup>.

Unlike in Korea where multiple organizations manage the sponsored loans depending on the stage, advanced countries such as the US, Germany and Japan have an integrated institution specializing in government sponsored loans. This should be noted for the significance of forecasting the future trends of how government sponsored loans are operated. In particular, the revisions in Japan show that government sponsored loans that

are being operated separately by each department at the Science and Technology Promotion Fund, ICT Promotion Fund, SME Promotion and Industrial Basis Fund and Cultural Industry Fund may be managed by a single integrated institution in the future<sup>8</sup>.

## 4.2 Implications

The analysis of competitiveness at three IT SMEs using Porter's diamond model and value chain model shows that the government sponsored loans offered by the Information Technology Promotion Fund have a significant effect on strengthening IT SMEs' competitiveness and increasing their profits, and thus play an important role in promoting the evolution of the IT industry. A comprehensive review of the inherent variables in the diamond model, which are factor conditions, demand conditions, related and supporting industries, and business context (business management conditions, corporate strategy, structure and competition) show that in terms of factor conditions, strengthened R&D capabilities, CEO's competence and recruitment of competent human resources were the common factors for competitive advantage. In terms of demand conditions, growth in related technology, increased demand and opportunities for exports and the timeliness of technological development were found to be the factors of competitive advantage. In terms of related and supporting industries, the government's expansion of its projects to sponsor IT SMEs, establishment of a global network, increasing collaboration between industry and academia and co-existence with conglomerates were identified as factors for competitive advantage. In business context, fiercer competition in the field, differentiation of products, association with manufacturing and distribution, import replacement (homegrown production) strategy, niche market strategy, cost advantage strategy, overseas markets, diversification and alliance with partner companies were the factors of competitive advantage. Moreover, in terms of the value chain, most companies saw that the loans affected their investment in R&D (technological development). In addition, other categories that were affected included contribution to foray into overseas or online markets, marketing and services, establishment of a corporate MIS, contribution to manufacturing activities such as the production of test facilities, and contribution to human resource management through recruitment of expert personnel, indicating that direct and indirect

effects occurred in business management. In conclusion, government sponsored loans are expected to contribute greatly to the overall growth of the IT industry from a macroeconomic perspective and to the progress and growth of IT SMEs through reinforced competitiveness from a micro-economic perspective. This indicates the need once more to continue to expand and reinforce government sponsored loan policies. The loans also were verified to have a positive effect on R&D investment in terms of the corporate value chain, thereby increasing competitiveness, boosting profits and bringing about growth in the overall industry. A detailed analysis of each variable in the diamond model and their factors for competitive advantage showed that loans were being used timely and appropriately, leading to enhanced performance and competitive-ness for the loan beneficiary company. Therefore, this implies indirectly that government sponsored loans that are currently being offered to IT SMEs for R&D would need to be expanded and increased to a certain degree in the future.

## 5. References

1. Baig J, Yoon B. A Study on the Effect of Small and Medium Sized Enterprise Policy Lending Programs on the Financial Performance. *Korean Corporation Management Review*. 2013; 20(5):139–58.
2. Baiksans Mobile Inc. 2015. Available from: [www.bsmobile.com](http://www.bsmobile.com)
3. Futurenuri Inc. Homepage. Available from: [www.futurenuri.com](http://www.futurenuri.com); 2015.
4. HFR Inc. Homepage. Available from: [www.hfrnet.com](http://www.hfrnet.com); 2015.
5. Hong S. Improvement Plan on Financial Supporting System for Small and Medium. *The Korean Association of Small Business Studies Series of Research*. 1995; 1: 274–306.
6. Kheo K. An Analysis on Usefulness of Supporting Loan for Development of Applied Technology and Political Proposal for Improving Outcom. *Korean Management Consulting Review*. 2012; 12(2):271–89.
7. Khoe K. Analysis on Performance of IT Promotion Fund (Loan Policy); 2013.
8. Khoe K. IT A Proposal of Alternative Financial Supporting Policy on IT-related Small and Medium sized Enterprises. *Journal of Digital Convergence*. 2013; 11(11):279–87.
9. Kim H. The Effects of Policy Lending Programs for Korean SMEs. *Korea Development Institute*; 2004.
10. Kim S, Park H. Enhancing management of the government financial assistance for Small and Medium sized entertainment. *Korea Research Institution for Local Administration*. 1998; 68–75.
11. Korea Credit Guarantee Fund. U.S. Government Loan for SMEs and Current Trends. *Sinbo Research*; 2006.

12. Korea Credit Guarantee Fund. German SMEs and Government Loan for SMEs. Kodit Research; 2008.
13. Korea Credit Guarantee Fund. Reforming Japan Government Loan for SMEs. Kodit Research; 2008.
14. Kwak S, Song H. A Study on Characteristic Factors and Managerial Performance of SMEs Supported by Government Loan: Focused on Small Venture Business. The Korean Association of Small Business Studies. Fall Academic Seminar; 2003. p. 131–49.
15. Lee K. Government Finance : Present, Effect Analyses, Improvement Plan. Korea Institute of Public Finance; 1994.
16. Masangsoft Inc. 2015. Available from [www.masangsoft.com](http://www.masangsoft.com)
17. Moon H, Rugman CAM, Verbeke A. A Generalized Double Diamond Approach to the Global Competitiveness of Korea and Singapore. *International Business Review*. 1998; 7:135–50.
18. Mugpeople Inc. 2015. Available from: [www.mugpple.com](http://www.mugpple.com)
19. Nanointech Inc. 2015. Available from: [www.ballmill.com](http://www.ballmill.com)
20. Obigo Inc. 2015. Available from: [www.obigo.com](http://www.obigo.com)
21. Porter ME. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. Free Press. New York; 1980.
22. Porter ME. *The Competitive Advantage of Nations*. Free Press. New York; 1990.
23. Rugman AM, D’Cruz R. The Double Diamond Model of International Competitiveness: The Canadian Experience. *Management International Review*. Special Issue. 1993; 2:17–39.
24. Shin Y. A Study on Improvement Plan on Government loans for IT Technological Development; 2010.
25. Shinheung Machine Co. 2015. Available from: [www.smck.com](http://www.smck.com)
26. Shinheung SEC Inc. 2015. Available from: [www.shsec.co.kr](http://www.shsec.co.kr)
27. Seyon EandS Inc. 2015. Available from [www.seyon-ens.com](http://www.seyon-ens.com)
28. Song H, Kim Y, Oungrak O. The Study on the Effect of SBC Policy Funding Programs on the Improvement of Financial Performance. *The Korean Small Business Review*. 2006; 28(4):65–80.
29. ST Bend and Plant Inc. 2015. Available from: [www.stbend.co.kr](http://www.stbend.co.kr)
30. Uplexsoft Co. 2015. Available from: [www.uplexsoft.com](http://www.uplexsoft.com)
31. Yoo C. A Study on the Improvement Effect of Financial Situation in Small and Medium Company by Policy-Fund Assistance. 2006; 11(1):169–86.