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# Major Challenges Facing Small and Medium-sized Enterprises in Asia and Solutions for Mitigating Them

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**Abstract**

Small and medium-sized enterprises (SMEs) are the backbone of the Asian economy. They make up more than 98% of all Asian businesses that provide two out of three private sector jobs in the region. Therefore, it is vitally important for Asia's economic success to have fully functioning support measures for SMEs. However, SMEs face challenges from limited access to finance, lack of databases, low R&D expenditures, undeveloped sales channels, and low levels of financial inclusion, which are some of the reasons behind the slow growth of SMEs. This paper focuses on four major reasons that slowed the SME growth in Asia including i) lack of finance, ii) lack of comprehensive databases, iii) low level of R&D expenditures, and iv) insufficient use of information technology and provides remedies for mitigating them.

**JEL Classification:** G21, G24, G32

# Contents

# 1. INTRODUCTION

Asia has been continuously growing during the recent decades, and this growth has alleviated poverty and increased the number of middle-income countries in the region. However, the recent regional and global economic slowdown requires a new growth model for Asia, with strengthened dynamics for small and medium-sized enterprises (SMEs) to boost national productivity.

SMEs are the backbone of the economies of Asia, accounting for 98% of all enterprises and 66% of the national labor force on average during 2007–2012. SMEs contributed 38% of the gross domestic product or manufacturing value-added in Asia on average in 2007–2012, suggesting their contribution to the region's economies can be expanded further.

SMEs influence trade. SMEs brought about 30% of the total export value in Asia on average in 2007–2012. In the People's Republic of China (PRC), SMEs accounted for 41.5% of total export value in 2012, up 6.8% year-on-year, while in Thailand they made up 28.8% of total export value with 3.7% year-on-year growth. SMEs that are part of the global supply chain have the potential to promote international trade and mobilize domestic demand (ADB 2014).

Definitions of SMEs are different country by country. In some countries the criteria for the categorization is capital, in some countries it is based on the number of employees, and other countries use a mixed criteria like Japan, and it varies in each business. Table 1 shows the definitions of SMEs in Japan.

**Table 1: Definitions of SMEs in Japan**

| Definitions under the Small and Medium-sized Enterprise Basic Act | | | | Definitions under the Corporation Tax Act |
|---|---|---|---|---|
| | SMEs | | Small enterprises | |
| Business type | Stated capital or number of employees | | Number of employees | Stated capital |
| Manufacturing industry and others | ¥300 million or less | 300 or fewer | 20 or fewer | ¥100 million or less |
| Wholesale trade industry | ¥100 million or less | 100 or fewer | 5 or fewer | |
| Services industry | ¥50 million or less | 100 or fewer | 5 or fewer | |
| Retail trade industry | ¥50 million or less | 50 or fewer | 5 or fewer | |

SMEs = small and medium-sized enterprises.

Source: METI (2014).

Limited access to finance, lack of a database, low research and development (R&D) expenditures, undeveloped sales channels, and a low level of financial inclusion are some of the reasons behind the slow growth of SMEs. In this paper, we will focus on four major reasons that have slowed SME development in Asia including: i) lack of finance, ii) lack of comprehensive databases, iii) low level of R&D expenditures, and iv) insufficient use of information technology in SMEs. We will then provide remedies for mitigating them.

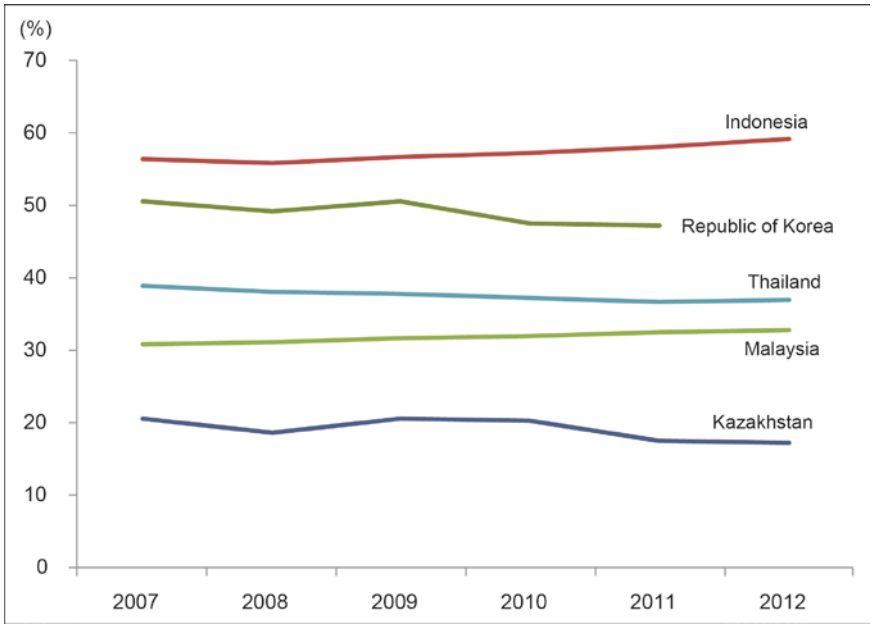
Section 2 of the paper explains the importance of SMEs in Asia, Section 3 describes the challenges SMEs face in Asia, Section 4 provides the solutions, and Section 5 contains concluding remarks.

# 2. IMPORTANCE OF SMES IN ASIA

As for the importance of SMEs in Asia, according to a survey conducted by the Asian Development Bank (ADB) on 14 economies from the five ADB regions: (a) Kazakhstan (Central Asia); (b) the People's Republic of China and the Republic of Korea (East Asia); (c) Bangladesh, India, and Sri Lanka (South Asia); (d) Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam (Southeast Asia); and (v) Papua New Guinea and the Solomon Islands (the Pacific), SMEs, together with microenterprises, account for more than 90% of total enterprises in each country (ADB 2014).

SMEs, including microenterprises, contributed 59.1% of nominal gross domestic product (GDP) in Indonesia in 2012, a figure that is gradually increasing (Figure 1). SMEs and microenterprises in Thailand contributed 37.0% of nominal GDP in 2012, and in Malaysia, 32.7% of real GDP in the same year. Thailand targeted an increase of SME contribution to GDP of 40% or more in its country strategy 2012. In Kazakhstan, the nominal GDP of SMEs tended to increase but their contribution to GDP decreased over 2010–2012, and was 17.3% in 2012.

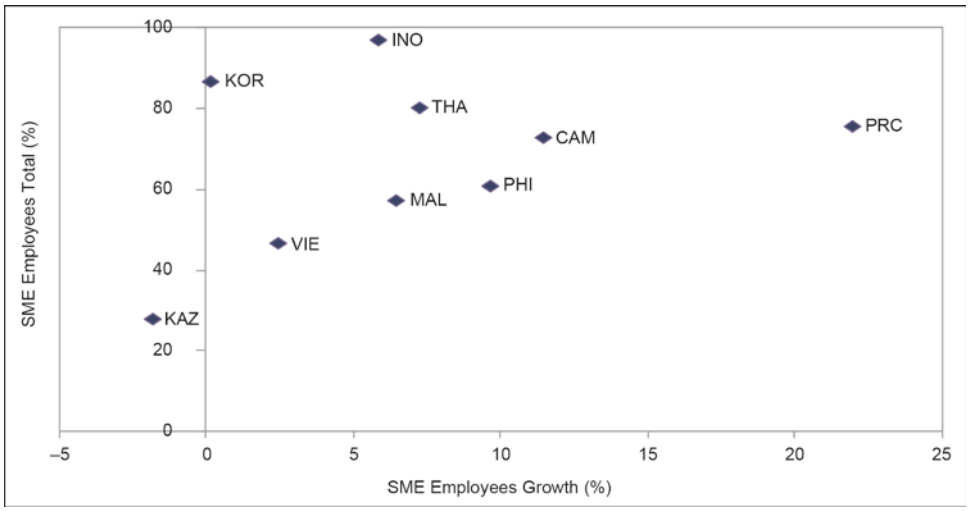
**Figure 1: Small and Medium-sized Enterprises Contribution to Gross Domestic Product**




Note: Republic of Korea SME contribution to gross value-added in manufacturing.
Source: ADB (2014).

The extent of employment by SMEs varies by country (Figure 2). The share of SME employees to total employment ranged between 28.0% (Kazakhstan) and 97.2% (Indonesia) in 2012.

**Figure 2: Employment by Small and Medium-sized Enterprises**




CAM = Cambodia; PRC = People's Republic of China; INO = Indonesia; KAZ = Kazakhstan; KOR = Republic of Korea; MAL = Malaysia; PHI = the Philippines; THA = Thailand; VIE = Viet Nam; SME = small and medium-sized enterprise.

Notes: Data as of 2012 in the PRC, Indonesia, Kazakhstan, Malaysia, Thailand, and Viet Nam. Data as of 2011 in Cambodia, Republic of Korea, and the Philippines.

Source: ADB (2014).

# 3. CHALLENGES SMES FACE

SMEs face challenges from increased competition, the ability to adapt to rapidly changing market demand, technological change, and capacity constraints relating to knowledge, innovation, and creativity. For many SMEs, however, their potential is often not fully realized due to factors related to their small scale:

i. lack of resources (finance, technology, skilled labor, market access, and market information);

ii. lack of economies of scale and scope;

iii. higher transaction costs relative to large enterprises;

iv. lack of networks that can contribute to a lack of information, know-how, and experience of domestic and international markets;

v. increased market competition and concentration from large multinational enterprises caused by globalization and economic integration;

vi. inability to compete against larger firms in terms of R&D expenditure and innovation (product, process, and organization);

vii. subject to "churning" and instability; and

viii. lack of entrepreneurial zeal, capacity, and know-how.

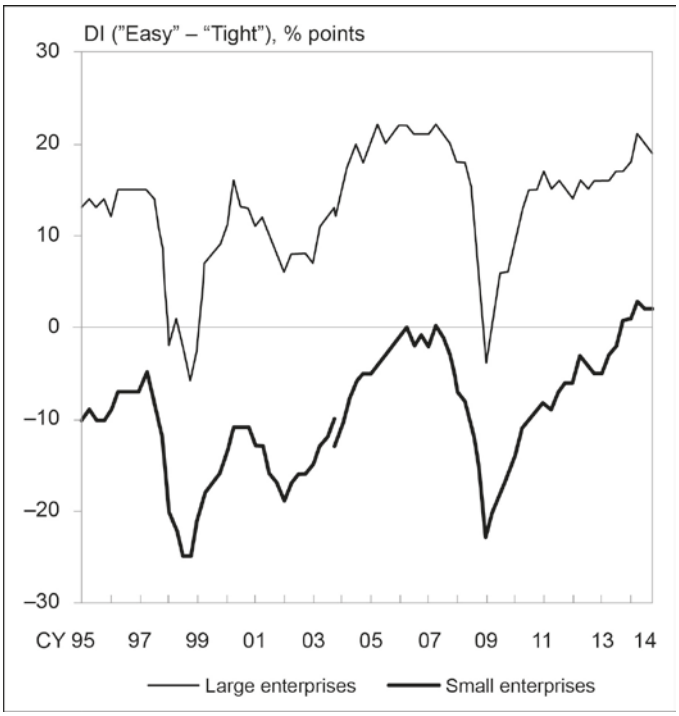
In addition, many small businesses find that their geographical isolation puts them at a competitive disadvantage. Despite these substantial obstacles many economies remain heavily dependent on SMEs, particularly for employment generation. Despite their perceived weaknesses SMEs have not been swept away with the process of globalization and regional integration, but, rather, their role and contribution have changed and evolved which have enabled many to remain internationally competitive and collectively be an important source of employment generation (Harvie and Charoenrat 2015).

In this section we will focus on explaining four major challenges faced by SMEs: i) difficulties in accessing finance, ii) lack of information infrastructure for SMEs, iii) low level of business R&D in the SME business sector, and iv) insufficient use of information technology.

## 3.1 SMEs' Difficulties in Accessing Finance

Figure 3 shows the level of difficulty in raising money depending on firm size: the thick line shows the difficulties faced by SMEs, and the thin line shows the relative ease for large enterprises. Data points below zero indicate that companies are finding it difficult to raise money from either banks or the capital market. SMEs appear to face a more difficult situation in raising money when compared with large firms.

**Figure 3: Access to Finance—Small and Medium-sized Enterprises and Large Firms in Japan**




CY = commercial year; DI = diffusion index.

Note: The diffusion index is a method of summarizing the common tendency of a group of statistical series.

Source: Bank of Japan (2014).

Many banks prefer to allocate their resources to large enterprises rather than to SMEs. The reason is that large enterprises have a lower risk of default and their financial statements are clear. However SMEs are riskier mainly from the point of view of lenders and they do not have clear accounting information.

## 3.2 Lack of Information Infrastructure for SMEs

The financial industry deals with information intrinsically. However, there is an asymmetric information problem between suppliers and demanders of funds in general. Information infrastructure is necessary to remedy this problem. Many big enterprises list their shares on stock markets and issue securities in bond markets. Therefore,

institutional information sharing schemes of capital markets can facilitate access to a wide range of information necessary to estimate the creditworthiness of big enterprises.

However, most SMEs have no connection with capital markets. Financial institutions can closely and continuously observe borrowers, but it is costly to do so for borrowers of small loans.

The lack of information infrastructure for SMEs exacerbates the information asymmetry problem.

In collateral-based lending, the provision of collateral is the simplest way for SMEs and financial institutions to reduce the risk premium in loan formulations. However following the introduction of the Basel capital accord, many governments expanded policy-based finance for SMEs for mitigating the constraints on SME finance as an urgent countermeasure. Under such a situation, efficient and lower cost credit risk evaluation tools were necessary for SME financing, especially for transaction-based lending. To address the serious credit constraints on SMEs to conform to Basel II requirements on risk management, comprehensive information infrastructure is needed. This soft infrastructure will be explained in Section 4 of this paper.

## 3.3 Low Level of Business R&D in SME Sector

Business enterprise expenditure on research and development (BERD) is an important driver of innovation and economic growth. During the last decade, BERD intensity rose significantly in many Asian economies like the Republic of Korea, the People's Republic of China, and India. However in many other Asian economies it slowed or did not increase significantly. An economy's R&D is generally concentrated in a limited number of large firms. In some economies, however, small and medium-sized firms account for a significant share of the total business R&D effort. This may be due to a relatively large body of SMEs or to SMEs that perform a large amount of R&D (such as specialized R&D units that are part of a larger group). The share of SMEs in total BERD in some Asian economies is low, like Japan with only 5%; this is one of the important reasons behind the slowed economic growth in Japan. However, when we look at economies in many non-Asian developed economies this ratio is more than two-thirds like in Estonia and New Zealand (OECD 2013).

Foreign-controlled affiliates also play an important role in domestic R&D. However, when looking at Japanese data, in 2009–2010 they accounted only for 6.3%. In many other Asian economies this ratio is small. But when we look at non-Asian developed economies, this ratio is large, for example 70% in Ireland (OECD 2013).

## 3.4 Insufficient Use of Information Technology in SMEs

Information technology has developed rapidly. Household ownership of mobile phones, smartphones, and tablet computers has also spread quickly in the recent years. Accordingly, more consumers have come to prefer Internet sales to over-the-counter sales and the e-commerce market for individuals is expanding.

However, SMEs have been unable to sufficiently utilize such opportunities. Most small enterprises do not have their own websites. For instance, in Japan while households' mobile phone ownership reached beyond 90% and Internet users reached 90.58% of the population in 2014 (World Bank 2016), SMEs selling products and receiving orders via their own websites accounted for only 10% of the total and less than 10% have their own online shops or market their goods on Internet shopping sites (METI 2014).

# 4. REMEDIES FOR TACKLING SME DEVELOPMENT CHALLENGES

The previous section defined some major challenges that face SMEs. In this section, we provide some efficient remedies for the development of SMEs in Asia, these solutions have worked in some Asian economies and it is necessary to expand them to the rest of Asia.

## 4.1 Diversifying Channels of Financing

In this section, we describe three different methods for easing SME financing by developing (i) credit guarantee schemes by governments, (ii) private SME lenders, and (iii) hometown investment trust funds for financing risky SMEs and start-up businesses.

### 4.1.1 Development of credit guarantee schemes

Owing to the significance of SMEs to Asian national economies, it is important to find ways to provide them with stable finance. However, SMEs usually have severe difficulties raising money. The under supply of credit to SMEs is mainly because of the asymmetric information, high default risk, and lack of collateral. SMEs have more difficulties accessing finance compared to large enterprises. Lending institutions mainly prefer to increase the flow of funds to the latter sector, since the aforementioned reasons are lower in this group. In order to fulfill this problem, various government and donor initiatives have emerged in developed as well as developing and emerging economies, and created the Credit Guarantee Scheme (CGS). The public credit guarantee scheme is a tool to reduce the supply–demand gap in SME finance.

The CGS has been used over the decades in many countries and in various forms as a way to increase the flow of funds into targeted sectors and groups. The purpose for the creation of such schemes is to contribute to the flow of funds in the sectors that have difficulties raising funds, that is, the SME sector. The CGS makes lending more attractive by absorbing or sharing the risks associated with lending to the targeted sector. This scheme can also increase the amount of loan funds available to an enterprise beyond its own collateral limits, because the guarantee is a form of loan collateral. The guarantee manager can assume the additional role of loan assessor and monitor, which can improve the quality of the loans made (Zander, Miller, and Mhlanga 2013). However, guarantee funds have a cost, which is paid through the fees charged and/or subsidized by the government or by third party institutions.

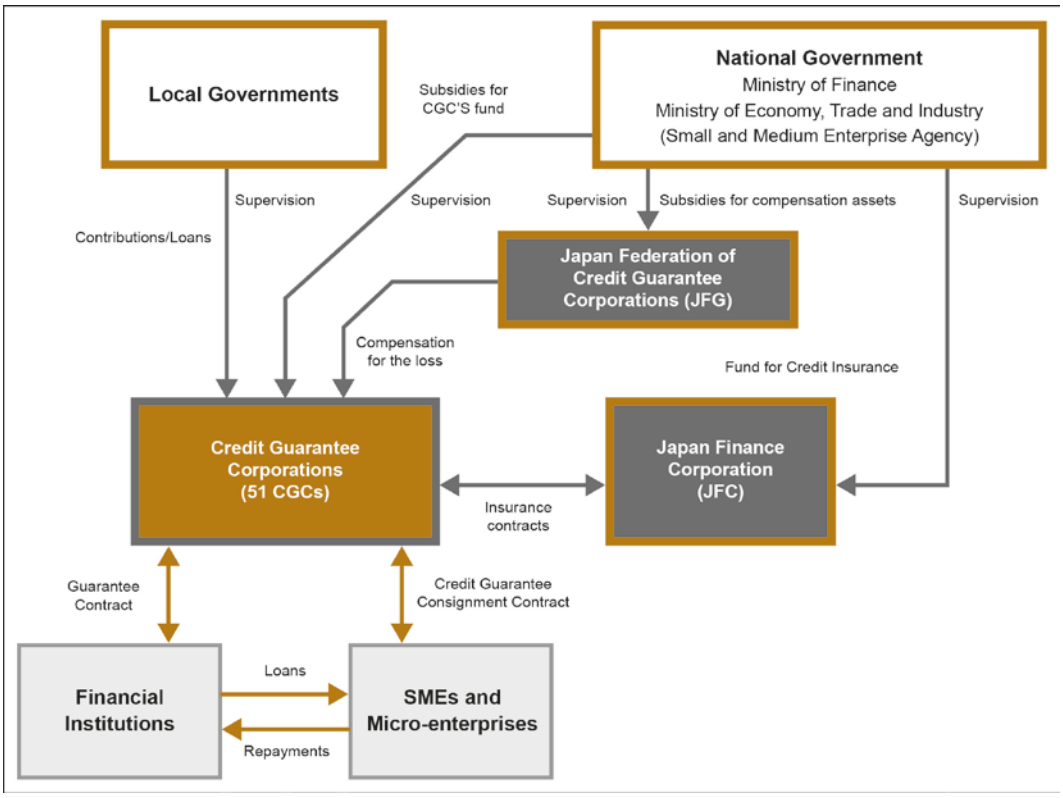
Many countries like Japan used to have full credit guarantee schemes that covered 100% of the default cost incurred by borrowers (Uesugi, Kasai, and Yamashiro 2006). Recently the Government of Japan revised the credit guarantee policy and implemented the partial credit guarantee as the full guarantee had moral hazard. If the government covers 100% of the SMEs default costs and absorbs the full risk, then lending institutions would not need to monitor and analyze the financial health of borrowers, because their risk is covered by the government. Thus, it could raise the number of nonperforming loans in the banking sector and will reduce the productivity of the public reserve. Hence, a partial credit guarantee scheme can be an optimal case.

A CGS consists of at least three parties—a borrower, a lender, and a guarantor. The borrower is often an SME or a micro-enterprise seeking debt capital. This borrower typically approaches a private financial institution (bank) for a business loan. For reasons of asymmetry of information the loan request is frequently turned down by the private lender. This is where the guarantor comes into the picture. The guarantor,

usually a government or trade association, seeks to facilitate access to debt capital by providing lenders with the comfort of a guarantee for a substantial portion of the debt (Riding and Haines 2001).

As it is clear in Figure 4, in this example, CGCs money comes from the national government (from the Ministry of Finance to the Ministry of Economy, Trade and Industry) and also from local governments. The national government provides direct subsidies to CGCs, provides subsidies for compensation assets to the Japan Federation of Credit Guarantee Corporations (JFG), and JFG provides it as compensation in case of losses to the CGCs. Also the national government provides funds for credit insurance to the Japan Finance Corporation (JFC) and JFC uses this these funds to insure the contracts. On the other hand, local governments are also supporters of CGCs that provide contributions and loans to them. In Japan in 2013 almost 3.8 million SMEs were operating, among which 37.9% (1.46 million) were guaranteed by the CGCs. There are 51 CGCs in Japan, one for each prefecture and one in each of the cities of Nagoya, Yokohama, Kawasaki, and Gifu. At the end of 2013, their total liabilities stood at approximately ¥30 trillion.

**Figure 4: Credit Guarantee Scheme, Japan**




Source: Japan Federation of Credit Guarantee Corporations (2014).

Credit guarantee schemes make banks' lending to SMEs easy, because in case of SME default, the credit guarantee cooperation, which is a government organization, will cover a certain percentage of the lender's losses. For example, if the credit guarantee corporation puts 80% as the guarantee ratio, it means if an SME goes into bankruptcy, banks can recover 80% of their loans. If there was no credit guarantee system and if an SME goes into bankruptcy, then banks lose everything. In Japan after the tsunami and earthquake disaster of Fukushima in March 2011, the government decided to make the credit guarantee ratio 100% (full guarantee) because it became more difficult

for many SMEs to borrow money from banks. However, a full guarantee by a credit guarantee corporation creates a moral hazard problem toward banks. In the case of a full guarantee, if an SME goes bankrupt, all the money will be recovered for the banks, therefore banks do not need to carefully monitor the quality of business of the SMEs, whether SMEs are sound or non-sound, banks are willing to lend money.

In Asia, credit guarantee schemes have been widely established. India launched the Credit Guarantee Fund Scheme for Micro and Small Enterprises in 2000 as a partial guarantee scheme; it covers 75% of the credit applied (ADB 2015). Indonesia started a public credit guarantee scheme for micro and small and medium-sized enterprises (MSMEs)—the People's Business Credit scheme (Kredit Usaha Rakyat) in 2007; it guarantees 70%–80% of the credit applied. Kazakhstan has a partial credit guarantee scheme for SMEs (up to 70%) under the Damu Entrepreneurship Development Fund. The Republic of Korea provides credit guarantees for SMEs mainly through two credit guarantee institutions: the Korea Credit Guarantee Fund and the Korea Technology Finance Corporation. In Malaysia, the Credit Guarantee Corporation provides guarantees for SMEs. In Papua New Guinea, a regional bank (Bank South Pacific) provides partial credit guarantees for SMEs (50% of the credit applied). The Philippines has two credit guarantee programs for MSMEs: the partial guarantee scheme provided by the Small Business Corporation (70% of the credit applied), and the Credit Surety Fund Program under the central bank. In the Solomon Islands, the central bank provides a credit guarantee scheme for SMEs, called the Small Business Finance Scheme, covering 90% of the credit applied. The central bank in Sri Lanka also provides credit guarantee schemes for SMEs as well as several credit lines. Thailand developed the portfolio guarantee scheme for SMEs in 2009 as part of the Thai economic stimulus measures against the global financial crisis. Viet Nam has two channels of credit guarantees, although they do not directly target SMEs: the credit guarantee fund operated by the Vietnam Development Bank (85% partial guarantees), and the local credit guarantee funds operated by provincial authorities under the supervision of the Ministry of Finance.

### 4.1.2 Development of specialized private banks for SME financing

In Japan there is a good example of the development of specialized private banks for SME financing, called *shinkin* banks. Shinkin banks are deposit-taking cooperative banks that specialize in financing SMEs within a region. Just like city banks and regional banks, shinkin banks are protected by deposit insurance and are subject to the capital adequacy requirements and other banking regulations and supervision.

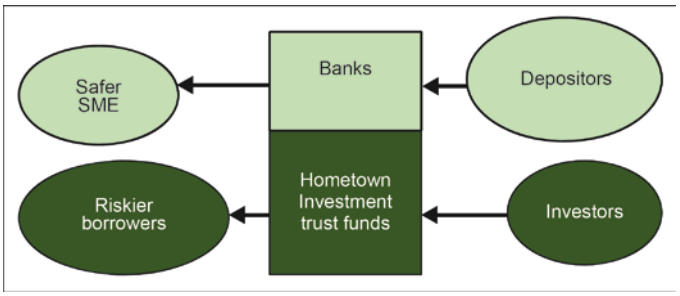
Unlike city banks or regional banks, however, shinkin banks make loans mainly to the member SMEs who capitalize the shinkin banks. They can make loans to non-member SMEs, but they have to restrict the share of the loans to non-member SMEs to below 20%. On the other hand, they can accept deposits from anyone.

Shinkin banks are regional financial institutions in the sense that they can make loans only to SMEs that operate within the same region as the shinkin banks. Shinkin banks are generally smaller than city banks and tier 1 and tier 2 regional banks and larger than credit cooperatives (*shinyo kumiai*). Shinkin banks have a significant role in the development of SMEs in different regions and in achieving comprehensive growth throughout Japan (Hosono, Sakai, and Tsuru 2006). Shinkin banks provide 14.7% share of total loans to SMEs having a total of ¥128 trillion (equivalent to $1,244 billion) in funds (Shinkin Central Bank 2014).

### 4.1.3 Development of hometown investment trust funds for risky SMEs

Given that the financial systems in Asia are dominated by banks, the creation of regional funds (or hometown investment trust funds)[1] to promote lending to start-up companies and riskier borrowers, such as SMEs, would help maintain the soundness of the banking sector, as banks would not be exposed to the risks that lending to such companies pose (Figure 5). Selling those regional trust funds through branch offices of regional banks, post offices, credit associations, and large banks would increase funding sources for regional companies.

**Figure 5: Bank-based Small and Medium-sized Enterprise Financing and Hometown Investment Financing to Riskier Borrowers**




SME = small and medium-sized enterprise.
Source: Yoshino and Taghizadeh-Hesary (2015a).

Such trust funds would not be guaranteed by a deposit insurance corporation and the associated risks would be borne by investors. The terms of a trust fund would have to be explained to investors, such as where their funds would be invested and what the risks would be, in order to strengthen potential investors' confidence and help expand the trust fund market (Yoshino 2013). Examples of such funds in Japan include wind power generators and musicians' funds. In the first example, to construct 20 wind power generators, public–private partnerships were launched and local residents invested $1,000–$5,000 in a fund. They receive dividends every year through the sales of electricity by each wind power generator in which they had invested. Musicians' funds gather many small investors to buy units for $150–$500. If the musicians become successful and their music sells well, the sales will generate a high rate of return for the fund.

Examples of both successful and failed funds can be cited. Project assessors play a key role in evaluating each project to limit the number of nonperforming investments and losses by investors. Some of the funds set up in Japan are regarded as charities, with some investors viewing them as a way to invest in their region to support new business ventures.

Such new ventures pose a problem for banks, as although some will have high expected rates of return, the high risks involved make it difficult for banks to finance them. However, if the projects are financed by hometown investment trust funds rather than by deposits transformed into bank loans, they will not create nonperforming loans for banks. Banks can still benefit and compete with each other by selling the trust funds through their branch offices, although it has to be made clear that an investment in those funds is not guaranteed. If a bank sells successful hometown investment trust funds, it will be able to attract more investors while on the other hand, if it sells

[1] Hometown investment trust funds were only recently established and now have been adopted as a national strategy in Japan (Yoshino and Taghizadeh-Hesary 2014).

loss-making funds, it will lose investors in the future. Competition will improve the quality of projects and enhance the risk-adjusted returns for investors.

A hometown investment trust fund has three main advantages. First, it contributes to financial market stability by lowering information asymmetry. Individual households and firms have direct access to information about the borrowing firms, mainly SMEs that they lend to. Second, it is a stable source of risk capital. The fund is project driven. Firms and households decide to invest by getting to know the borrowers and their projects. In this way, the fund distributes risk, but not so that it renders risk intractable, which has been the problem with the "originate and distribute" model. Third, it contributes to economic recovery by connecting firms and households with SMEs that are worthy of their support. It also creates employment opportunities at the SMEs as well as for the pool of retirees from financial institutions who can help assess the projects (Yoshino 2013; Yoshino and Taghizadeh-Hesary 2014).

## 4.2 Development of SME Database and Credit Risk Analysis of SMEs

Considering the importance of SMEs to many dimensions of Asian economic activity, further efforts need to be made to offer them access to finance. Their financial and nonfinancial accounts are often difficult to assess, but the Credit Risk Database (CRD) in Japan shows how SMEs can be rated based on financial and nonfinancial data. The CRD includes a large amount of data that can be used to rate SMEs through statistical analysis.

**Database provided by the CRD Association**

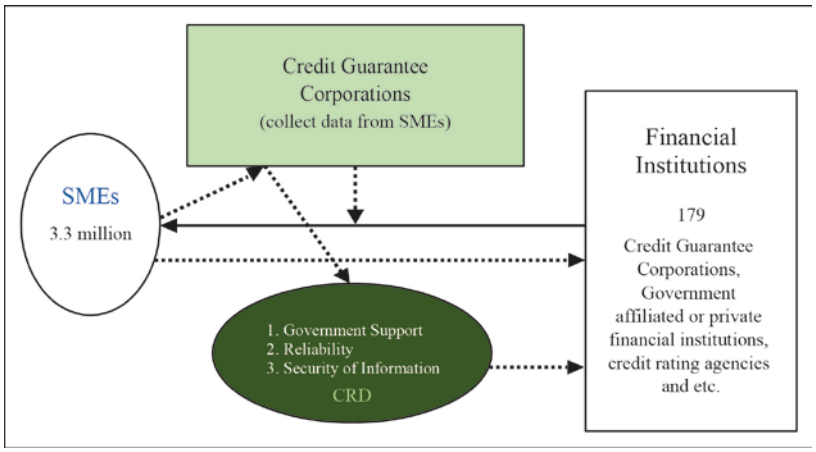
The CRD Association was established in 2001 as an initiative of the Japanese Ministry of Economy, Trade and Industry and the Small and Medium Enterprise Agency. The initial membership was 52 credit guarantee corporations as well as financial and nonfinancial institutions. Its aim was to facilitate fundraising for SMEs and to improve their operational efficiency. The association's membership increased from 73 institutions at the end of March 2002 to 179 by April 2015 (Kuwahara et al 2015).

The CRD covers SMEs exclusively (Figure 6). As of 31 March 2015 it included 2,210,000 incorporated SMEs and 1,099,000 sole-proprietor SMEs, and it is the largest SME database in Japan. The database for enterprises in default covered 500,000 incorporated and sole-proprietor SMEs (Yoshino and Taghizadeh-Hesary 2015b). The CRD Association receives active support from both the private and public sectors, which have contributed to its success. For example, the Small and Medium Enterprise Agency nominates representatives of the CRD Association to government councils, which gives the association an opportunity to promote its activities and increase its membership. Credit guarantee corporations and private financial institutions use the CRD when they create a joint guarantee scheme.[2] Before the CRD was formally established, the government invested ¥1.3 billion from the supplementary

[2] A credit guarantee system would make it easier for banks to lend money to SMEs. For example, in the case of an SME default, a percentage of the losses would be met by the credit guarantee corporation, which is a government organization. For example, assuming a credit guarantee corporation sets 80% as the guarantee ratio, if an SME went into bankruptcy, a bank could recover 80% of its loan. If there was no credit guarantee system in place and an SME went into bankruptcy, the bank would lose its entire loan. Research is needed into the optimal level of partial credit guarantees; that is, the percentage at which a credit guarantee corporation can encourage lending yet ensure that banks have an incentive to carefully assess the creditworthiness of borrowers. Arráiz, Meléndez, and Stucchi (2014) have provided a framework for a partial credit guarantee system.

budgets for fiscal years 1999 and 2000 to finance the setting up of the CRD's computer system and other operational costs. The association provides sample data and statistical information, and scoring services.

**Figure 6: Credit Risk Database of Small and Medium-Sized Enterprises**




CRD = Credit Risk Database; SME = small and medium-sized enterprise.
Source: Authors and CRD website. www.crd-office.net

Member financial institutions use scoring models to evaluate creditworthiness, check the validity of internal rating systems, and align loan pricing with credit risk. In addition, the CRD Association provides consulting services to support the management of SMEs on the assumption that if SMEs are better managed, this will reduce the credit risk for member financial institutions and strengthen SME business operations. Consulting services have also been offered to member financial institutions to help them promote implementation of Basel II.

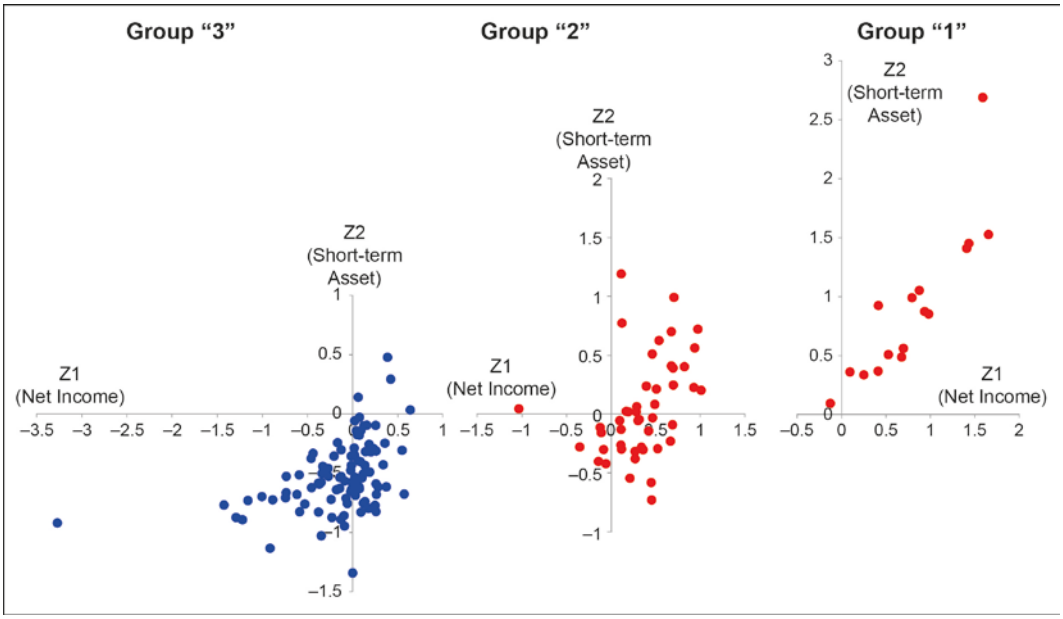
If such systems could be established in other parts of Asia to accumulate and analyze credit risk data, and to measure each SME credit risk accurately, SMEs would not only be able to raise funds from the banking sector, they could also gain access to the debt market by securitizing their claims.

### SME credit ratings

Credit ratings are opinions expressed in terms of ordinal measures, reflecting the current financial creditworthiness of issuers such as governments, firms, and financial institutions. These ratings are conferred by rating agencies—such as Fitch Ratings, Moody's, and Standard and Poor's—and may be regarded as a comprehensive evaluation of an issuer's ability to meet their financial obligations in full and on time. Hence, they play a crucial role by providing participants in financial markets with information for financial planning. To conduct rating assessments of large corporations, agencies resort to a broad range of financial and nonfinancial pieces of information, including experts' expectations. Rating agencies usually provide general guidelines on their ratings decision-making process, but detailed descriptions of the rating criteria and the determinants of banks' ratings are generally not provided (Orsenigo and Vercellis 2013). In search of more objective assessments of the creditworthiness of large corporations and financial institutions, there has been a growing body of research into the development of reliable quantitative methods for automatic classification according to their financial strength.

Extensive empirical research devoted to analyzing the stability and soundness of large corporations dates back to the 1960s. Ravi Kumar and Ravi (2007) provided a comprehensive survey of the application of statistical and intelligent techniques to predicting the likelihood of default among banks and firms. Despite its relevance, however, the development of reliable quantitative methods for the prediction of large corporations' credit ratings has only recently begun to attract strong interest. These studies are conducted mainly within two broad research strands focusing on statistical and machine learning techniques, and may address both feature selection and classification. Poon, Firth, and Fung (1999) developed logistic regression models for predicting financial strength ratings assigned by Moody's, using bank-specific accounting variables and financial data. Factor analysis was applied to reduce the number of independent variables and retain the most relevant explanatory factors. The authors showed that loan provision information, and risk and profitability indicators added the greatest predictive value in explaining Moody's ratings. Huang et al (2004) compared support vector machines and back-propagation neural networks to forecast the rating of financial institutions operating in the United States and Taipei,China. In each case, five rating categories were considered based on information released by the respective rating agencies. The analysis of variance was used to discard non-informative features. In this study, support vector machines and neural networks achieved comparable classification results. However, the authors found that the relative importance of the financial variables used as inputs by the optimal models were quite different between the two markets.

**Figure 7: Classification of Small and Medium-sized Enterprises**




SME = small and medium-sized enterprise.

Note: Group 1 = financially healthy SMEs; Group 2 = medium-risk SMEs; Group 3 = financially risky SMEs.

Source: Yoshino and Taghizadeh-Hesary (2015b).

As mentioned earlier, the main purpose of developing a CRD is to create the infrastructure for improved credit ratings of SMEs. There are various methods for performing credit rating analysis using data on SMEs. A comprehensive credit rating method developed by Yoshino and Taghizadeh-Hesary (2014; 2015b) employed statistical analysis techniques on various financial variables of a group of SME customers of an Iranian bank. As Figure 7 shows, the analysis classified SMEs into

several groups: financially healthy SMEs, medium-risk SMEs, and financially risky SMEs. A detailed analytical framework is explained in Yoshino and Taghizadeh-Hesary (2014; 2015b).

For SMEs in the financially healthy group, banks can lend them more money by charging low rates of interest with no required collateral. On the other hand, for SMEs in the high-risk group, banks can charge higher rates of interest with greater collateral requirements. If an SME's performance improves and it moves into a lower risk group, banks can change their interest rates from high to low, accordingly. Similar SME data analysis is underway in Thailand. We hope the data analysis explained in this paper can be expanded to many other Asian economies so that more reliable credit rating of SMEs will become possible. When data are not well established, banks lend money to SMEs based on their intuition rather than examining solid data. The establishment of SME databases will reduce information asymmetry between SMEs and lenders.

## 4.3 R&D Tax Incentives

In addition to providing grants, contracts, and loans, Asian governments should contribute to business R&D through tax incentives. This is what is occurring in many Asian economies. For instance, the Government of the Republic of Korea provided one of the most combined support incentives for business R&D as a percentage of GDP. Effective tax subsidy rates should be influenced by business characteristics, and should vary based on the type of the business and maturity of the company. Among Asian economies Japan and the Republic of Korea give more generous treatment to SMEs relative to large firms. Some countries allow firms to benefit from tax incentives when they are not profitable enough to use them in the current period, but few do so to a significant extent. Australia provides a tax credit equal to 40% or 45% of eligible R&D expenditure, with any excess refundable to SMEs (Deloitte 2014).

Refunds by authorities effectively allow SMEs to benefit from incentives as if they were profitable. Refunds and carry-forward provisions are sometimes used to promote R&D in firms that could not otherwise use their credits or allowances. Such provisions should be more generous for SMEs and younger firms.

In this subsection, we provide an example of Japanese new R&D tax policies toward large enterprises and SMEs, which is applicable for the rest of Asia:

Japanese R&D taxed incentives are volume-based credits for a) SMEs and b) large enterprises.

a) SMEs[3]
   - A credit of 12% of total R&D expenditures.
   - The tax credit is limited to 20% of the company's national corporate income tax liability before the credit is applied. The 20% limitation applies for fiscal periods beginning on or after 1 April 2012. Previously the limitation was 30% for the fiscal years beginning on or after 1 April 2009, up to 31 March 2012.

b) Large companies
   - A credit of 8% to 10% of total R&D expenditures.
   - The tax credit limitation is the same as for SMEs as outlined above.

[3] SMEs in this policy are companies whose capital does not exceed ¥100 million, excluding an SME held by a large company and/or companies, whose capital exceeds ¥100 million.

Additional incremental credits (for both SME & large companies). Either, where the current period R&D expenditure exceeds: (i) the annual average of the R&D expenditure for the 3 preceding fiscal years; and (ii) the highest annual R&D expenditure for the previous 2 fiscal years, then the company may claim 5% of the incremental R&D expenditures (that is, the current year expenditure less the amount in (i)); or where the current period R&D expenditure exceeds 10% of the average annual sales for the 4 most recent preceding fiscal years Japan offers separate credits for small-and-medium sized enterprises and large companies, as well as an additional credit for entities of all sizes. (Including the current year), the company is eligible for a credit calculated using the following formula: (R&D expenditure less [average annual sales x 10%]) multiplied by the R&D ratio (reduced by 10%), multiplied by 20%. The R&D ratio is the amount of current year R&D expenses divided by average annual sales for the 4 most recent preceding fiscal years (including the current tax year). The tax credit is limited to 10% of the company's national corporate income tax liability before the credit is applied. The additional tax credit is available for fiscal years commencing on or after 1 April 2008 through 31 March 2014. The R&D tax credit is available to blue form tax return filers.[4] A blue form tax return status is obtained by submitting an application form to the appropriate tax office. Furthermore, there are record keeping substantiation requirements applicable under the corporate tax law. Another R&D credit system is applicable for a company conducting R&D jointly with a qualified R&D institution (for example, designated universities). Generally, unused R&D tax credits may be carried forward 1 year. The unused R&D tax credits for the fiscal years beginning on or after 1 April 2009 to 31 March 2010 may be carried forward up to 3 years. Research credits for fiscal years beginning on or after 1 April 2010 to 31 March 2011 may be carried forward 2 years.

### 4.3.1 Collaboration on innovation

Collaboration is a key vector of innovation-related knowledge flows both for firms that use R&D (either internally developed or externally acquired) and for those that are not R&D active. In all economies for which data are available, R&D active firms tend to collaborate more frequently on innovation than non-R&D active firms, although in the Republic of Korea (manufacturing only) and Australia, both types of firms have similar rates of collaboration. Patterns of collaboration differ in terms of partners' characteristics. Collaboration with higher education or public research institutions is an important source of knowledge transfer for large firms. In most economies, these firms are usually two to three times more likely than SMEs to engage in this type of collaboration. More than half of all innovating large firms in Finland, Slovenia, Austria, and Hungary collaborate with these institutions but less than one in ten in Mexico and Australia. Collaboration is more frequent with other market actors, in particular suppliers and clients. Among large firms, suppliers play a key role as value chains become increasingly integrated, while in Finland, the United Kingdom, the Republic of Korea, South Africa, and Iceland, collaboration with clients is equally or more importantly, a potential indication of the growing importance of user-driven innovation.

[4] A Japanese taxpayer becomes a "blue form" tax filer by submitting an election to the authorities and then maintaining their accounting records to an acceptable standard. In theory, the blue form tax return system is intended to encourage better record keeping and reporting by individual and corporate taxpayers by conferring certain benefits on the "blue form" tax filers. In practice many of the benefits from blue form filing status (such as the carry forward of tax losses) are fundamental to the Japanese tax system.

## 4.4 Utilizing Information for SMEs

In order to teach the new methods of sales using the Internet, it is possible that national governments through the municipalities which are nationwide, or through societies of commerce and industry and chambers of commerce and industry provide close mentoring style support to SMEs and small enterprises, in each region acting as "primary care doctors".

In Japan, the government planned that Small and Medium Enterprises Comprehensive Support Centers be established in 47 prefectures nationwide from April 2013 onward with the aim of further strengthening the support system for SMEs and small enterprises.

These centers have the following three functions: (i) provide comprehensive and advanced business advice that cannot be fully dealt with by existing support organizations, (ii) offer support through organizing expert teams optimized for particular problems of respective enterprises, and (iii) introduce appropriate support organizations (one-stop services).

The non-use of information technology has not only damaged SME sales, but also made many SMEs unfamiliar with the ongoing support available. For example in a survey done in Japan, approximately 50% to 60% of SMEs and small enterprises responded that they are not sure about where they can obtain information on SME support measures. Approximately 50% do not obtain any such information. Only 10% have utilized SME support measures but some 70% of those evaluate the measures positively (METI 2014).

The SMEs' responses in this questionnaire highlighted the following concerns:

- A high percentage of enterprises hope to obtain information concerning the government's SME support measures from SME support organizations and municipalities. Therefore, the government should actively hold face-to-face briefing sessions not only for prefectures but also for municipalities and SME support organizations at an early stage.
- Approximately 50% responded that the amount of information concerning the government's SME support measures is inadequate. Those who responded that the timing of obtaining information is not timely, accounted for approximately 50% and those who responded that information is hard to understand also accounted for approximately 50%.
- In light of these survey results, the government decided to endeavor to improve the "direct consulting briefing services" and the content of email publications, and also prepare a video in which officials explain the content of the support measures, including their background and intended purposes, in an easy-to-understand manner and place it on the SME Agency's portal website.

# 5. CONCLUSIONS

SMEs face challenges from increased competition, the ability to adapt to rapidly changing market demand, technological change, and capacity constraints relating to knowledge, innovation, and creativity. For many SMEs, however, their potential is often not fully realized due to factors related to their small scale: lack of resources (finance, technology, skilled labor, market access, and market information); lack of economies of scale and scope; higher transaction costs relative to large enterprises; lack of networks

that can contribute to a lack of information, know-how, and experience of domestic and international markets; increased market competition and concentration from large multinational enterprises caused by globalization and economic integration; an inability to compete against larger firms in terms of R&D expenditure and innovation (product, process, and organization); being subject to "churning" and instability; and a lack of entrepreneurial zeal, capacity, and know-how.

This paper provided solutions for mitigating four major challenges faced by SMEs:

i) Three different methods for easing SME financing are by developing (i) credit guarantee schemes by governments, (ii) private SME lenders, and (iii) hometown investment trust funds for financing risky SMEs and start-up businesses.

ii) The lack of SME databases is another challenge for SMEs. Their financial and nonfinancial accounts are often difficult to assess. As a possible solution for other Asian economies, we provided the example of the Credit Risk Database (CRD) in Japan that shows how SMEs can be rated based on financial and nonfinancial data. The CRD includes a large amount of data that can be used to rate SMEs through statistical analysis.

iii) The third major challenge of SME development is the lack of R&D expenditure. To mitigate this problem we provided a variety of solutions. In addition to providing grants, contracts, and loans, Asian governments should contribute to business R&D through tax incentives. This is already occurring in many Asian economies. Collaboration is a key vector of innovation-related knowledge flows both for firms that use R&D (either internally developed or externally acquired) and for those that are not R&D active.

iv) The last major challenge for SME development is the insufficient use of information technology for sales. It is possible that national governments through the municipalities that are nationwide, or through societies of commerce and industry and chambers of commerce and industry provide close mentoring-style support to SMEs and small enterprises for teaching them how to use information technology in their business.

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