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APEC SME Internationalization Model Indices: Development and Application

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Executive Summary

Background and Objectives

Internationalization is important for SMEs, and needs for government support policies are increasing in order to facilitate and diversify SME internationalization. As such, it is essential to objectively assess SME internationalization levels using model indices, on which potential problems in internationalization must be addressed. In this respect, APEC has stressed the importance of studies on the development of model indices and data collection regarding SME internationalization.

This work is significant, especially for APEC member economies employing a vast range of definitions for their SMEs, based on several criteria. These complexities make it difficult to compare statistics on SMEs across all members. Moreover, gaps in government policies and the innovative capacities, entrepreneurship, and business strategies of SMEs present significant challenges in developing such a tool.

This study's aim is to develop APEC SME Internationalization Model Indices. The feasibility of these model indices was tested using data collected through pilot studies from five member economies. Based on these studies, internationalization indices were calculated to perform several analyses.

APEC SME Internationalization Model Indices

SME internationalization is defined as the process through which SMEs strengthen their positions for global business by diversifying overseas markets and sourcing methods based on firm capacities.

APEC SME Internationalization Model Indices are rooted in the New-New Trade Theory that explains a firm's internationalization activities in terms of corporate productivity and fixed export costs, under the assumption that firms are heterogeneous. This model categorizes the types of internationalization activities as export, import, international subcontracting, international cooperation, and FDI activities. The Model is comprised of the IPI (Internationalization Participation Index) and ICI (Internationalization Composite Index), where the former measures the degree to which SMEs participate in various international activities, while the latter is divided into two parts: one measures the degree of diversity in internationalization activities (e.g. the number of partners) (Diversity Index) and the other measures the degree to which they conduct intensive international activities (e.g. cost or investment) (Intensity Index). Internationalization indices are calculated based on a simple or weighted average of the Participation Index, Diversity Index, and Intensity Index, where weights are given to the five internationalization activities as well as three indices, with the indices standardized beforehand.

SME Internationalization Levels in the APEC Region

In order to examine the feasibility of the Model Indices, data and information were collected from five APEC member economies - Chile; Korea; Malaysia; Philippines; and Thailand. Using the collected data, this study calculated APEC SME Internationalization Indices. The

overall internationalization index figure for APEC is 48.396. When the indices are divided into three sub-indices, the Participation Index is 49.553, the Diversity Index is 46.097, and the Intensity Index is 44.813. As a general rule, the larger the firm size, the higher the level of internationalization. Electronics, metals, and machinery industries were proven to be the most internationalized sectors. In terms of each industry, food-textiles-chemicals shows the greatest degree of internationalization in terms of participation, while electronics and metals are the most prominent in terms of diversity and intensity, respectively.

According to the comprehensive analysis of economy-firm size-industry, internationalization levels are relatively high and evenly spread out for Korea and Thailand across the various firm sizes and industries, while Korea shows a greater overall number of cells for which the internationalization level is high. Again, larger firm sizes generally coincides with higher internationalization levels in all economies, and the internationalization level of all economies is high across all firm sizes in the food-textiles-chemicals sector. A detailed analysis of each economy is presented in the paper.

In the diversity-intensity analysis, the Diversity Index is generally higher than the Intensity Index across all economies. It is also shown here that larger firm sizes bring greater results in the Participation Index and Diversity Index. However, this is not the case in the Intensity Index.

In the final analysis, R&D, export history, openness, and industry characteristics are proven to be important determinants of SME internationalization. On the other hand, readiness to expand overseas and government support policies are found to have little to no significant impact on internationalization.

Global Capacity and Environment for Internationalization

In examining the global capacity and environment of internationalized economies, successful factors can be found. First, the readiness of SMEs to attempt overseas expansion – the retention of export departments and foreign promotional materials – is at a high level. Second, the ratio of R&D-performing SMEs and their innovative capacities are at high levels. Moreover, these SMEs retain relatively more IPRs and certifications. Third, government support policies are well-known or implemented effectively. The most important and common motive for SME internationalization is “To expand the market for products and services.” Expenses for overseas expansion and financial difficulties are pointed out as the most serious and common obstacles working against internationalization.

Future Work

Based on the above analyses, it is concluded that these model indices are feasible and applicable for measuring the internationalization of SMEs in the APEC region. On the other hand, this study has a few limitations in terms of data collection due to constraints related to budget and time, and thus reliability in comparative analysis became difficult in some cases. For future studies, due consensus is required among member economies regarding the importance and necessity of data collection. Moreover, the scope of study needs to be further expanded to non-exporting SMEs and service SMEs.

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I. Introduction

1. Background

Internationalization has grown exponentially more complex with the expansion of globalization. Previously, companies primarily focused on trade as the main source of growth. Reductions in trade barriers and technological advances have facilitated the movement of goods, services and people between economies and have contributed to a substantial increase in international trade. However, today, companies are becoming increasingly involved in global value chains and in establishing diverse forms of collaboration, including joint ventures, non-equity strategic alliances, licensing agreements and so on. This trend has been seen in the evolution of small and medium-sized enterprises (SMEs), as well, although SMEs typically face greater obstacles compared to large enterprises.

Internationalization is important for SMEs in that it improves the potential global capacities of SMEs, allowing them to make more significant contributions to the economy. Recent empirical studies on international trade at the firm level have shown that firms engaging in export activities or foreign direct investment (FDI) are generally more productive and larger than those serving only their domestic markets (Bernard and Jensen, 1999, 2004; Head and Ries, 2003; and Tomiura, 2007). This is consistent with the theoretical predictions of heterogeneous-firm trade models, most notably those of Melitz (2003) and Helpman, Melitz and Yeaple (2004), in which only productive firms pay costs associated with export activities and FDI, and would hence serve foreign markets. Thus, as global business environments shift, there is an increasing need for government policies which can facilitate and diversify internationalization. As such, it is essential to fully analyze SME internationalization levels using model indices so that potential problems can be addressed.

However, there is no single tool at this time which is capable of measuring the internationalization levels of SMEs. This is because the patterns of internationalization are diverse, especially in the APEC region, where gaps in government policies and in the innovative capability, entrepreneurship, and business strategies of SMEs make developing such a tool a significant challenge.

With that said, there have been prior attempts made to measure the internationalization levels of SMEs. The European Union (EU) surveyed the current state of the internationalization level of some 9,480 SMEs in EU members and non-EU members by reporting the ratio of SMEs divided into five distinct categories of internationalization activities.[1] The United Economies Conference on Trade and Development (UNCTAD) developed the Transnationality Index (TI) to rank the top 100 multinational enterprises (MNEs).[2] Because the IT was developed specifically to analyze MNEs, it is difficult to apply it directly to SMEs. Furthermore, the limitations to acquire the necessary data on SMEs results in a less-than-ideal situation in which only partial indices can be used. Therefore, the majority of existing research on SME internationalization remains in the form of literature and case studies.

Bearing in mind the given limitations, this study aims to develop APEC SME internationalization model indices that can measure the internalization of SMEs in the APEC region. Specifically, this study has three objectives: 1) to define the concept of SME internationalization and develop APEC SME internationalization model indices; 2) to apply these developed model indices to APEC member economies and collect relevant data; and 3) to devise a set of recommendations to help APEC economies build capacity for successful internationalization.

[1] EU (2011).

[2] UNCTAD (2007).

2. Study Structure

This study is structured as follows. After this chapter, Section II provides an overview of SMEs in the APEC region, including a definition of SMEs and a description of their contributions to the national economy.

Section III describes the developed APEC SME Internationalization Model Indices. First, it defines SME internationalization and the types of internationalization. Then, it reviews the existing literature on trade and industrial organizations, from which the internationalization model indices are developed.

Section IV describes the objective of the pilot studies and the data sampling method, as well as the data collection results.

Section V analyzes the pilot study results. First, using the pilot study results, it applies the model indices to extract several SME internationalization indices. Second, examinations are done through intensity-diversity analysis and comparisons of internationalization levels according to economy, firm size and industry. Moreover, an econometric analysis is performed to study the relationship between the level of internationalization and the global capacity of firms. Third, based on the survey results, the global capacity and business environment surrounding SMEs in the APEC region are analyzed.

Section VI details conclusions and recommendations.

II. Overview of SMEs in the APEC Region

1. Definition of SMEs

The APEC member economies employ a diverse range of definitions of SMEs based on several criteria – the number of employees, sales/revenue, assets and capital/investment. Some define SMEs based on a single criterion, while others apply several criteria. Australia; Japan; and Mexico use the number of employees as the given criterion; Malaysia and Thailand also use the number employees but further details SMEs by industry. China and Indonesia use the combined criteria of the number of employees, sales/revenue and capital/investments. Moreover, not including Hong Kong, China; Singapore; and the United States, other economies classify SMEs into micro, small and medium enterprises. These complex and varied definitions found among the APEC members make it difficult to compare statistics on SMEs across the different economies.

<Table 1> Definitions of SMEs in APEC Economies

Economy	Micro, Small and Medium Enterprise (MSME) Definitions (IFC)		
	Micro	Small	Medium
Australia	1-4 employees	5-19 employees	20-199 employees
Brunei Darussalam	1-5 employees	6-50 employees	51-100 employees
Canada	1-4 employees	5-99 employees	100-499 employees
Chile	≤2,400 UF	2,400 UF ≤ s ≤ 25,000 UF	25,000 UF ≤ s ≤ 100,000 UF
China	<0.5 million RMB in agriculture, fishery; <20 employees, 3 million RMB in heavy industries; <5 employees, 10 million in wholesale trade	≥0.5 million RMB agriculture, fishery; ≥20 employees, 3 million RMB in heavy industries; ≥5 employees, 10 million in wholesale trade	≥5 million RMB in agriculture, fishery; ≥300 employees, 20 million RMB in heavy industries; ≥20 employees, 50 million in wholesale trade
Hong Kong, China	<100 employees in manufacturing, <50 in other		
Indonesia	a ≤ 50 million IDR; total annual sales ≤ 300 million IDR	50 million IDR < a ≤ 500 million IDR ; 300 million IDR < t ≤ 2,5 billion IDR	500 million IDR < a ≤ 2,5 billion IDR ; 2,5 billion IDR < t ≤ 50 billion IDR
Japan	1-4 employees	5-19 employees	20-299 employees

Korea	<12 billion KWR in manufacturing.; < 8 billion KWR in mining, construction, transportation ; <5 billion KWR in IT; < 10 in other		<150 billion KWR in manufacturing; < 100 billion KWR in mining, wholesale, construction ; <80 billion KWR in transportation, IT; < 40 billion in other
Malaysia	<5 employees	5-50 employees in manufacturing; 5-19 in agriculture and services	51-150 employees in manufacturing; 20-50 employees in agriculture and services
Mexico	0-10 employees	11-50 employees	51-250 employees
New Zealand	1-9 employees	10-99 employees	100-499 employees
Peru	<150 UIT	150 UIT < s < 1700 UIT	1700 UIT < s < 2300 UIT
Philippines	1-9 employees Below Php 3 million	10-99 employees Above Php 3 million to Php 15 million	100-199 employees Above Php 15 million to Php 100 million
Russia	1-15 employees or <60 million RUB	16-100 employees or <400 million RUB	101-250 employees or < 1 billion RUB
Singapore	< 200 employees or 100 million SGD		
Chinese Taipei	<5 employees	≤2.42 million TWD, 200 employees in manufacturing, mining, construction, quarrying; ≤3.03 million TWD, 100 emp. in agriculture, services	
Thailand		<50 employees in production, services <25 employees in wholesale <15 employees in retail	<200 employees in production, services <50 employees in wholesale <30 employees in retail
United States	<500 employees or 0.75million USD depending on industry		
Viet Nam	<10 employees	10-200 employees or c < 20 billion VND in agriculture, construction; 10-50 employees or c < 10 billion VND in trade and services	200-300 employees or c < 100 billion VND in agriculture, construction; 50-100 employees or c < 50 billion VND in trade and services

Source: IFC (2016). MSME Country Indicator.
OECD (2013). *Financing SME and Entrepreneurs 2013: An OECD Scoreboard.*

2. Contributions to Economy

Over 97% of enterprises located in the APEC economies are SMEs. Many economies are comprised solely or nearly solely of SMEs (99%-100% of the given economy's total number of enterprises). 98%-98.9% of the enterprises in Hong Kong, China; Chile; and Brunei Darussalam are defined as SMEs in contrast to 97%-97.9% of the enterprises in Chinese Taipei; Viet Nam; and Malaysia. However, the size of SMEs in these regions is very small, with about 80% of the economies being primarily composed of micro-enterprises (60% or more of the total enterprises). On the other hand, the overall ratio of medium-enterprises is very low but relatively high within Australia; China; and Japan; medium-enterprises make up over 10% of each of the enterprises in these three economies.

<Figure 1> Ratio of SMEs in APEC Enterprises

Source: APEC (2016). SMEs in the APEC Region (Infographic).

<Table 2> Number and Ratio of SMEs in APEC Economies

Economy	Number of MSMEs			Size Breakdown (% of all MSMEs)		
	Micro	SMEs	Total MSMEs	Micro	Small	Medium
Australia	527,445	306,617	834,062	63.2	27.4	9.4
Brunei Darussalam	16,254	21,546	37,800	43.0	53.0	4.0
Canada	817,203	265,576	1,082,779	75.5	22.7	1.9
Chile	586,464	138,919	725,383	90.4	7.8	0.6
China	0	10,231,000	10,231,000		90.0	10.0
Hong Kong, China	n/a	n/a	280,000	-	-	-
Indonesia	22,408,365	247,466	22,655,831	98.9	1.0	0.1
Japan	3,487,042	2,218,974	5,706,016	61.1	30.1	8.8
Korea	2,874,794	99,391	2,974,185	86.6	10.4	2.9
Malaysia	434,939	113,328	548,267	74.9	19.4	3.0
Mexico	3,550,472	177,577	3,728,049	95.5	3.6	0.2
New Zealand	120,329	28,058	148,387	81.1	17.9	1.0
Peru	667,210	18,452	685,662	98.1	1.5	0.3
Philippines	720,191	60,278	780,469	92.3	7.4	0.4
Russia	1,065,016	296,821	1,361,837	85.0	14.0	1.0
Singapore	160,000	0	160,000	100.0		
Chinese Taipei	-	-	1,331,182	97.64 of all enterprises		
Thailand	0	2,264,525	2,264,525		99.6	0.4
United States	4,730,815	1,273,241	6,004,056	78.8	19.7	1.5
Viet Nam	2,660,000	47,800	2,707,800	65.7	29.6	2.2

Source: IFC (2016). MSME Country Indicator.
OECD (2013). *Financing SME and Entrepreneurs 2013: An OECD Scoreboard.*

The contribution ratio of SMEs to the national economy varies significantly across economies, ranging between 21% and 59%. The contribution of SMEs is the highest in China and the lowest in Russia. SMEs make a more significant contribution to employment, ranging from 25% to 92%. The contribution to employment varies significantly across economies here as well. It is the highest in Indonesia and the lowest in Russia.

<Table 3> SME Contribution to Economy and Employment

Economy	% of Contribution to National Economy	National Economy	% of Contribution to Employment	Employment
Australia	39%	Value Added (2011-2012)	-	-
Brunei Darussalam	22%	GDP (2008)	58%	2008
Canada	39%	GDP (2008)	90%	2012
Chile	-	-	80%	2010-2011
China	59%	GDP (2011)	75%	2011
Hong Kong, China			47%	2012
Indonesia	59%	GDP (2012)	92%	2010
Japan	51%	GDP (2009)	66%	2009
Korea	54%	GDP (2010)	87%	2011
Malaysia	33%	GDP (2012)	57%	2012
Mexico	36%	GDP (2009)	67%	2009
New Zealand	34%	GDP (2010)	43%	2012
Peru	-	-	62%	2010
Philippines	36%	Value Added (2011)	61%	2011
Russia	21%	GDP (2011)	25%	2012
Singapore	47%	GDP (2013)	70%	2013
Chinese Taipei	30%	Total Annual Sales (2011)	78%	2011
Thailand	37%	GDP (2011)	84%	2011
United States	50%	GDP (2010)	56%	2009
Viet Nam	40%	GDP (2011)	77%	2011

Source: APEC (2016). SMEs in the APEC Region (Infographic).

SMEs exist in most sectors, accounting for over 90% of all enterprises within a given sector. The sectors with the largest proportion of SMEs are wholesale and retail, agriculture and fishing, and construction. Those with the smallest proportion are mining and quarrying, oil, gas extraction and utilities.

<Table 4> Sectors with the Highest and Lowest Share of Total SMEs

Economy	Highest Share Sector	% of SMEs	Lowest Share Sector	% of SMEs	Year
Australia	Property and Business Services	25.3	Electricity, Gas, and Water Supply	0.1	Jun-07
Brunei Darussalam	Wholesale and Trading	21.1	Oil and Gas	0.2	2008
Canada [2]	Retail Trade	12.3	Utilities	0.1	Jun-09
Chile	Wholesale and Retail	39.3	Electricity, Gas, and Water Supply	0.2	2000
Hong Kong, China [3]	Import/Export Trade and Wholesale	38.9	Mining, Quarrying; Electricity, Gas, Waste Mgmt; Construction	0.4	D e c -09
Indonesia	Agriculture , Livestock, Forestry, Fisheries	51.5	Electricity, Gas, and Water Supply	0.02	2008
Japan [4]	Wholesale and Retail Trade	27.5	Mining	0.1	2006
Korea	Wholesale and Retail	28.4	Electricity, Gas, Steam, and Water	0.01	2007
Mexico [5]	Retail	49.8	Management of Companies and Enterprises	0.01	2003
Peru [6]	Services	47.0	Agriculture and Fishing	2.0	2006
Philippines	Wholesale and Retail Trade	49.9	Mining and Quarrying	0.04	2008
Russia [7]	Trade and Mass Cat ring	50.0	Science and Informational Technologies	2.0	2006
Singapore	Wholesale and Retail Trade	32.0	Accommodation and Food & Beverage	3.0	2008
Chinese Taipei	Wholesale and Retail Trade	52.5	Electricity and Gas Supply	0.02	2008
Thailand	Wholesale and Retail Trade	46.7	Manufacturing	19.3	2008
United States [8]	Construction	13.2	Utilities	0.1	2006
Viet Nam	Trade	40.7	Agriculture and Forestry	1.0	2004

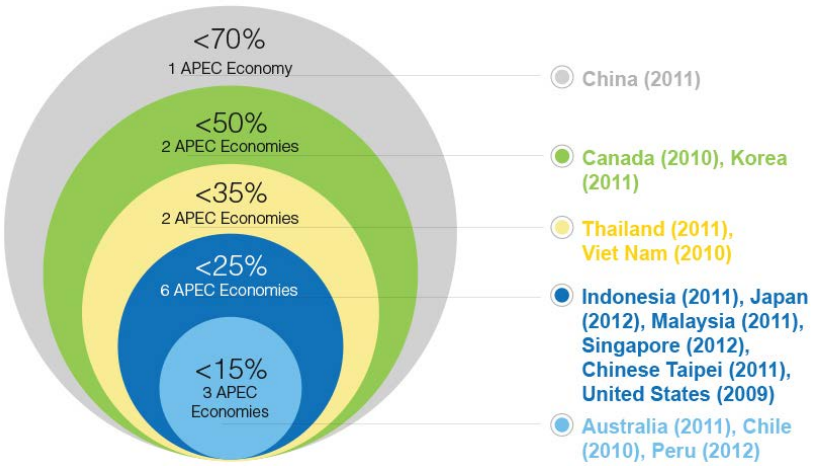
Notes:

1. Sector classifications differ between economies, therefore limiting cross-economy comparisons.
2. For Canada, the percentage of SMEs engaged in the Retail Trade sector together with the percentage of SMEs engaged in the Wholesale Trade sector accounted for 18.2% of total SMEs in June 2009.
3. For Hong Kong, China; the percentage of SMEs engaged in the Import/Export Trade and Wholesale sector together with the percentage of SMEs engaged in the Retail sector accounted for 54.1% of total SMEs in December 2009.
4. For Japan, data are available only for Wholesale and Retail Trade as a whole, so the analysis considers enterprises with fewer than 100 employees in the Wholesale and Retail Trade industry as an SME (in contrast with the official definition of an SME in Retail Trade as having fewer than 50 employees).
5. For Mexico, establishments with 250 employees or fewer in the following industries are considered as SMEs in the analysis: Agriculture, Forestry, Fishing and Hunting; Mining; Electricity, Water and Gas; Construction; Manufacturing. For all other industries, establishments with 100 employees or fewer are considered to be SMEs. Note that the percentage of SMEs in the Retail Trade sector together with the percentage of SMEs engaged in the Wholesale Trade sector accounted for 52.7% of total SMEs in 2003.
6. For Peru, there is currently no definition of medium enterprises. The sector shares of small and medium enterprises cover only enterprises in the formal sector.
7. For Russia, the sector shares cover only small enterprises.
8. For the United States, the general definition of an SME as a firm having fewer than 500 employees is used. Note that SMEs in the percentage of SMEs in the Retail Trade sector together with the percentage of SMEs in the Wholesale Trade sector accounted for 17.6% of total SMEs in 2006.

Source: APEC (2015).

The range in SME internationalization across the APEC economies is large. The export value of SMEs makes up anywhere between 15% and 70% of the total export value of a given economy. The export value of SMEs as a share of total export value is highest in China; followed by Canada and Korea (less than 50%); Thailand and Viet Nam (less than 50%); Indonesia; Japan; Malaysia; Singapore; Chinese Taipei; and the United States (less than 25%); and Australia and Chile (less than 15%).

<Figure 2> SME Export Value as a Share of Total Export Value



Source: APEC (2016). SMEs in the APEC Region (Infographic).

In a survey conducted in 2008 by the Organization for Economic Co-operation and Development (OECD), SMEs and policy makers in APEC and the OECD recognize that internal barriers (including internal capacity and access) are more problematic than external barriers (such as business environment) in achieving internationalization. However, the survey reports that these problems are unique and dependent upon the international experiences of the SMEs. Although there are some differences in perception between SMEs and policymakers, it can be said that there are four major impediments in internationalization: shortage of working capital to finance exports, difficulty identifying foreign business opportunities, limited information for analyzing markets and inability to contact potential overseas customers.

<Table 5> Perception of Barriers to SME Internationalization

Description of Barriers	Ranking by SMEs	Ranking by Policymakers
Shortage of working capital to finance exports	1	2
Difficulty identifying foreign business opportunities	2	4
Limited information for locating/analyzing markets	3	3
Inability to contact potential oversea s customers	4	6
Difficulty obtaining reliable foreign representation	5	7
Lack of managerial time to deal with internationalization	6	5
Inadequate quantity of and/or untrained personnel	7	1
Difficulty matching competitor prices	8	15
Lack of home government assistance /incentives	9	23
Excessive transportation/insurance costs	10	19

Source: APEC (2015). "SME Market Access and Internationalization: Medium-term KPIs for the SMEWG Strategic Plan." *Policy Brief.*

III. SME Internationalization Model Indices

1. Definition and Types of SME Internationalization

1.1. Definition

There are several definitions regarding internationalization or globalization. They largely focus on the activities of multinational companies, but also represent a variety of viewpoints from which to understand the internationalization activities of SMEs. The Uppsala Model (Luostratinen and Hellman, 1993; Bamberger and Evers, 1993) understands globalization as a process of development and incremental change. Under this definition, companies require innovative efforts and resources to enter new phases. As they enter new phases, the companies diversify their modes of selection and entry into global markets. The Network Model (Johanson and Vahlne, 1990; Welch and Welch, 1993; Chen and Chen 1998) understands globalization as the process of continuous construction, development, and maintenance of international relations for the purpose of achieving a company's goals. The Resource-based Model (Tallman and Karin 1994; Malnight, 1995) understands globalization as a process whereby companies retain optimal locations for entering overseas markets through the utilization of their own resources and competency development. In contrast to these traditional processes of globalization, Born Globalization, which is a recent theory, offers a more appropriate explanation for cases whereby businesses embark on globalization as soon as they are established. Enterprises following this model include technology-intensive venture SMEs and strong small enterprises (Cupta and Govindarajan, 2004).

Based in the above literature, this study defines the SME internationalization as the process through which SMEs strengthen their positions for global business by diversifying overseas markets and sourcing methods based on their capabilities.

1.2. Types

The activities of an enterprise are classified based on market access and sourcing. Market access is further divided into domestic sales, exports and local subsidiary sales through foreign direct investment (FDI) (horizontal FDI); sourcing is divided into domestic outsourcing, domestic insourcing, abroad outsourcing (arm's length import) and abroad insourcing (intra-firm import) through FDI (vertical FDI). Furthermore, there are intermediate forms including long-term contracts, strategic alliances and joint ventures. SMEs internationalization can be classified into one of five types: export, import, international cooperation and FDI as general types of internationalization, and international subcontracting as a type specific to SMEs alone.

Exports and imports involve the transfer of goods or services through borders or customs warehouses. These are the forms of internationalization that SMEs adopt relatively easily; of the two, import activities are known to be more commonly utilized by SMEs (APEC 2015). Furthermore, domestic subcontracting can be an important channel for SME exports. Direct exports include exports sent directly to foreign enterprises and exports via subcontracting for foreign enterprises. Indirect exports include exports sent via agencies and subcontracting for domestic enterprises. The latter further includes SME exports to foreign enterprises via supply contracts to domestic firms. Import is also subdivided into direct and indirect. The former includes imports directly from foreign enterprises and imports via foreign contractors; the latter includes import via agencies.

International subcontracting is a type of internationalization activity that is particular to SMEs and cannot be applied to MNEs. APEC (2005) specifies that the indicator, meaning the number of foreign affiliates for the MNE aspect, can be modified to match international subcontracting for the SME aspect. It has become one of the most prevalent internationalization activities with the expansion of global value chains (GVCs), which can be separated from export and import in this study. International subcontracting includes both "being subcontractors to foreign enterprises" and "having foreign contractors" (EU 2011), where subcontractors provide commission work as a part of different foreign firms.

International cooperation refers to having cooperative relations with foreign companies through joint ventures, non-equity alliances, licensing, franchising, etc. (APEC 2015). A joint venture is an entity established by two or more independent companies, with at least one being a domestic SME and one being a foreign enterprise. These two enterprises share control over the joint venture. In contrast, a strategic alliance does not involve an equity alliance but instead allows two or more companies to provide strategic resources to each other. Licensing refers to a situation in which a domestic SME allows a foreign enterprise to access its intangible assets for a certain period of time in exchange for royalties. Franchising refers to a situation in which a domestic SME acquires the rights from a foreign enterprise to perform a specific business activity and in return pays the foreign enterprise royalties.

Foreign Direct Investments (FDIs) are long-term investments made by an enterprise from one economy in an enterprise of another economy. FDIs occur in the form of direct acquisitions of foreign firms, investment in construction of appropriate machines and equipment, etc. (EXIM Bank 2005). It requires direct or indirect vote on foreign firms and significant management control. If the investing firm has 100% of ownership, the firm receiving the investment is called a “branch.” The flow volume of the FDI is a representative indicator of the openness of each economy. While trade represents quantitative openness, FDI is a yardstick used to gauge the qualitative and practical openness. While the size of the inward FDI is dependent upon the regulations or the acceptance of investments by the host economy, the size of the outward FDI is determined based on the global mindset of its domestic agents and the existence of technology and management systems.

2. Development of Model Indices

2.1. Theoretical Approach

Firms differ in size, productivity, and participation in foreign markets. In particular, firms that trade are different from non-trading firms. Bernard and Jensen (1995, 1999) investigated the characteristics of firms within industries to assess the extent to which they differ by trade status, and found that only a few firms in the United States do exports, and among those with exports, only a few firms export to more than a few economies. Bernard et al. (2007) reported the following: "Engaging in international trade is an exceedingly rare activity: of the 5.5 million firms operating in the United States in 2000, just 4 percent were exporters. Among these exporting firms, the top 10 percent accounted for 96 percent of total U.S. exports." After Bernard and Jensen (1995, 1999), a number of similar studies were conducted on other economies, including Canada; Colombia; Mexico; Morocco; France; and Spain.[3] According to the WTO (2008), 20 percent of firms in Japan in 2000 were exporters and 20.9 percent of firms in Chile in 1999 were exporters.

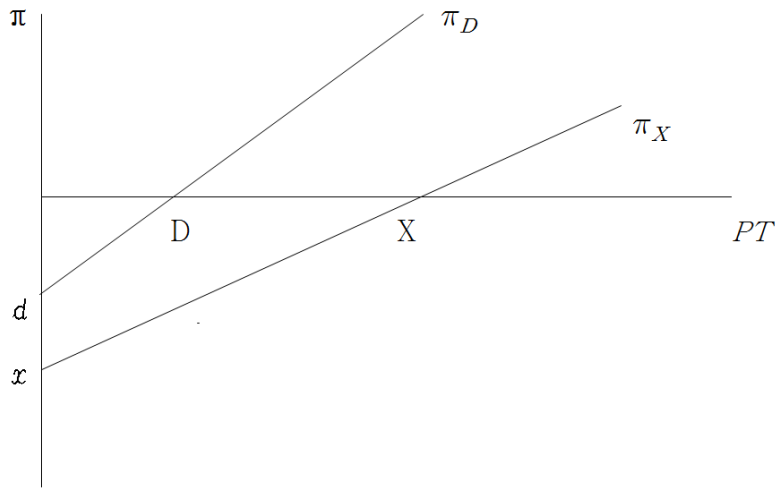
Why is it that exporting and non-exporting firms exist simultaneously? The above phenomena can be explained based on the New-New Trade Theory. Melitz (2003) developed a model on firm heterogeneity in productivity and the presence of fixed export costs to explain these phenomena in which only a small fraction of firms are exporters. This viewpoint differentiates from those of both traditional and New-Trade theories. The traditional trade theory locates causes in the occurrence of heterogeneity between economies. Because economies are viewed as having a comparative advantage in the production of different goods and thus exchanging them with other economies due to differences in labor productivity (seen in the Ricardian model) and due to differences in factor endowments (seen in the Heckscher-Ohlin model), trade is generally made up of inter-industry transactions. Thus, according to the traditional trade theory, increased exports are explained as an increase in the export volume, that is, the export intensive margin. Meanwhile, the export extensive margin can also occur within intra- industry trade patterns. This can be explained by the new

[3] See Baldwin and Gu (2003) for Canada; Clerides, Lach, and Tybout (1998) for Colombia, Mexico, and Morocco; Bernard, Eaton, Jensen, and Kortum (2003) and Eaton, Kortum, and Kramarz (2004) for France; and Delgado, Fariñas, and Ruano (2002) for Spain

trade theory presented by Krugman (1980), Helpman (1981), and so on, suggesting economy of scale as a cause for trade by supposing differentiated goods and monopolistic competition.

Let us examine the New-New Trade Theory in further detail. According to this theory, only highly productive firms find it profitable to sell goods abroad because firms have to bear an additional fixed cost for exports. Melitz (2003) showed that the best strategy for the least-productive firms is to exit the industry, for intermediate-productivity firms to provide their output only to domestic customers, and for the most-productive firms to serve the foreign market as well as the domestic market. Melitz further found that heterogeneous firms can self-select into only two activities: domestic sales or export. In <Figure 3>, the horizontal axis represents productivity while the vertical axis represents profit. From this figure, we drive the following conclusion: the lowest productivity firms, with productivity to the left of point *D*, leave the industry because they have negative profits; those with productivity between points *D* and *X* serve only the domestic market; and firms with productivity between points *X* and *S* export and serve the domestic market.

<Figure 3> Selection of Firms into Exports



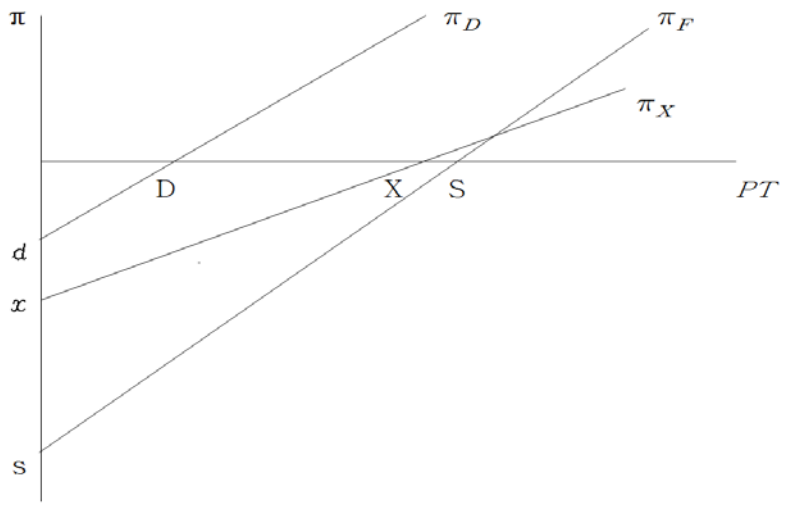
Source: Melitz (2003)

where $\boldsymbol{\pi}$: profit, ***PT***: productivity, $\boldsymbol{\pi_D}$: profit from domestic sales, and $\boldsymbol{\pi_X}$: profit from export sales,

However, with the rapid emergence of global value chains as production processes become increasingly fragmented across economies, the organizational forms of firms are no longer limited to domestic sales and exports. Export is only one of several international activities a firm can participate in. In practice, firms today can choose a much larger set of activities, including arm's length transactions (export or import), joint ventures, serving foreign markets via subsidiary sales and dividing production processes across several different economies. By allowing firms to serve foreign markets with both exports and subsidiary sales (FDI),

Helpman, Melitz and Yeaple (2004) expanded the Melitz (2003) model into one that explains the reason some firms export while others supply foreign markets through foreign subsidiaries. In this model, firms can choose three strategies: serving only the domestic market, exporting and investing in subsidiaries. Helpman (2011, pp.139-140) illustrated the firms' choice of organization as follows. In <Figure 4>, the horizontal axis represents productivity while the vertical axis represents profit. Compared to the export profit curve, the profit curve of subsidiary sales has a lower intercept and is steeper. The lower intercept reflects the higher fixed cost of FDI over exporting, and the steeper slope reflects the fact that exports have higher variable trade costs than subsidiary sales. From this figure, we drive the following conclusion: in addition to the Melitz's explanation, those with productivity to the right of *S* engage in local production overseas (FDI) and serve the domestic market. As a result, firms are sorted according to productivity with respect to the different organizational forms. The least-productive firms serve only the domestic market, the most-productive firms invest foreign market, and firms with intermediate productivity levels choose to export. This implies that domestic firms have the lowest average productivity, exporters have a higher average productivity, and firms engaged in foreign direct investment have the highest productivity.

<Figure 4> Selection of Firms into Exports and FDI



Source: Helpman (2011)

where $\boldsymbol{\pi}$: profit, ***PT***: productivity, $\boldsymbol{\pi_D}$: profit from domestic sales, $\boldsymbol{\pi_X}$: profit from export sales, and $\boldsymbol{\pi_F}$: profit from FDI

The main implication of the New-New trade theory is that firm heterogeneity in productivity generates a hierarchy of organizational forms, in which the least-productive firms are domestically oriented, the firms with intermediate level of productivity serve foreign markets via export, and the most-productive firms serve foreign markets through subsidiary sales. Furthermore, industry organization literature supports it, in that arm's length transactions (exports or imports) are less integrated, while alternative organization forms such as franchise agreements, strategic alliances, joint venture are intermediately integrated, and forms serving foreign markets through subsidiary sales (FDI) is more integrated.[4] If the different degrees of integration are due to different fixed costs and reflect the heterogeneous productivity of the firms, then a hierarchical structure of internalization activities of firms is generated: arm's length transaction (export or import) is the lowest among the international activities, international cooperation including franchise agreements, strategic alliances, joint venture is at the intermediate level, and FDI is at the highest level. Therefore, in assessing the internalization of firms, we can give the highest weight to FDI, the next to international cooperation and the lowest to export or import.

[4] See Besanko et al. (2007, pp. 106)

Incorporating firm heterogeneity into trade models leads to a decomposition of trade expansion into extensive and intensive margins[5]. While traditional and new trade theories are limited in their abilities to explain a single phenomenon within export intensive and export extensive margins, the so-called New-New Trade Theory, which includes work by Melitz (2003) and Bernard et al. (2004), makes it possible to simultaneously break down exports into export intensive and export extensive margins by removing the assumption that firms are homogeneous and by introducing heterogeneous personalities. An increase in exports for firms that are already engaged in export activities also shows an increase in the firm-level intensive margin, while an increase in exports for new firms shows an increase in the firm-level extensive margin. If we suppose that each firm produces differentiated products, then firm-level intensive and extensive margins are concluded in product-level intensive and extensive margin. In general, the extensive margins represent the newly created trade flows and the intensive margins represent the exiting trade flows. The export volume is determined by the extensive and intensive margins as follows:

$$\text{Export} = \text{EM} \cdot \text{IM},$$

where EM is the extensive margin and IM is the intensive margin.

For the purpose of the study, the extensive and intensive margins of trade are classified as follows: product-level extensive and intensive margins, economy-level extensive and intensive margins, and firm-level extensive and intensive margins. Changes in the export volume of an economy may due to changes in the number of partner economies (economy-level extensive margin) or as a result of changes in the exporting volume to the partner economies where a bilateral trading relationship has been established previously. Hummels and Klenow (2005) defined trade margins based on product-level. An economy may export larger quantities of each good (intensive margin) or a wider set of goods (extensive margin). In addition, export volume by firms that are already exporters refers to the firm-level

[5] Chaney (2008) provides a theoretical basis for the determinants of trade intensive and trade extensive margins based on the gravity model. Chaney (2008) theoretically suggests that only some heterogeneous firms export in accordance with the level of existing trade costs and that decreased trade costs mean that exports increase for firms that are already engaged in export activities (intensive margin), while new firms emerge as export performers (extensive margin).

intensive margin and the entry of new firms into the export market is the firm-level extensive margin.

These margins can also be applied to the exporting behaviors of SMEs. The presence of fixed export costs implies that adjustments in the export volumes of SMEs may occur along both the intensive margin and the extensive margin. However, the margins described above are related only to trade. This study analyzes the international activities of SMEs, including not only trade but also other international activities, such as international cooperation and FDI. To avoid confusion, this study uses the terms "intensity index" and "diversity index". The former is used to understand the intensity with which SMEs conduct each international activity and the latter to understand the number of partner economies (firms) with which each SME conducts each international activity. In the case of export, the intensity index is defined by the average export volume per economy (firm), and the diversity index is the number of foreign partner economies (firms). For FDI, the intensity index is the average investment per firm (relative to total sales) and the diversity index measures the number of locations in which a firm owns affiliates.[6] Since SMEs differ by size, the absolute export volume of each SME is different. In order to compare the intensity of an SME's export (FDI), this study measures the intensive index based on the average export volume (FDI) as a share of total sales.

[6] Similarly, Yeaple (2009) used the within-firm intensive and extensive margin to understand the manner in which firms expand abroad. The within-firm extensive margin is measured by the number of economies in which a firm is active, and the within-firm intensive margin by the average sales per location of firms that own affiliates abroad.

2.2. Model Indices

2.2.1. Internationalization Model

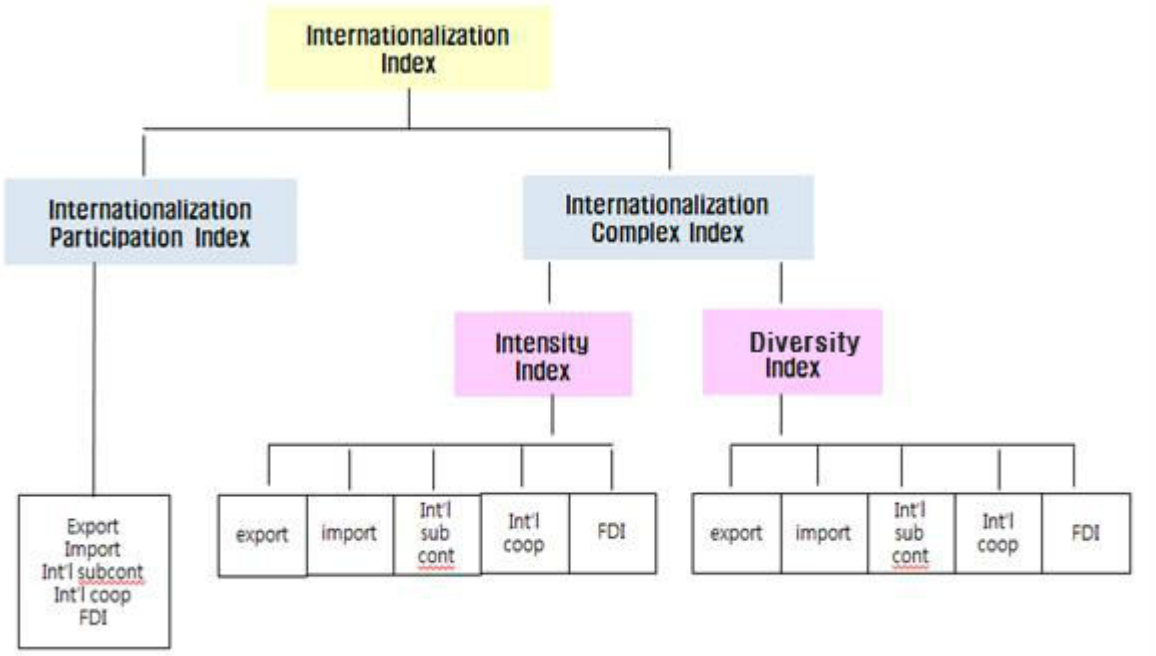
The internationalization level of SMEs differs depending on the estimation used. The use of a a single index may suffer from issues arising from the overestimation or underestimation of the international activities of SMEs. Therefore, in order to minimize this possibility, the following internationalization model indices are proposed based on the previous discussions.

The APEC SME Internationalization Model Indices are based on the New-New Trade Theory, with the assumption that firms are heterogeneous. In this Model, the types of internationalization activities are categorized as export, import, international subcontracting, international cooperation, and FDI. Export and import are subdivided into direct and indirect according to whether transaction are made through customs warehouses or through agencies. International subcontracting, a prevailing activity is also divided into two types - being subcontractors to foreign enterprises and having foreign contractors. Joint ventures, non-equity alliances, licensing and franchising are all categorized as international cooperation activities. In case of FDI, only outward-FDI is considered in this Model.

2.2.2. Internationalization Indices

The Model is comprised of the IPI (Internationalization Participation Index) and ICI (Internationalization Composite Index). The IPI measures the degree to which SMEs participate in various international activities. The ICI is divided into two parts, measuring both the number of partner SMEs with which international activities are conducted (Diversity Index) and the intensity of the international activities conducted (Intensity Index).

<Figure 5> SME Internationalization Model Indices



The IPI measures the number of internationalization activities SMEs participate in. It is calculated based on the binary variable of whether the SME exports, imports, subcontracts internationally, cooperates with foreign firms or has FDI. The same weight is given to each activity, and the final IPI value is calculated as the sum of the binaries divided by 5. The IPI in a particular industry or in total is calculated as the average of the overall SMEs' IPIs.

The ICI measures the number of partners with which SMEs conduct international activities (Diversity Index), and the intensity of these activities (Intensity Index). This index can be calculated in two ways - the simple average ICI and the weighted average ICI, depending on the weight to be given to export, import, international subcontracting, international cooperation, and FDI. The simple average ICI gives an equal weight to each of the internationalization activities, and is calculated as the average of the diversity and intensity indexes pertaining to the internationalization category. In contrast, the weighted average ICI gives a different weight to each international activity. A single theory or rule for the weights to be used does not exist, but the Analytical Hierarchy Process (AHP) offers one possible option. This study adopts the simple average ICI method to calculate the indices, and Appendix 1 lists the report of indices where the weighted average ICI method was applied.

In the case of exports, the intensity index is defined by the average export volume per economy (firm), and the diversity index is the number of foreign partner economies (firms). For imports, the intensity index is defined by the average import volume per economy (firm), and the diversity index is determined by the number of foreign partner economies (firms). For international subcontracting, the intensity index is defined by the average subcontracting volume per economy (firm), and the diversity index pertains to the number of foreign partner economies (firms). For international cooperation, the intensity index is defined by the average case of cooperation per economy (firm), and the diversity index is linked to the number of foreign partner economies (firms). For FDI, the intensity index is the average investment per economy (firm) and the diversity index measures the number of locations in which a firm owns affiliates. Since SMEs differ based on their size, the absolute volume of each SME is different. In order to compare the intensity of a given SME's export activities (imports, international subcontracting and FDI), this study also measures the intensity index based on the average export volume (imports, international subcontracting and FDI) as a share of total sales.

Internationalization indices are calculated as follows. The IPI measures the degree to which SMEs participate in various international activities. First, it calculates the binary value of whether an SME exports, imports, cooperates with foreign firms or does FDI. The same weight is given to each activity, and the IPI is calculated as a sum of the binaries that the SME participates in divided by 5.

$$IPI_i = \frac{\sum_i^5 y_i}{5}$$

Here, y_i represents whether the SME *i* exports, imports, cooperates with foreign firms or does FDI. The IPI in a particular industry or in total is calculated as the average of the overall SMEs' IPIs. A larger IPI figure indicates a higher level of internationalization.

The ICI is calculated as the average of the intensity index and the diversity index. The intensity index represents the amount of internationalization activities performed by an SMEs, defining the indices as the average value of each type of activities per economy or firm and the percentage of the average value in total sales. The diversity index represents the

number of partners and the geographical distribution of the SMEs' internationalization activities, defining the indices as the number of trading or cooperation economies and firms. A larger ICI figure reflects a higher degree of internationalization.

Because the units of the variables or indices to be included in the modeling process include percentages, pieces, amounts, etc., this study has chosen to standardize the indices and units used. This standardization allows the differences between the SMEs to be compared in a meaningful and equal way compared to simply ranking the items.

IV. Application: Pilot Projects

1. Overview

Sections IV and V examine the feasibility of the model indices that have been developed in Section III. For this end, this study collected data on SMEs in the APEC region. In principle, the model should be applied to formal statistics, but such comprehensive and reliable data on the internationalization activities of SMEs does not exist. As such, this study relies on informal data obtained from corporate surveys.

Corporate data was collected through pilot studies conducted on five APEC economies – Chile; Korea; Malaysia; Philippines; and the Thailand. For the studies, five local consultants were selected to conduct the research and survey based on the guidelines and survey questionnaire prepared by the Korea Small Business Institute (KOSBI).[7] The survey was conducted from 18 December 2015 - 11 April 2016.

2. Survey Structure

The survey focuses on the type and degree of the internationalization activities conducted by SMEs, their global capacity with respect to their internationalization activities, the difficulties faced in their internationalization activities and government policies. Accordingly, this survey questionnaire consists of five parts including general information.

[7] Before the launch of the pilot studies, a seminar was held in Korea on 18 December 2015 to discuss the model indices and survey questionnaires and to share relevant information on the participating economies.

<Table 6> Structure of Survey Questionnaire

Criteria		Details
General status of respondents		● Name of firm, year of establishment ● Name of respondent, position, contact details
		● Industry classification
General information of the company		● Type of company ● Financial status and R&D ● IPR and certification ● Status of organization
General status of internationalization		● Type of internationalization the firm is involved in ● Motivations for internationalization ● Yes/no of having foreign promotion materials ● Frequency of updating the foreign homepage ● Maintenance of e-commerce form
Status of specific internationalization activities	**Export**	● Export amount, number of economies and firms ● Year of starting export ● Major three exporting economies and the ratio of each
	Import	● Import amount, number of economies and firms ● Year of starting import ● Major three importing economies and the ratio of each
	International subcontracting	● Subcontracting amount, number of economies and firms ● Year of starting international subcontracting ● Major three subcontracting economies and the ratio of each
	International cooperation	● Cases of international cooperation, number of economies and firms ● Year of starting international cooperation ● Major three cooperating economies and the ratio of each
	FDI	● FDI amount, number of economies and firms ● Year of starting FDI ● Major three FDI economies and the ratio of each
Difficulties in internationalization and government support		● Difficulties in internationalization within the firm ● Difficulties in internationalization in overseas fields ● Degree of the awareness of government supports ● Yes/no of receiving government support ● Effectiveness of government support ● Type of innovations carried out by firm ● Areas of policy demand

3. Data Sampling and Collection

Given the diversity in the definition and dispersion of SMEs within APEC, this study analyzes each economy using the definitions of SMEs set by the economy rather than seeking to standardize the definition uniformly across economies.

In order to allow for a balanced understanding of the internationalization activities of SMEs, it is reasonable to expect that non-exporting firms should be surveyed as well as exporting ones. However, in consideration of the small sample size and the possibility that non-exporting SMEs will be disproportionately included in the data extraction process, only exporting SMEs are included in this study. This decision is based on the fact that only a small fraction of SMEs are involved in export activities, as mentioned in 2-1. Moreover, due to time and budget constraints, the survey targets SMEs concerned primarily with the manufacturing sector.

<Table 7> presents the basic information – survey target, sampling frame, sample size, data collection method and period – collected from the pilot studies conducted in the five selected economies: Chile; Korea; Malaysia; Philippines; and the Thailand.

<Table 7> Status of Data Collection

	Chile	Korea	Malaysia	Philippines	Thailand
Survey Target	Exporting SMEs in the manufacturing sector (1-200 employees)	Exporting SMEs in the manufacturing sector (1-299 employees)	Exporting SMEs in the manufacturing sector (1-299 employees)	Exporting SMEs in the manufacturing sector (1-199 employees)	Exporting SMEs in the manufacturing sector (1-199 employees)
Sampling Frame (Data Source)	"Database of exporting firms" from ProChile (Chilean Governmental Agency to promote Chilean exports around the world)	"2015 Comprehensive Firm List" from the Korea Chamber of Commerce and Industry (KOCHAM)	List of Manufacturers from SMECorp, Matrade Malaysia	2014 Directory of Philippine Exporters	Office of Small and Medium Enterprise Promotion
Sample Size	42 firms	300 firms	28 firms	68 enterprises	300 firms
Data Collection Method	Web-based survey	Fax and web in parallel	Phone calls and web in parallel	Face-to-face interview and e-mailed questionnaire	Mail, e-mail, web, fax, interview at company, phone call, distribution at export-related seminars in parallel
Data Collection Period	2016-03-08 to 2016-05-06 (8 weeks)	2015-01-21 to 2015-02-19 (4 weeks)	2015-12-20 to 2016-02-19 (4 weeks)	2016-02-21 to 2016-03-18 (4 weeks)	2015-01-21 to 2015-02-25 (5 weeks)

Here, it is important to note the sample size problem of Chile; Malaysia; and the Philippines. The sample size of these economies is too small to provide a statistically significant conclusion. In particular, when the analyses are extended to comparisons based on firm size or sectors, the confidence intervals for each estimate become too broad to accept. Moreover, we cannot ignore the possibility that firms active in internationalization activities were only partially surveyed for those three economies. However, the data was collected through the pilot studies, so this study includes them in the following analyses.

V. SME Internationalization Levels in the APEC Region

1. Calculation Results of Indices

The indices consist of three main values: the Participation Index, the Intensity Index, and the Diversity Index. The Participation Index represents how actively each economy is participating in internationalization while the Intensity Index and the Diversity Index stands for the scale and the scope of internationalization respectively. At the end, the Internationalization Index which reflects all the indices also will be computed. The computation processes are as follows.

1.1. Participation Indices

Before calculating the Participation Index, this study divides the internationalization activities into five categories: export, import, international subcontracting, international cooperation and FDI. Firstly, a value of 1 is given to each category if the SME is engaged in the relevant activity or a 0 if it is not engaged in the activity. In the case of exports and imports, if the SME participates in any of direct exports (imports) or indirect exports (imports), a value of 1 is assigned. For international cooperation, if the SME is engaged in any joint venture, strategic alliance, or licensing, it is assigned a 1. Next, the computed results for each internationalization activity are averaged out to calculate the Participation Index for each firm. The calculation of the Participation Index by firm is as follows:

Participation Index = (export + import + sub-contracting + international cooperation + FDI) / 5

The Participation Index of APEC as a whole is 0.327. In looking at individual member economies, Malaysia has the highest Participation Index at 0.391; followed by 0.363 for Chile; 0.318 for Korea; 0.258 for Philippines; 0.305 for the Thailand (<Table 8>). The higher rankings for Malaysia and Chile compared to other member economies may be a result of the sample size. Their sample sizes are very small, at 22 and 64, and the results may be inaccurate due to the large confidence interval.

<Table 8> Participation Index: APEC as a Whole and by Economy

Economy	Sample Size	**Avg.**	Std.	**Std. Error**	C. of Variation	Med.	Min	Max
APEC	720	**0.327**	0.144	**0.0172**	2.303	0.320	0.200	0.760
Chile	64	**0.363**	0.181	**0.023**	2.000	0.400	0.200	1.000
Korea	272	**0.318**	0.124	**0.008**	2.573	0.400	0.200	0.600
Malaysia	22	**0.391**	0.157	**0.033**	2.489	0.400	0.200	0.800
Philippines	62	**0.258**	0.105	**0.013**	2.461	0.200	0.200	0.600
Thailand	300	**0.305**	0.153	**0.009**	1.992	0.200	0.200	0.800

Because the indices are calculated to target only exporting firms, the participation index for "exports" is 1. The participation indices for imports, international subcontracting, international cooperation, and FDI are, respectively, 0.386, 0.079, 0.086, and 0.016. Excluding imports, the participation indices for the remaining activities are under 10%. In particular, the participation index for FDI is very low at 1.6%.

<Table 9> Participation Index: According to Internationalization Activity

	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
APEC	1.000	0.386	0.079	0.086	0.016

When firm size is specifically analyzed, the participation index for the "1-9" size is 0.256, "10-49" is 0.318, and "50 or more" comes in at 0.318. These numbers indicate that a larger firm size generally results in a higher participation index.

<Table 10> Participation Index: According to Firm Size

	1~9	10~49	50~
APEC	0.256	0.318	0.318

The participation index performance for each industry are listed in the order of Metals; Electronics; Machinery, etc.; Food-Textile-Chemicals, etc.; and Miscellaneous.

<Table 11> Participation Index: According to Industry

	Food-Textile-Chemicals, etc.	Metals	Electronics	Machinery, etc.	Miscellaneous
APEC	0.309	0.398	0.348	0.331	0.285

In terms of each separate member economy, the ratios of imports to exports are around 50% for Chile; Korea; and Thailand. International subcontracting is highest for Korea (at 13.6%) and lowest for Malaysia (at 3.2%). International cooperation is also relatively high for Korea (at 22.7%) and Chile (at 14.1%). FDI is at 1.7% for Philippines and 0.8% for Chile, while the figures are insignificant for other economies.

<Table 12> Participation Index: According to Internationalization Activity and Economy

Economy	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
Chile	1.000	0.531	0.063	0.141	0.078
Korea	1.000	0.591	0.136	0.227	0.000
Malaysia	1.000	0.226	0.032	0.032	0.000
Philippines	1.000	0.313	0.087	0.107	0.017
Thailand	1.000	0.452	0.081	0.051	0.007

As a general rule, the larger the firm size, the higher the participation index in imports. In the “1-9” size category, the participation index is 29.4% to exports, but for the “10-49” size, the participation index is 35.4% to exports, and in the “50 or more” size, it is 45% to exports. International subcontracting also has a high participation index in proportion to firm size. International cooperation and FDI have higher participation indices in the “10-49” size than in the “50 or more” size.

<Table 13> Participation Index: According to Internationalization Activity and Firm Size

Economy	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
1~9	1.000	0.294	0.056	0.032	0.000
10~49	1.000	0.354	0.084	0.099	0.026
50~	1.000	0.450	0.084	0.097	0.016

When looking at imports, in particular, the participation indices are highest in Metals; followed by Electronics; then Machinery, etc.; Food-Textile-Chemicals, etc.; and, finally, Miscellaenous. International subcontracting has high participation indices in Metals and Machinery, etc., while a low participation index is seen in Miscellaneous. High participation

indices are also seen for international cooperation in Metals and Machinery, etc, and FDI has high participation indices in Metals and Electronics.

<Table 14> Participation Index: According to Internationalization Activity and Industry

Industry	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
Food-Textile-Chemicals, etc.	1.000	0.345	0.073	0.086	0.013
Metals	1.000	0.544	0.103	0.103	0.059
Electronics	1.000	0.487	0.090	0.064	0.026
Machinery, etc.	1.000	0.420	0.101	0.101	0.007
Miscellaneous	1.000	0.235	0.020	0.059	0.000

1.2. Composite Indices

1.2.1. Intensity Indices

The Intensity Index is calculated based on the type of internationalization activity. The Export Intensity (Import Intensity) is computed by dividing the total amounts of exports (imports) by the number of exports (imports) counterparties, i.e. the number of internationalization activity partners within the given economy. The maximum number of direct export (import) partners and of indirect export (import) partners was used for the number of partner economies in the denominator. The International Subcontracting Intensity is calculated by dividing the total amount of subcontracts by the number of subcontracting channel economies. The FDI Intensity is calculated by dividing the total amount of FDIs by the number of FDI host economies. Finally, the International Cooperation Intensity is computed by dividing the number of international cooperation ventures by the number of partner economies.

The Intensity Index below is calculated based on the number of partner economies. Intensity may be calculated by using the total sales or the number of firms. In each case, intensity is a share of the total internationalization activity amount in total sales or total internationalization activity amount divided by the number of firms respectively. This will be shown in the “Index Analysis” (V. 1.3). International cooperation can only be defined by the number of cases, rather than the amount. Hence, Intensity is obtained based on the number of cases on all occasions.

Export Intensity

= (exports / no. of partner economies)

* no. of economies = max (no. of direct exports, no. of indirect exports)

Import Intensity

= (imports / no. of partner economies)

* no. of economies = max (no. of direct imports, no. of indirect imports)

International Subcontracting Intensity

= (international subcontracting amount/no. of economies)

* no. of economies

= no. of subcontracting importing economies + no. of subcontracting exporting economies

FDI Intensity

= (FDI amount / no. of economies)

International Cooperation Intensity

= (total number of international cooperation / number of economies in international cooperation)

The Intensity Index by each firm is calculated based on the indicators above. The Intensity Index by firm is a simple average of these indicators.

Intensity Index

= (Export Intensity + Import Intensity + International Subcontracting Intensity + FDI Intensity + International cooperation Intensity) / 5

The Intensity Index for APEC as a whole is 227,533.5. The member economy with the highest intensity index is Korea; followed by the Philippines; Malaysia; Chile; and Thailand. However, there is an enormous gap between the minimum and maximum level in the intensity index for each economy.

<Table 15> Intensity Index: APEC as a Whole and by Economy

Economy	Sample Size	**Mean**	Std.	**Std. Error**	C. of Variation	Med.	Min	Max
APEC	652	**227,522.500**	700209.000	**27,422.300**	0.320	33333.340	0.200	8512800.000
Chile	48	**81,675.000**	235244.300	**33,954.600**	0.347	16600.100	281.900	1600000.000
Korea	268	**421,536.400**	971506.500	**59,344.200**	0.434	136666.700	200.000	8512800.000
Malaysia	17	**155,427.200**	194632.600	**47,205.300**	0.799	75000.200	0.200	693586.400
Philippines	52	**160,249.000**	383228.400	**53,144.200**	0.418	22068.800	87.000	2000000.000
Thailand	267	**76,694.100**	382785.000	**23,426.100**	0.200	8571.400	17.100	5757800.000

The intensity indices, that is, the degree of internationalization activity per member economy, produce higher figures in exports and FDI, while similar levels are seen for imports and international subcontracting.

<Table 16> Intensity Index: According to Internationalization Activity

	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
APEC	2,122,095	317,515.400	341,317.900	0.082824	1,393,967

The intensity index shows a tendency for increase that aligns with firm size. The intensity index for the “50 or more” size is about four times that of the “1-9” size.

<Table 17> Intensity Index: According to Firm Size

	1~9	10~49	50~
APEC	72,735.200	150,302.800	270,540.500

The intensity indices are highest in Electronics and Metals when looking at each industry, though it should also be noted that the figure for Electronics is more than twice that of Metals.

<Table 18> Intensity Index: According to Industry

	Food-Textile-Chemicals, etc.	Metals	Electronics	Machinery, etc.	Miscellaneous
APEC	148,853.400	162,883.500	356,809.100	187,291.600	67,641.270

In descending order, the intensity index in exports is seen to be highest in Thailand; Malaysia; and then Korea. In imports, the intensity indices for Thailand and Korea are both high, while the index for Malaysia is very low. Compared to these figures, the intensity indices for international subcontracting and FDI are minimal.

<Table 19> Intensity Index: According to Internationalization Activity and Economy

Economy	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
Chile	296,622.600	110,472.500	425.520	0.377	854.166
Korea	430,929.800	330,588.400	15,617.650	0.294	0.000
Malaysia	760,036.700	41,208.290	0.000	0.000	0.000
Philippines	263,780.100	106,912.700	3,788.817	0.086	8,988.648
Thailand	1,392,040	691,324.100	19,784.590	0.046	4,533.581

The intensity index shows a tendency for greater increases to accompany larger firm sizes. According to each internationalization type, this tendency remains consistent for exports, imports, international subcontracting, and so on.

<Table 20> Intensity Index: According to Internationalization Activity and Firm Size

Economy	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
1~9	505,902.600	31,912.550	1,423.111	0.019	0.000
10~49	628,630.400	329,798.800	7,640.295	0.137	5,037.018
50~	990,923.100	475,035.500	15,287.240	0.074	8,069.745

The intensity indices for exports and imports are highest in Electronics and Machinery, etc., followed by Metals. The intensity indices in Food-Textile-Chemicals, etc., and Miscellaneous are relatively low. International subcontracting shows a similar tendency, while the intensity indices of FDI are generally very low.

<Table 21> Intensity Index: According to Internationalization Activity and Industry

Industry	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
Food-Textile-Chemicals, etc.	469,500.600	128,580.500	6,742.469	0.064	3,844.938
Metals	852,159.600	585,241.600	6,444.391	0.247	35,166.670
Electronics	1,678,594.000	845,190.800	21,163.370	0.062	266.666
Machinery, etc.	1,105,064.000	625,650.500	17,809.330	0.101	0.000
Miscellaneous	498,221.100	19,830.160	41.707	0.058	0.000

1.2.2. Diversity Indices

The Diversity Index is calculated by averaging the number of economies participating in exports, imports, subcontracting, FDI and international cooperation. The calculation of Diversity Indicator by firm is shown below. The Diversity Index is calculated based on the number of firms; this is shown in "I-C Indices and Analysis." The following formula is based on the number of economies.

Diversity Index = (no. of exporting economies + importing + subcontracting + FDI + international cooperation) / 5

The Diversity Index for APEC as a whole is 1.668. In terms of its member economies, Korea's Diversity Index is the highest at 2.35; Malaysia follows with 1.13; and 0.92 for Thailand. The results for Chile are rejected due to its broad 95% confidential interval of mean. The results in <Figure 9> imply that an exporting SME stays involved in internationalization on average with 2.35 economies in Korea. Those of Malaysia; Thailand; and the Philippines perform internationalization with an average of 1.13, 0.92, and 0.73 economies, respectively.

<Table 22> Diversity Index: APEC as a Whole and by Economy

Economy	Sample Size	**Mean**	Std.	**Std. Error**	C. of Variation	Med.	Min	Max
APEC	674	**1.668**	12.330	**1.690**	0.260	1.000	0.200	90.400
Chile	53	**3.210**	12.330	**1.690**	0.260	1.000	0.200	90.400
Korea	272	**2.350**	3.330	**0.200**	0.710	1.200	0.200	30.000
Malaysia	18	**1.130**	0.850	**0.200**	1.330	0.800	0.200	3.000
Philippines	52	**0.730**	0.460	**0.060**	1.580	0.600	0.200	2.000
Thailand	279	**0.920**	0.790	**0.050**	1.170	0.600	0.200	5.200

By internationalization type, the diversity index for exports is the highest, while the diversity indices for imports, international subcontracting, international cooperation, and FDI are very low, especially in comparison to the figure for exports.

<Table 23> Diversity Index: According to Internationalization Activity

	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
APEC	6.311	0.949	0.279	0.225	0.038

As a general rule, the greater the firm size, the higher the diversity index. The diversity index for the “50 or more” size is about four times that of the “1-9” size.

<Table 24> Diversity Index: According to Firm Size

	1~9	10~49	50~
APEC	0.748	1.134	2.817

By industry, the diversity indices, listed in descending order, are greatest in Electronics, followed by Food-Textile-Chemicals, etc., Miscellaneous, Metals, and Machinery, etc.

<Table 25> Diversity Index: According to Industry

	Food-Textile -Chemicals, etc.	Metals	Electronics	Machinery, etc.	Miscellaneous
APEC	1.751	1.520	1.987	1.312	1.618

In terms of exports and imports, Chile’s diversity indices are much higher than those of other economies. In addition, Thailand’s diversity index is high in terms of exports, whereas the figures for international subcontracting, international cooperation, and FDI are very low in comparison.

<Table 26> Diversity Index: According to Internationalization Activity and Economy

Economy	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
Chile	12.717	2.208	0.283	0.811	0.019
Korea	3.167	1.611	0.278	0.611	0.000
Malaysia	3.115	0.519	0.000	0.019	0.000
Philippines	3.484	0.588	0.161	0.272	0.075
Thailand	9.849	1.272	0.500	0.114	0.018

In the case of exports, imports, and international subcontracting, larger-sized firms tend to show higher diversity indices. In the “1-9” size, the diversity indices of international cooperation and FDI are insignificant.

<Table 27> Diversity Index: According to Internationalization Activity and Firm Size

Economy	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
1~9	3.523	0.477	0.128	0.028	0.000
10~49	4.721	0.911	0.248	0.314	0.058
50~	9.583	1.290	0.401	0.254	0.039

In considering exports and imports, the diversity index in Electronics is much higher than that of other industries. The diversity indices in Metals and Machinery, etc., are quite similar, but Metals have a higher diversity index in international subcontracting and international cooperation.

<Table 28> Diversity Index: According to Internationalization Activity and Industry

Industry	Export	Import	Int'l Subcontracting	Int'l Cooperation	FDI
Food-Textile-Chemicals, etc.	5.986	0.846	0.218	0.190	0.042
Metals	6.091	1.212	0.833	0.348	0.015
Electronics	10.104	1.831	0.442	0.312	0.013
Machinery, etc.	7.400	1.015	0.254	0.285	0.077
Miscellaneous	6.023	0.628	0.023	0.233	0.000

1.3. Internationalization Indices

The Internationalization Index of each economy is calculated based on a simple average of the given economy's Participation Index, Intensity Index and Diversity Index which are calculated as above. However, these indices use different units, and it is impossible to calculate various internationalization indices. Thus, the next section standardizes and presents these in further detail. Additionally, <Table 29> presents the figures calculated based on the number of firms (Diversity 2 and Intensity 3) and sales amounts (Intensity 1), besides Diversity 1 and Intensity 2, calculated based on the number of economies.

<Table 29> Participation and Composite Indices

Economy	Number of Firms	**Participation**	**Diversity 1**	Diversity 2	Intensity 1	**Intensity 2**	Intensity 3
			No. of Economies	No. of Firms	Sales Amount	**No. of Economies**	No. of Firms
APEC	720	0.327	1.667	2.379	0.173	179,116.300	135,208.800
Chile	64	0.363	3.208	2.185	0.263	81,675.020	71,744.790
Korea	272	0.318	2.351	4.479	0.178	421,536.400	297,259.900
Malaysia	22	0.391	1.133	2.482	0.133	155,427.200	110,558.900
Philippines	62	0.258	0.731	1.600	0.169	160,249.000	129,671.800
Thailand	300	0.305	0.916	1.152	0.122	76,694.080	66,808.390

1.4. Standardized Internationalization Indices

The internationalization activity data from each economy are processed to generate indices, and the data are standardized to allow for easy analysis and comparison using z-scores. The transformed value of the z-scores from the cumulative distribution function of the standardized normal distribution, also known as *F(z)*, was used to calculate the standardized indices. For example, the values of the Participation Index are standardized to a z-score which has an average of 0 and a variance of 1. Samples for the standardization include all data, regardless of the economy. Then the position of the z-score is drawn for cumulative distribution, and finally the standardized Each Index is calculated by multiplying the z-score by 100. The Participation Index of the relevant economy is a simple average of the firms' Participation Indices in that economy.

The standardized Internationalization Indices are presented in <Table 23> and <Table 24>. According to it, Malaysia and Chile have relatively high Internationalization Participation Indices at 63.3 and 55.0 respectively. However, these values may be inaccurate due to their small sample sizes. For the Diversity Index, the results based on the number of economies and the number of firms is nearly identical across the economies not including the change in rank between Chile and Malaysia. Because the internationalization level is evaluated by economy, this report concludes that Diversity 1 is the better measure, when taking into account the fact that the difference between the correlation coefficients of Diversity 1 and Diversity 2 is only 0.92. For the Intensity Index, the results based on the number of economies and the number of firms is again nearly identical when taking into account the fact that the results for Intensity 2 Intensity 3 are similar. Intensity 1 is found to not be reflective of the variation level of trade partners as it is based on the sales amount which only reflects the overall size of internationalization. As mentioned before, because this analysis computed based on economy, this report concludes that Intensity 2 is the better measure. For reference, Intensity 3 can overestimate the Intensity Index if trades are made between a limited numbers of economies among multiple firms.

<Table 30> International Participation and Composite Indices by Economy

Economy	Number of Firms	**Participation**	**Diversity 1**	Diversity 2	Intensity 1	**Intensity 2**	Intensity 3
			No. of Firms	No. of Firms	Sales Amount	**No. of Economies**	No. of Economies
APEC	720	**49.552**	**46.096**	46.092	55.837	**44.812**	44.476
Chile	64	**55.044**	**48.951**	46.035	57.684	**41.193**	41.050
Korea	272	**49.918**	**52.636**	52.881	55.228	**52.041**	51.615
Malaysia	22	**63.312**	**44.927**	47.315	55.051	**45.878**	45.218
Philippines	62	**35.493**	**41.118**	43.247	56.610	**44.552**	43.936
Thailand	300	**43.997**	**42.852**	40.986	54.613	**40.399**	40.564

<Table 31> Internationalization Indices by Economy

Economy	Index 1	**Index 2**	Index 3	Index 4	Index 5	Index 6
	Participation Diversity 1 Intensity 1	Participation **Diversity 1 Intensity 2**	Participation Diversity 1 Intensity 3	Participation Diversity 2 Intensity 1	Participation Diversity 2 Intensity 2	Participation Diversity 2 Intensity 3
APEC	50.495	**46.820**	46.708	50.494	46.819	46.707
Chile	53.893	**48.396**	48.348	52.921	47.424	47.376
Korea	52.594	**51.532**	51.390	52.676	51.614	51.472
Malaysia	54.430	**51.372**	51.152	55.226	52.168	51.948
Philippines	44.407	**40.388**	40.182	45.117	41.097	40.892
Thailand	47.154	**42.416**	42.471	46.532	41.794	41.849

As a general rule, the greater the firm size, the higher the diversity index

<Table 32> Intrnationalization Indices by Firm Size (Base: Index 2)

	1~9	10~49	50~
APEC	41.007	45.962	50.171

By industry, the diversity indices, listed in descending order, are greatest in Electronics, followed by Metals, Machinery, etc., Food-Textile-Chemicals, etc. and Miscellaneous.

<Table 33> Intrnationalization Indices by Industry (Base: Index 2)

	Food-Textile-Chemicals, etc.	Metals	Electronics	Machinery, etc.	Miscellaneous
APEC	44.665	52.073	52.287	49.468	42.226

2. Index Analysis

This section is composed of three analyses: comprehensive analysis of internationalization indices according to each economy, industry, and firm size, diversity-intensity analysis; and analysis of the determinants of SME internationalization levels. The analyses and rankings are based on Participation, Diversity 1 and Intensity 2 which are indicated in bold in <Table 30> and <Table 31>.

2.1 Comprehensive Analysis of Internationalization Indices According to Economy, Industry, and Firm Size

As seen below in <Figure 6>, a total of 75 cells are formed by dividing the figures for each economy (5), industry (5), and firm size (3) in order to compare the internationalization indices between the groups. The number in each cell represents the estimated value of the internationalization index of SMEs belonging to each. The asterisk next to that number represents the level of significance for the estimated value. "***," "**," and "*" represent respective significances of 99%, 95%, and 90% in terms of confidence level. The numbers in brackets below represent the number of firms belonging to each cell. When only a single firm belongs to a cell, the significance level cannot be measured for the estimated value. Here, we can simultaneously recognize the groups of economy, firm size and industry for which internationalization levels are relatively high. A lighter color represents a higher level of internationalization. The grey area signifies that analysis was impossible due to a lack of data. Yellow boxes are shown for some member economies, meaning the data there was too small to provide a statistically significant interpretation.

The following characteristics can be verified in the distribution of estimated average values for internationalization according to each economy, industry, and firm size.

- Among the five listed economies, Korea and Thailand are the only members with evenly distributed internationalization indices in overall industries and firm sizes. Korea has a greater overall ratio of brightly colored cells.

- In terms of different industries, almost no research has been done in Miscellaneous for

Chile; Electronics for Malaysia; and Metals, Electronics and Machinery, etc. for the Philippines.

- In all five economies, greater firm sizes represent higher internationalization indices. However, some cases are found to show higher internationalization levels in the "10-49 persons" size than in the "50-99 persons" size, such as in Korea's Food-Textile-Chemicals, etc., industry.

- The Food-Textile-Chemicals, etc., industry shows advanced internationalization in all firm sizes and for all five member economies. Though the internationalization indices for Korean firms in the "10-49" and "50-199" sizes and Chile's firms in the "50-199" size are seen as average or higher, those in the firm groups of other economies are below average.

- It is harder to determine the internationalization index in Electronics (excluding the economies of Korea; Thailand; and Chile) and Miscellaneous (excluding Korea; Thailand; and the Philippines). In Miscellaneous, the internationalization level is lower than for other industries.

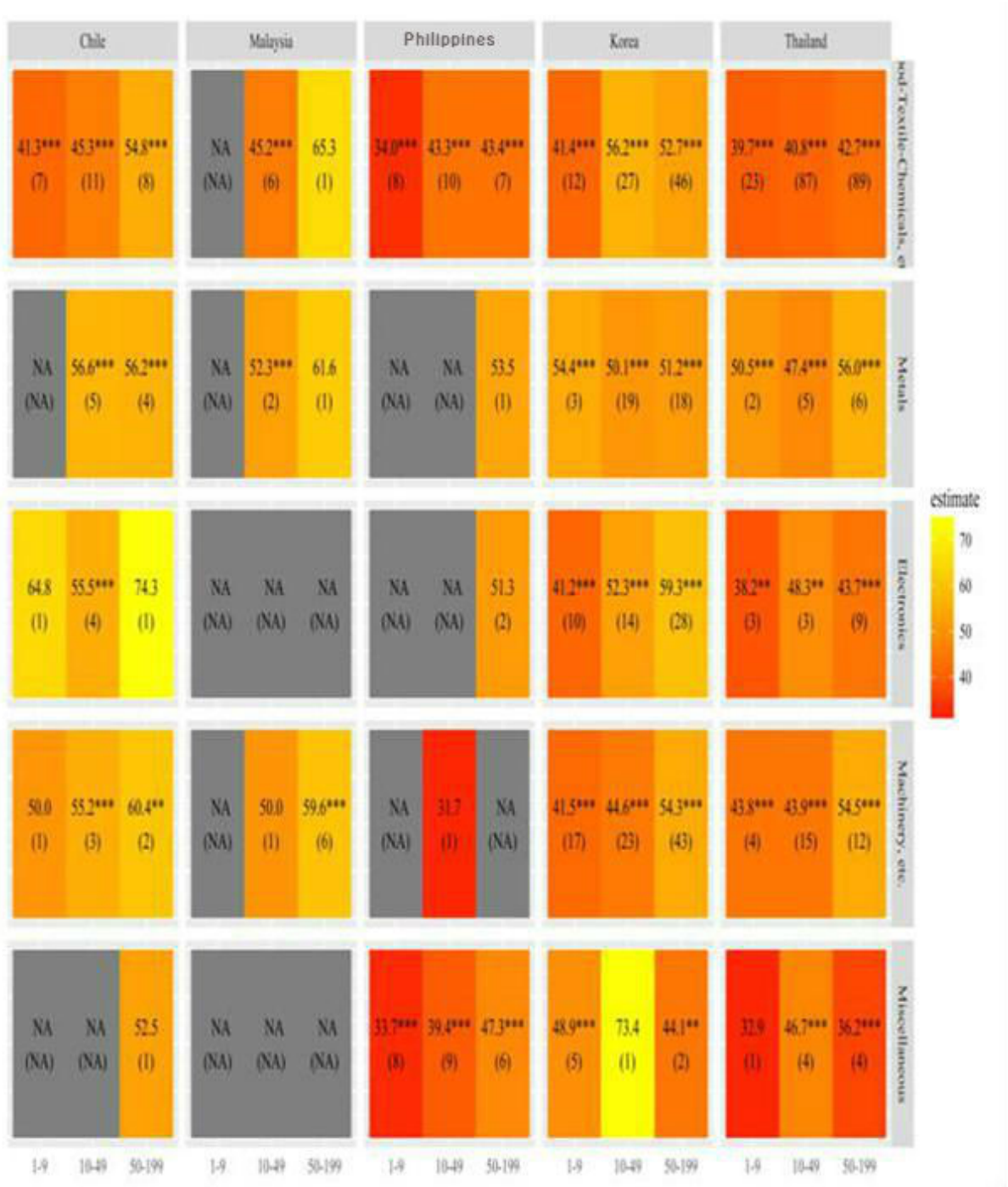
- An average or higher internationalization index is found in Metals for Chile and Malaysia. In the case of Chile, the internationalization level is high in Electronics and Machinery, etc. for medium-sized firms with 10 or more persons, and Malaysian firms in the "50-199" size also have average or higher internationalization levels.

- Small-sized firms in the Philippines show a tendency for low internationalization levels. Representative examples of this tendency are Food-Textile-Chemicals, etc. and Miscellaneous. Internationalization levels in the Philippines are listed as average or lower in most cases.

- In general, Korea has average or higher internationalization levels across all cells, excluding small-sized firms with under 10 persons. In particular, in the case of Korea's Electronics and Machinery, etc., industries, the greater the firm size, the higher the level of internationalization. In the case of Metals, however, this tendency is reversed: the smaller the firm size, the higher the internationalization level.

- In the case of Thailand, in general, internationalization levels are lower than average, excluding those found in Metals and Machinery, etc., for firms of “50-199” persons. Internationalization is seen to be most advanced in Metals.

<Figure 6> Comprehensive Analysis of Internationalization Indices by Economy, Industry, and Firm Size

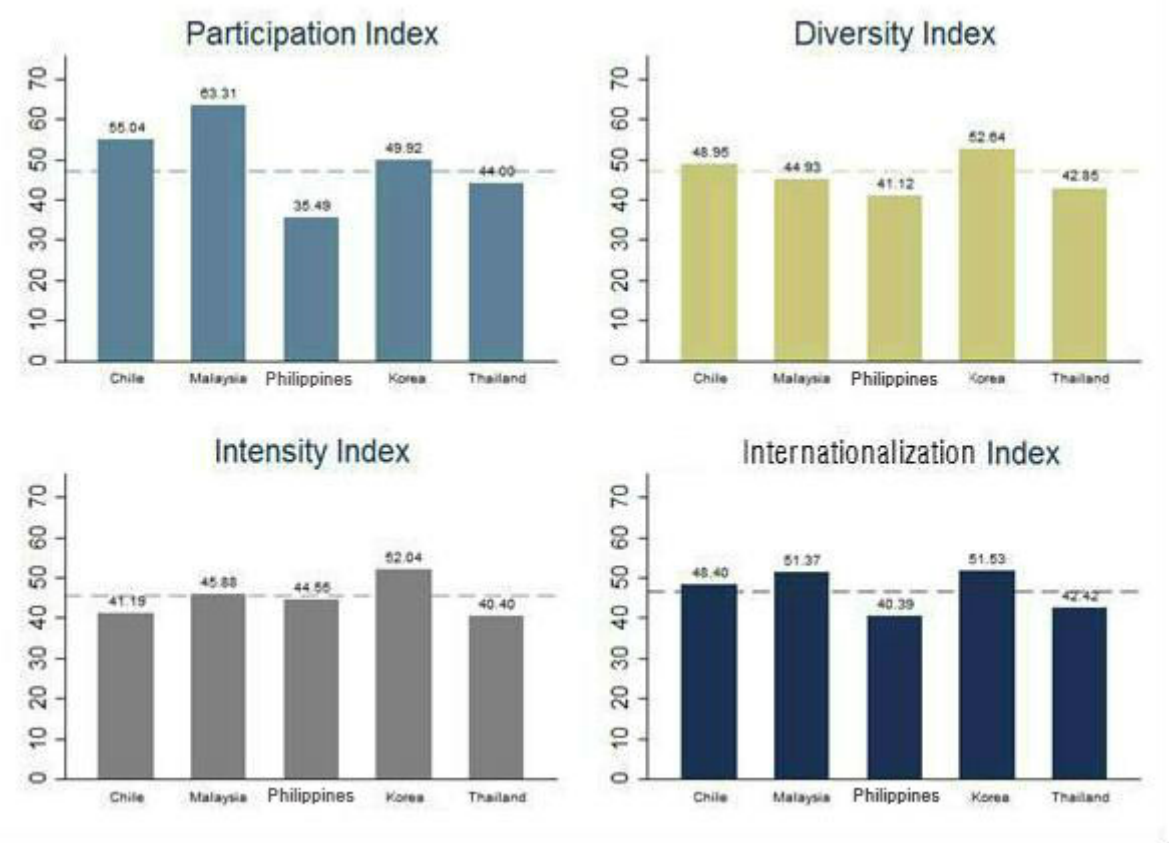


* Note: Linear fit is performed for the internationalization indices of firms included in each cell. The constant term targets 75 cells divided for each different economy, industry, and firm size. The number centered in the top portion of each cell is the estimated average value, and the asterisk on the right of the number represents the significance level. “***,” “**,” and “*”signify confidence levels of 99%, 95%, and 90%, respectively. The number in brackets found below represents the number of firms included in a particular cell.

2.2. Diversity-Intensity Analysis

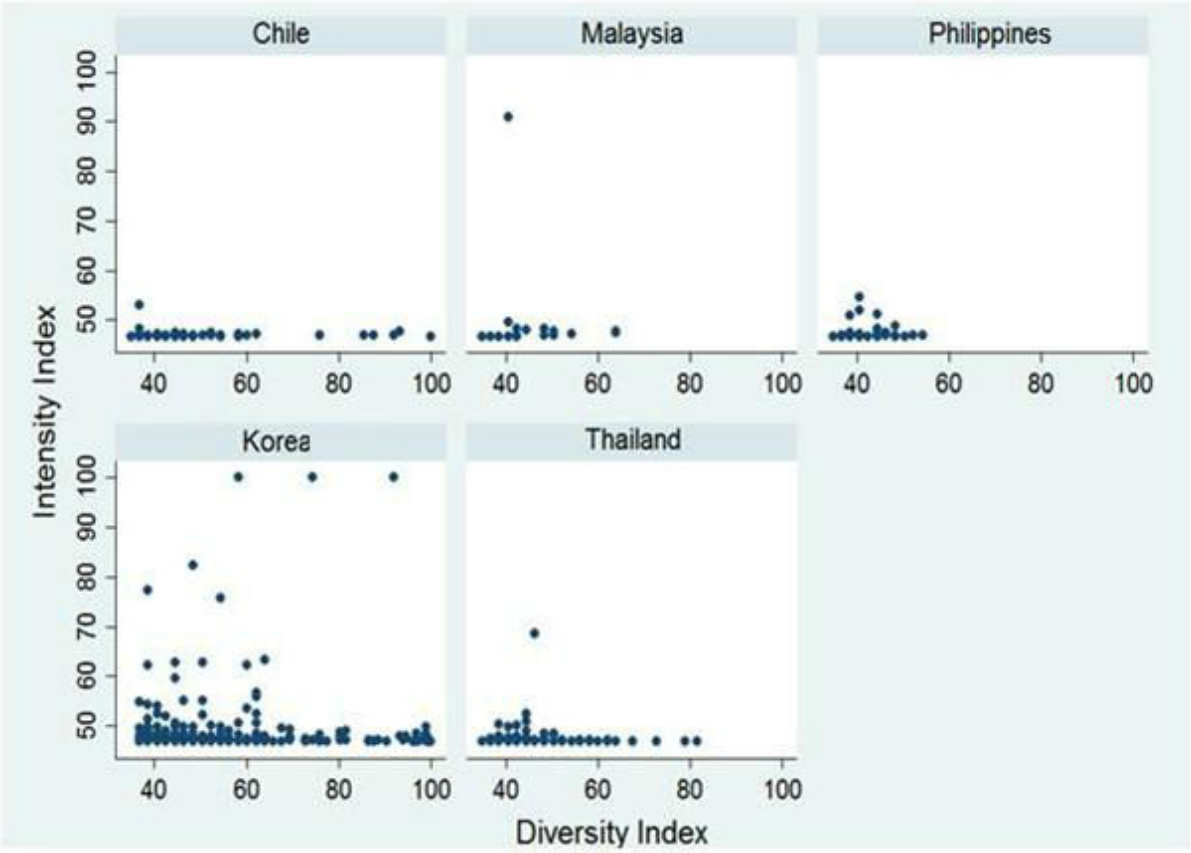
<Figure 7> shows the current state of SME internationalization levels by index. Korea has the highest Internationalization Participation Index when excluding Chile and Malaysia due to their limited sample sizes. It also has the highest Diversity Index while the Philippines has the lowest. A high Diversity Index implies that the given economy is exporting to many different economies. In descending order, the ranking of economy by Intensity Index is as follows: Korea; Malaysia; the Philippines; Chile; and Thailand. A high Intensity Index implies a large amount of trade with other economies. In descending order, the ranking of economies by Internationalization Index is as follows: Korea; Malaysia; Chile; Thailand; and the Philippines. Although the reliability of this data is low, Chile and Malaysia are ranked relatively high due to their high Internationalization Participation Index.

<Figure 7> Indices by Economy



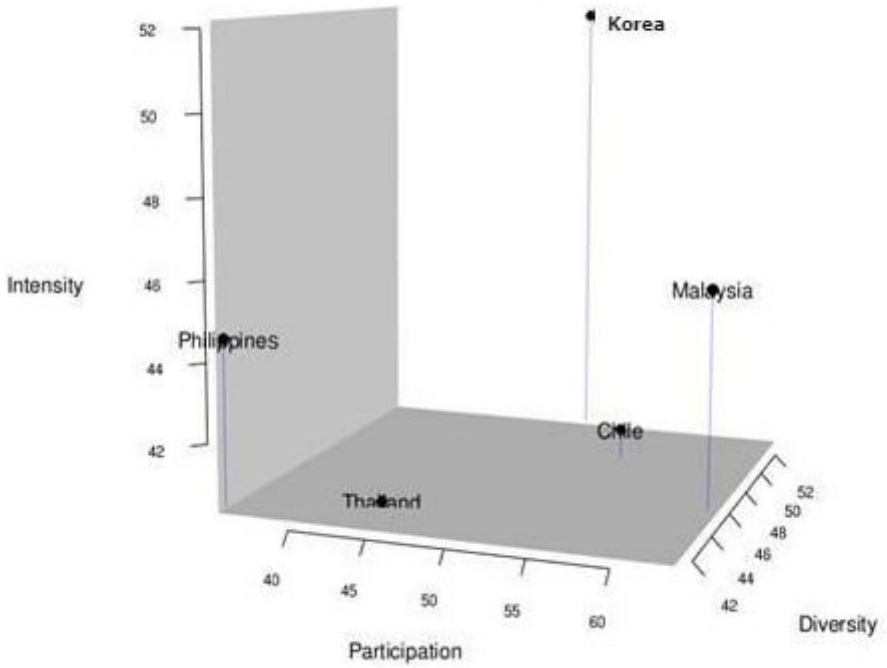
The scatter plots of the Intensity Index and Diversity Index in <Figure 8> show that the Diversity Index is generally higher than the Intensity Index across all economies. Korea and Chile have relatively high Diversity Indices compared to the other economies. The Intensity Index is low overall except in Korea and Thailand. However, SMEs in the Philippines have both a low Diversity Index and a low Intensity Index.

<Figure 8> Scatter Plots of Diversity Index and Intensity Index by Economy



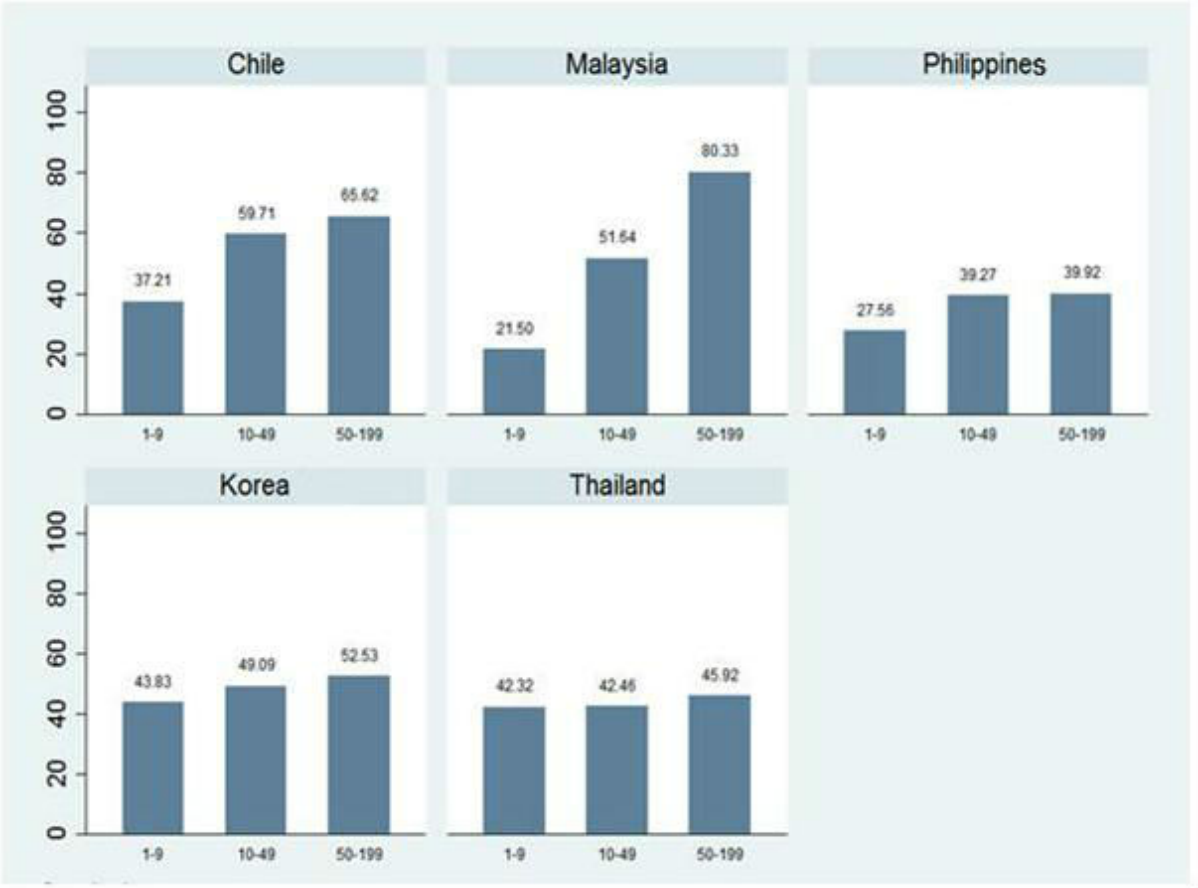
<Figure 9> shows the relative Index position of each economy according to Index 2 (Participation + Diversity 1 + Intensity 2). The analysis of each economy is as follows: Chile has high levels of Participation and Diversity, but a very low level of Intensity; Malaysia has a high level of Participation, but the Diversity and Intensity levels are below average; Korea has an average level of Participation and high levels of Diversity and Intensity. There is also a particularly large difference between Korea and other economies with respect to Intensity; the Philippines has low levels of Diversity, Participation and Intensity; and Thailand has low levels of Participation and Diversity, with the lowest Intensity level of the five economies. Here, the problem of limited sample size needs to be considered.

<Figure 9> Relative Index Position by Economy



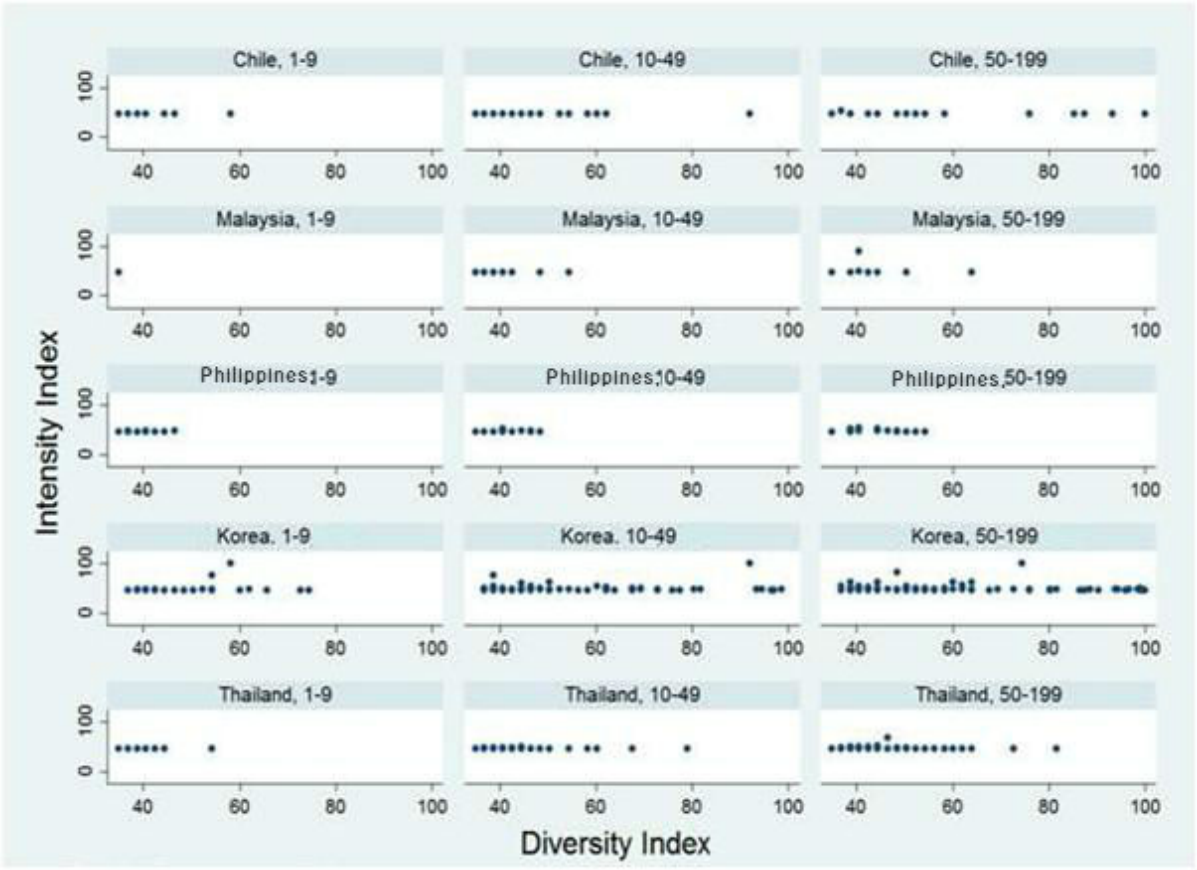
In Chile; Malaysia; and Korea, it is found that larger SMEs show higher levels of Participation. Relatively, the Participation difference by size is biggest in Malaysia, but smallest in Korea. In the Philippines, the small-sized SMEs show a lower level of Participation compared to those of bigger SMEs. However, in Thailand, the differences by size are not significant.

<Figure 10> Participation by Economy and Firm Size



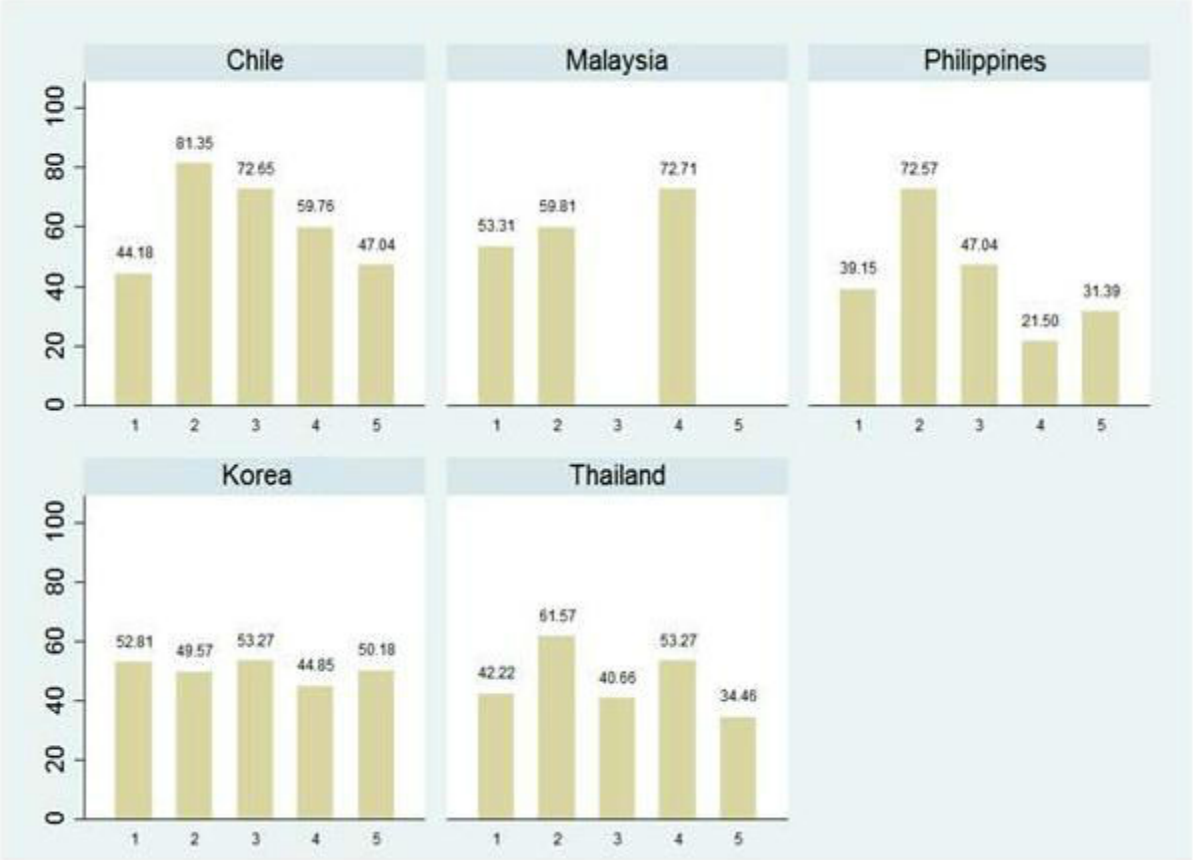
<Figure 11> shows the relationship between Intensity and Diversity according to economy and firm size. Generally, in all economies, the bigger the SMEs, the higher Diversity. However, with respect to Intensity, the effect of size is relatively small and negligible.

<Figure 11> Intensity-Diversity Tendency by Economy and Firm Size



<Figure 12> shows that the difference in Participation between industries is small in Korea, but relatively large in Thailand. Specifically, the Chemical, Rubber and Plastic; Metal; and Machinery and Transportation Equipment industries show high levels of Participation. In the Philippines, the Chemical, Rubber and Plastic; and Metal industries show high levels of Participation. However, this study cannot analyze the industries of Chile and Malaysia because of the limited sample size.

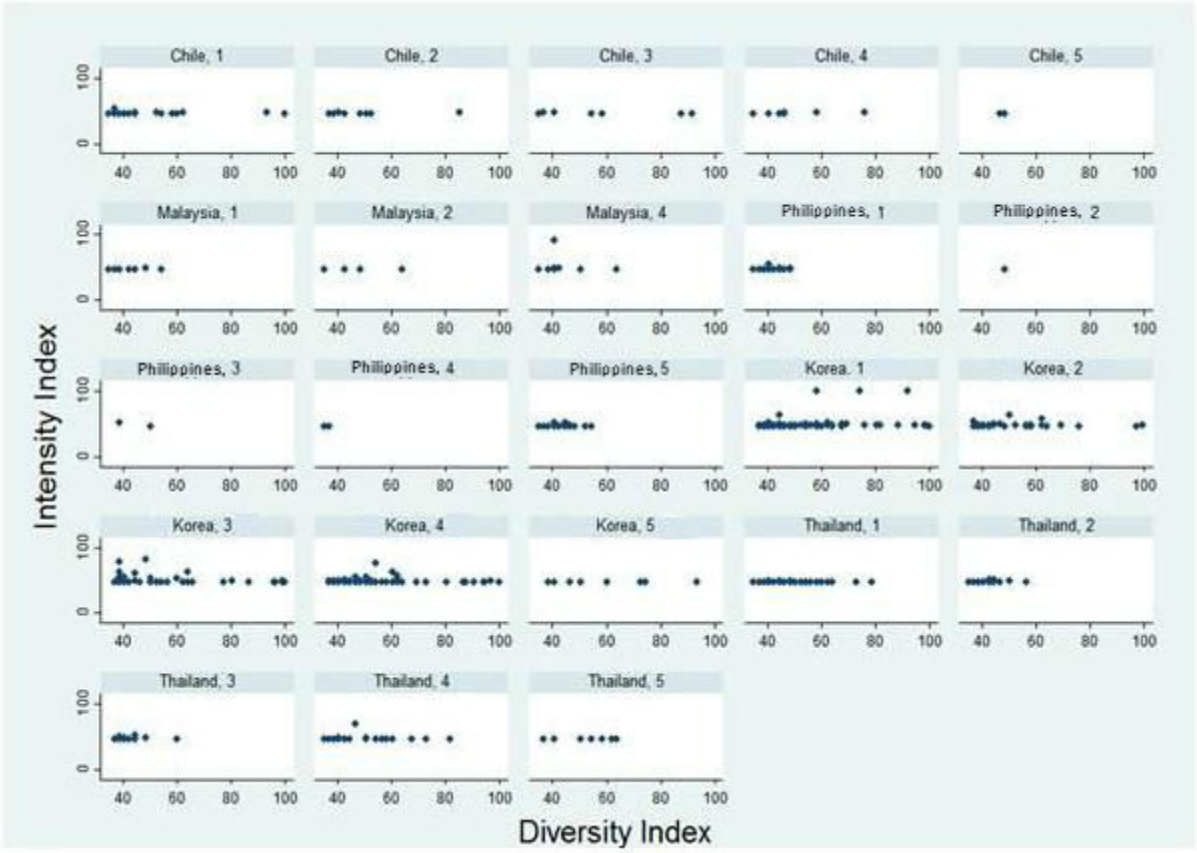
<Figure 12> Participation by Economy and Industry



Note: 1: Food & Beverage, Textile & Apparel and Chemicals
2: Metals
3: Electronics
4: Machinery and Transport Equipment
5: Miscellaneous

Overall, the Food & Beverage, Textile and Woods industries have high levels of Diversity exempt for in Korea. In Korea, the Diversity difference between industries is small compared to other economies. Malaysia shows high level of Intensity in the Machinery and Transportation Equipment industries, while Korea shows highest level of Intensity in the Food & Beverage, Textile and Woods; Electronics; and Machinery and Transportation Equipment industries. However, in other economies, this study cannot identify significant trends.

<Figure 13> Intensity-Diversity Tendency by Economy and Industry.



Note: 1: Food & Beverage, Textile & Apparel and Chemicals
2: Metals
3: Electronics
4: Machinery and Transport Equipment
5: Miscellaneous

2.3. Determinants of the Internationalization of SMEs

This section analyzes the determinants of the internationalization of SMEs. Specifically, this tests the following assumptions:

A1: The older the SME, the more likely it is to be involved in internationalization.

A2: The larger the SME, the more likely it is to be involved in internationalization.

A3: SMEs that conduct R&D are more likely to be involved in internationalization.

A4: SMEs which have received foreign investments are more likely to be involved in internationalization.

A5: The more patents the SME owns, the more likely it is to be involved in internationalization.

A6: SMEs that benefit from government supports are more likely to be involved in internationalization.

A7: SMEs with higher internal capacities are more likely to be involved in internationalization.

In order to test these assumptions, this study applies Ordinary Least Squares (OLS). It is applied as follows

$$Y = \alpha + X\beta + e$$

where *Y* represents the dependent variables – the six internationalization indices – and X represents the independent variable, which is composed of firm characteristics and government supports. The independent variables are described in <Table 34>.

<Table 34> Explanation of Independent Variables

Variables	Explanation
export_age	Common logarithms for SME export age
Size	Defined as 1, 2 or 3 according to the number of employees
rnd_dummy	Defined as 1 if R&D > 0, or 0 if not (for 2014)
f_capital_dummy	Defined as 1 if foreign capital > 0, or 0 if not (for 2014)
Patent	Number of domestic patents + foreign patents
patent_etc	Number of misc. domestic patents + misc. foreign patents
policy_yn	Classified as 1 if the SME has ever received government support, and as 0 otherwise
export_dep	Classified as 1 if the SME has a specialized export department, and as 0 otherwise
Material	Classified as 1 if the SME has foreign promotional materials, and as 0 otherwise
Iindustry_	Classified as 1 if the SME belongs to a specific industry, and as 0 otherwise

As a result of regression analysis, it is found that factors showing a great correlation with SME internationalization include export history, firm size, and foreign capital attraction. When other indices than the index (5) are set as dependent variables, the internationalization of SMEs also has a greater correlation with R&D. According to each industry, high internationalization levels are seen for all industries other than Food & Beverage. In particular, the internationalization levels for Metals and Electronics are high.[8]

The effects of the number of patents, number of miscellaneous patents, government support, foreign promotional materials, specialized export departments, and so on are generally insignificant. In particular, the presence or absence of benefits from government policies is

[8] In the survey, industries are divided into ten groups. Though they are made up of five groups in the above analysis for convenience in description, regression analysis in this section is applied to each of the ten industries in accordance with the survey design. The results of the analysis of the five groups made up of ten industries are similar to the other analysis results for this section – that is to say, the internationalization levels of Metals and Electronics are found to be highest.

found to have no correlation with the internationalization index, raising questions on the effectiveness of government policies.

Regression analysis can be performed by standardizing the index, which is the dependent variable, and the explanatory variable for Index 2, and then comparing the correlation between the dependent variable and the explanatory variable (in the far right row of the table below). The greatest correlation with the internationalization index is seen in firm size variable and industry variable, such as Electronics, Metals, and Chemicals. Besides them, the impacts of export history, foreign capital, and R&D are similar. Accordingly, the analysis results fit Assumptions A1; A2; A3; and A4, but they do not do enough to support Assumptions A5; A6; and A7.

Even if different calculation methods are used from Index 1 to Index 6, the model fit does not greatly differ. If we were to perform the analysis while including only Korea and Thailand – both with relatively large sample sizes – only the impact of export history would decrease, with no great differences in the results presented below for other variables.

<Table 35> Regression Analysis Results by Indices (5 industries included)

VARIABLES	(1) index1	(2) index2	(3) index3	(4) index4	(5) index5	(6) index6	standardized coef. (index2)
export_age	4.677***	4.346***	4.237***	6.061***	5.662***	5.392***	.110
	(1.527)	(1.505)	(1.578)	(1.572)	(1.580)	(1.565)	
a12	1.688**	3.307***	3.686***	1.950***	3.659***	3.667***	.176
	(0.681)	(0.687)	(0.697)	(0.691)	(0.715)	(0.692)	
rnd_dummy	2.719**	2.499**	2.732**	2.306**	2.197*	2.319**	.090
	(1.144)	(1.159)	(1.176)	(1.139)	(1.185)	(1.159)	
f_capital_dummy	5.238**	4.684**	4.309**	4.888**	4.631**	4.532**	.092
	(2.061)	(2.154)	(2.181)	(1.923)	(2.125)	(2.116)	
Patent	0.017	0.000	-0.000	0.018	0.003	0.002	.0001
	(0.014)	(0.008)	(0.008)	(0.012)	(0.007)	(0.007)	
patent_etc	0.030	-0.033	-0.039	0.024	-0.041	-0.044	-.018
	(0.045)	(0.031)	(0.033)	(0.041)	(0.029)	(0.029)	
policy_yn	-0.460	-0.858	-0.944	-0.698	-1.143	-1.161	-.029
	(1.132)	(1.092)	(1.136)	(1.138)	(1.126)	(1.105)	
Material	1.744	0.187	0.114	2.617**	0.692	0.455	.006
	(1.094)	(1.131)	(1.171)	(1.126)	(1.209)	(1.169)	
export_dep	1.502	1.636	1.264	1.270	1.597	1.089	.060
	(1.325)	(1.284)	(1.321)	(1.312)	(1.293)	(1.270)	
_Iindustry__2	3.250*	3.354*	3.938**	2.884	2.738	3.137	.074
	(1.849)	(1.878)	(1.936)	(1.830)	(1.906)	(1.918)	
_Iindustry__3	3.056*	3.849**	4.038**	3.704**	4.362**	4.203**	.092
	(1.718)	(1.839)	(1.839)	(1.750)	(1.940)	(1.872)	
_Iindustry__4	0.471	1.043	1.251	0.113	0.362	0.617	.030
	(1.518)	(1.489)	(1.508)	(1.468)	(1.487)	(1.442)	
_Iindustry__5	1.684	0.428	0.519	1.266	0.122	-0.416	.007
	(2.304)	(2.146)	(2.334)	(2.297)	(2.188)	(2.141)	
Constant	44.733***	36.522***	35.796***	42.184***	33.941***	34.422***	
	(2.792)	(2.515)	(2.583)	(2.792)	(2.563)	(2.521)	
Observations	615	618	586	585	586	588	
R-squared	0.15	0.20	0.19	0.16	0.21	0.21	

Note: Economy dummies have been controlled.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

<Table 36> Regression Analysis Results by Indices (10 industries included)

VARIABLES	(1) index1	(2) index2	(3) index3	(4) index4	(5) index5	(6) index6	standardized coef. (index2)
export_age	4.090***	3.878**	3.732**	5.338***	5.058***	4.829***	.098
	(1.533)	(1.511)	(1.582)	(1.570)	(1.575)	(1.565)	
a12	1.816***	3.345***	3.738***	2.097***	3.715***	3.730***	.178
	(0.691)	(0.692)	(0.702)	(0.702)	(0.725)	(0.699)	
rnd_dummy	2.429**	2.247*	2.446**	1.967*	1.906	2.035*	.081
	(1.152)	(1.169)	(1.187)	(1.150)	(1.197)	(1.171)	
f_capital_dummy	4.636**	4.248**	3.828*	4.282**	4.199**	4.079*	.083
	(2.046)	(2.136)	(2.171)	(1.921)	(2.112)	(2.110)	
Patent	0.019	0.002	0.002	0.019*	0.005	0.004	.004
	(0.014)	(0.007)	(0.008)	(0.012)	(0.007)	(0.007)	
patent_etc	0.034	-0.029	-0.036	0.027	-0.037	-0.041	-.016
	(0.045)	(0.031)	(0.033)	(0.041)	(0.029)	(0.029)	
policy_yn	-0.140	-0.621	-0.769	-0.381	-0.900	-0.958	-.021
	(1.147)	(1.102)	(1.146)	(1.151)	(1.138)	(1.116)	
Material	2.065*	0.467	0.332	2.910***	0.968	0.697	.016
	(1.085)	(1.125)	(1.161)	(1.115)	(1.205)	(1.161)	
export_dep	1.467	1.604	1.218	1.278	1.607	1.101	.058
	(1.306)	(1.269)	(1.305)	(1.290)	(1.278)	(1.257)	
_Iindustry_2	4.428**	3.266*	2.977	5.296***	4.171**	3.668*	.076
	(1.827)	(1.758)	(1.962)	(1.962)	(1.927)	(1.896)	
_Iindustry_3	4.363**	3.794*	3.749*	4.573**	3.948*	4.095**	.067
	(2.087)	(2.018)	(2.071)	(2.120)	(2.077)	(2.034)	
_Iindustry_4	6.504***	5.166**	5.059**	6.184***	4.756**	4.497**	.107
	(2.054)	(2.008)	(2.162)	(2.148)	(2.152)	(2.110)	
_Iindustry_5	5.693**	5.021**	4.929**	5.292**	4.881**	4.946**	.091
	(2.273)	(2.274)	(2.278)	(2.339)	(2.476)	(2.382)	
_Iindustry_6	7.057***	6.399***	6.884***	6.757***	5.893***	6.160***	.141
	(2.048)	(2.066)	(2.132)	(2.031)	(2.084)	(2.093)	
_Iindustry_7	6.832***	6.878***	6.990***	7.561***	7.505***	7.218***	.165
	(1.953)	(2.042)	(2.067)	(1.992)	(2.126)	(2.061)	
_Iindustry_8	3.906**	3.461*	3.804**	3.849**	3.065	3.292*	.088
	(1.901)	(1.866)	(1.928)	(1.857)	(1.875)	(1.827)	
_Iindustry_9	5.104*	5.655**	5.186*	4.195	4.598*	4.457*	.092
	(2.836)	(2.833)	(2.792)	(2.745)	(2.718)	(2.641)	
_Iindustry_10	4.934**	3.061	3.063	4.581*	2.867	2.248	.054
	(2.444)	(2.258)	(2.438)	(2.434)	(2.288)	(2.241)	
Constant	41.712***	34.258***	33.687***	39.233***	31.688***	32.208***	
	(2.823)	(2.548)	(2.623)	(2.802)	(2.582)	(2.554)	
Observations	615	618	586	585	586	588	
R-squared	0.17	0.21	0.20	0.18	0.22	0.22	

Note: Economy dummies have been controlled.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3. Global Capacity and Environment for Internationalization

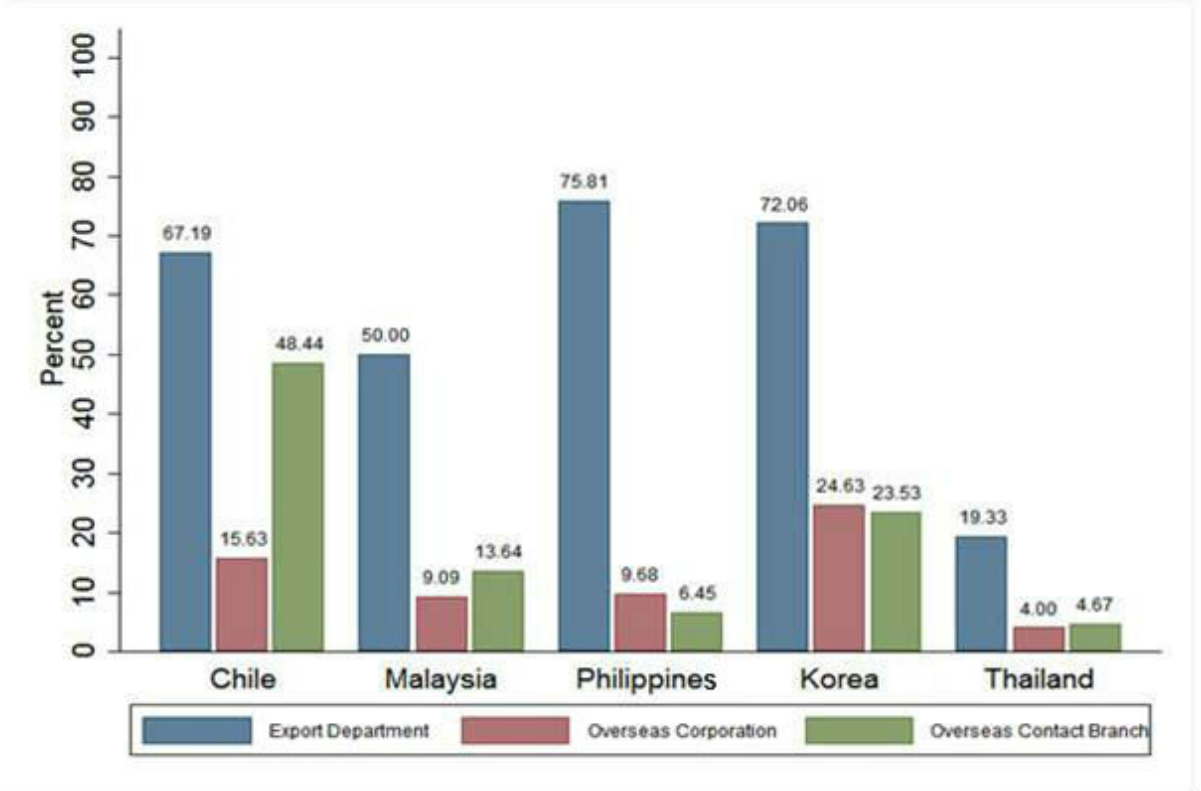
This section analyzes the global capacity and environment for internationalization, based on the survey results.

3.1. Readiness

SME readiness is examined in terms of whether or not a firm retains internal organizations and promotional tools for overseas expansion.

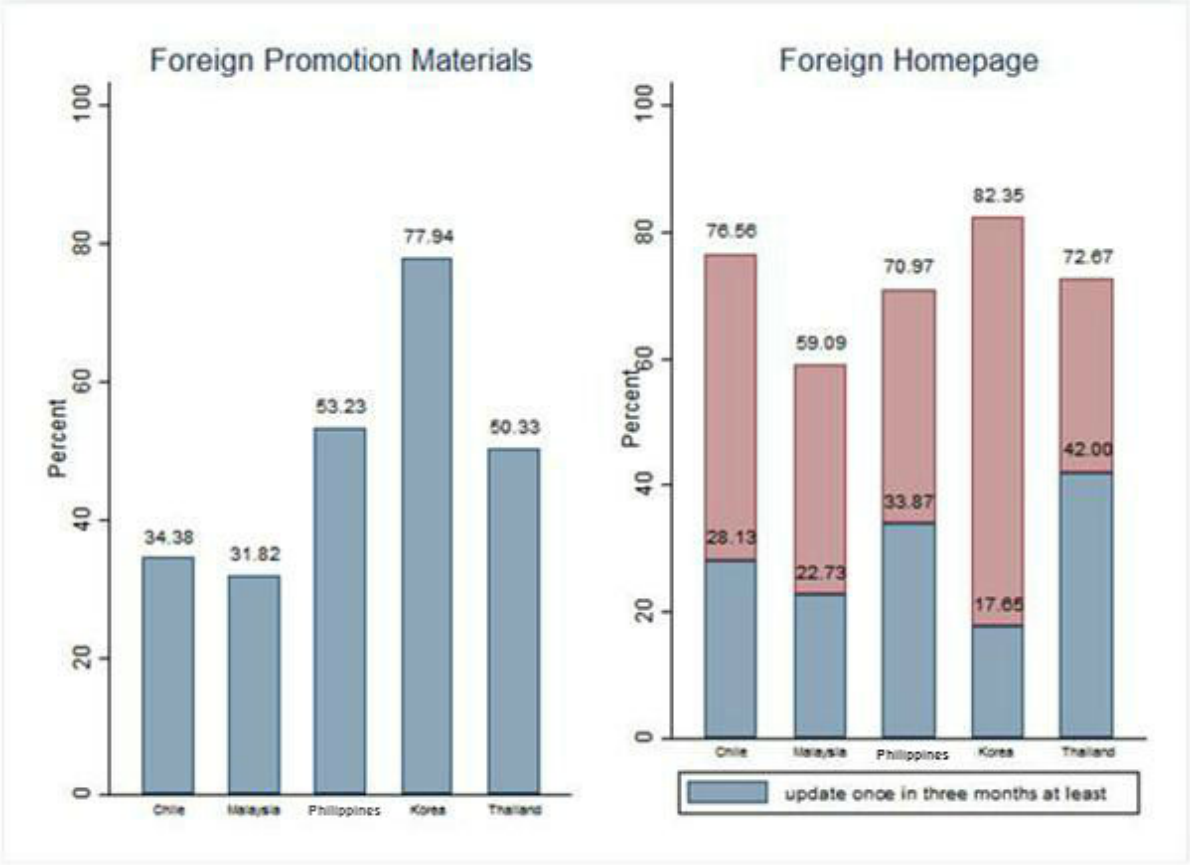
<Figure 14> is found in the Philippines, but in terms of the retention of overseas contact branches, Chile has the highest percentage of firms. However, this data may be unreliable due to the limited sample size. Thailand has the lowest levels across all three terms which implies that it is lacking sufficient support for internationalization. In general, the ratios of firms having export departments are found to be higher than those of firms having organizations of the remaining two types.

<Figure 14> Percentage of Export Departments and Staff Retention, Retention of Overseas Corporations, and Retention of Overseas Contact Branches



<Figure 15> shows that the highest percentages of firms having foreign promotional materials and foreign homepages are both found in Korea. The percentages are relatively low in Chile and Malaysia. However, this data may be unreliable due to the small sample size. Although the percentage of firms having foreign homepages is highest in Korea, the number of firms which “update at least once every three months” is the lowest. In contrast, firms with foreign homepages in Thailand and the Philippines update their homepages quite often.

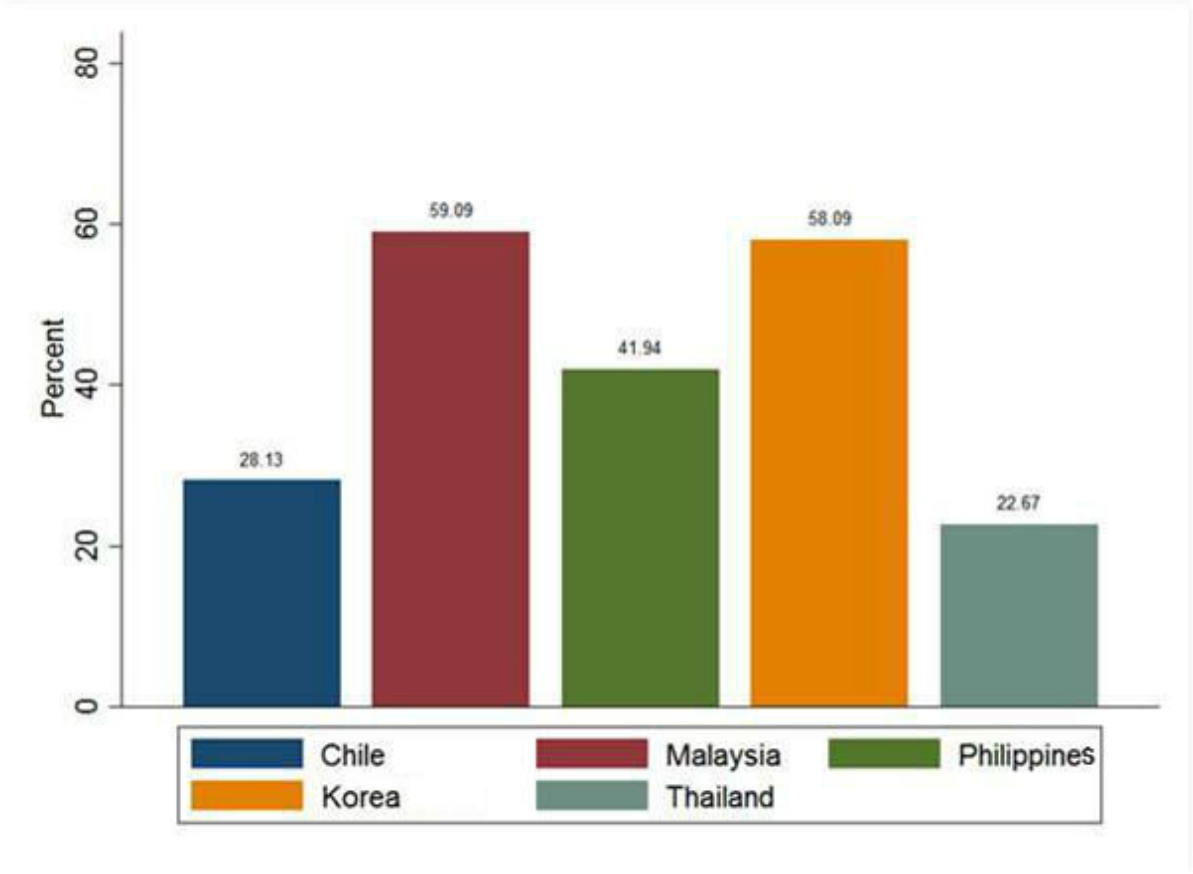
<Figure 15> Percentage of Foreign Promotional Materials and Foreign Homepage Retention



3.2. Innovation

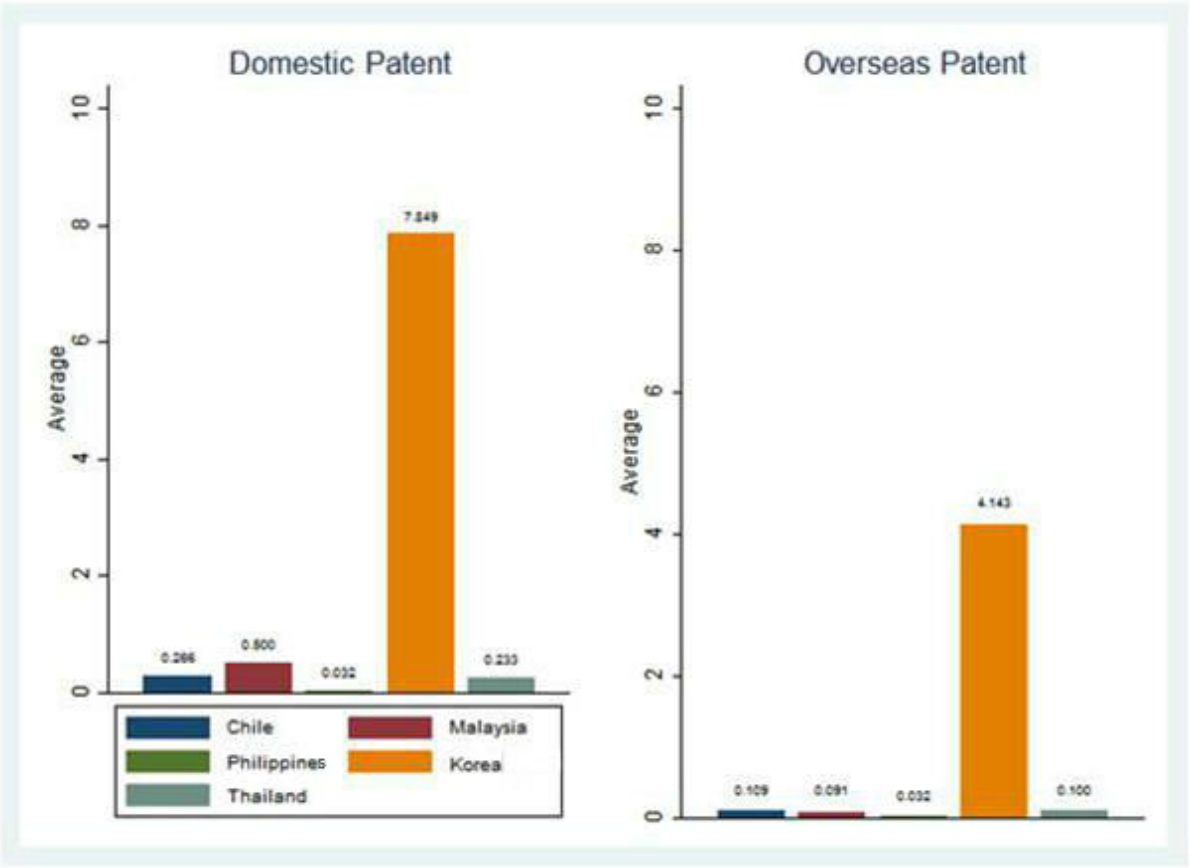
The innovation capacities of SMEs are examined in terms of whether or not the firms conduct R&D or innovation and how many IPRs or certifications are retained. <Figure 16> shows that the percentage of firms conducting R&D is highest in Malaysia, but this data may be unreliable due to the limited sample size; Korea is in second place followed by the Philippines; Chile; and Thailand.

<Figure 16> Overall Percentage of Firms Conducting R&D



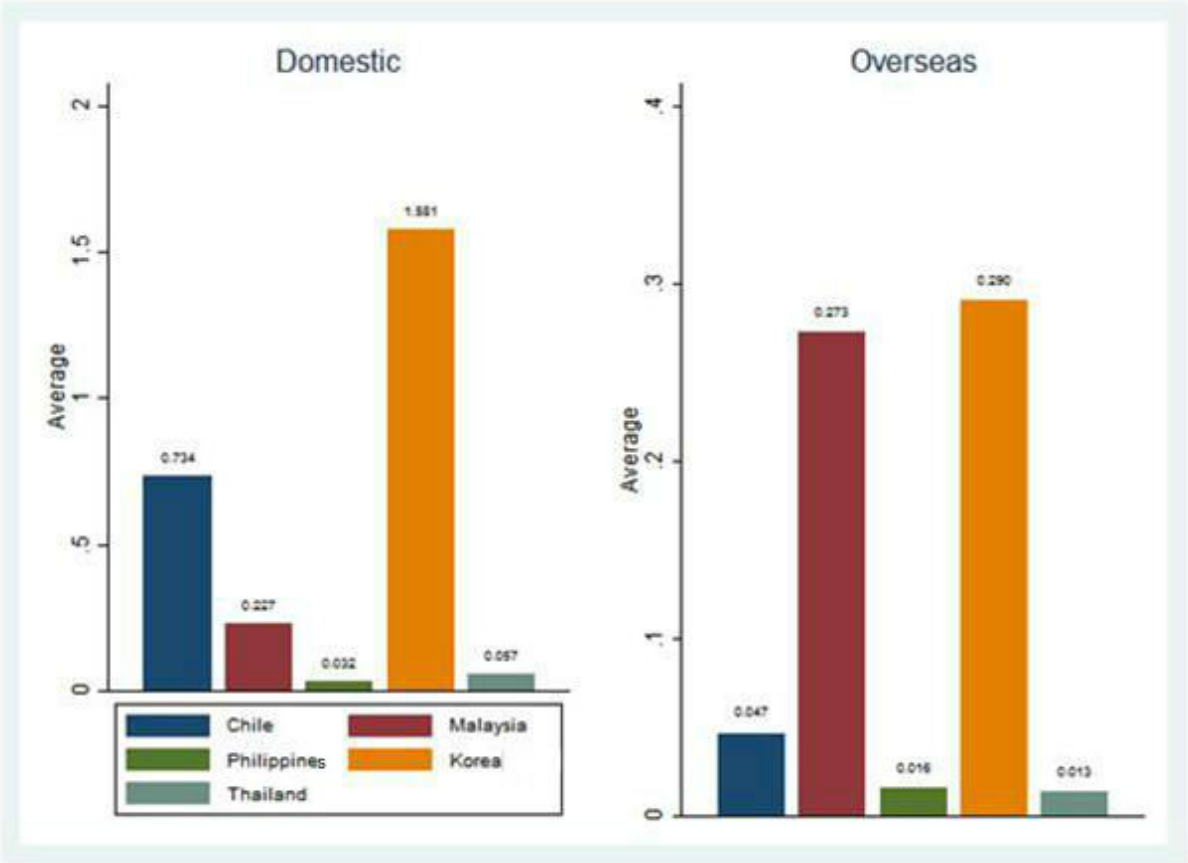
While Korea holds a much greater number of IPR patents both at home and abroad, other economies hold fewer than 0.5 patents in each case (<Figure 17>). Korea's number of domestic patents is 14 times greater than that of Malaysia, which occupies second place. In the case of Korean overseas patents, the number is also substantial, at more than 4, representing a figure 36 times greater than that of Chile, which holds second place in this category. The Philippines shows the smallest numbers both at home and abroad.

<Figure 17> Average Number of Domestic and Overseas Patents



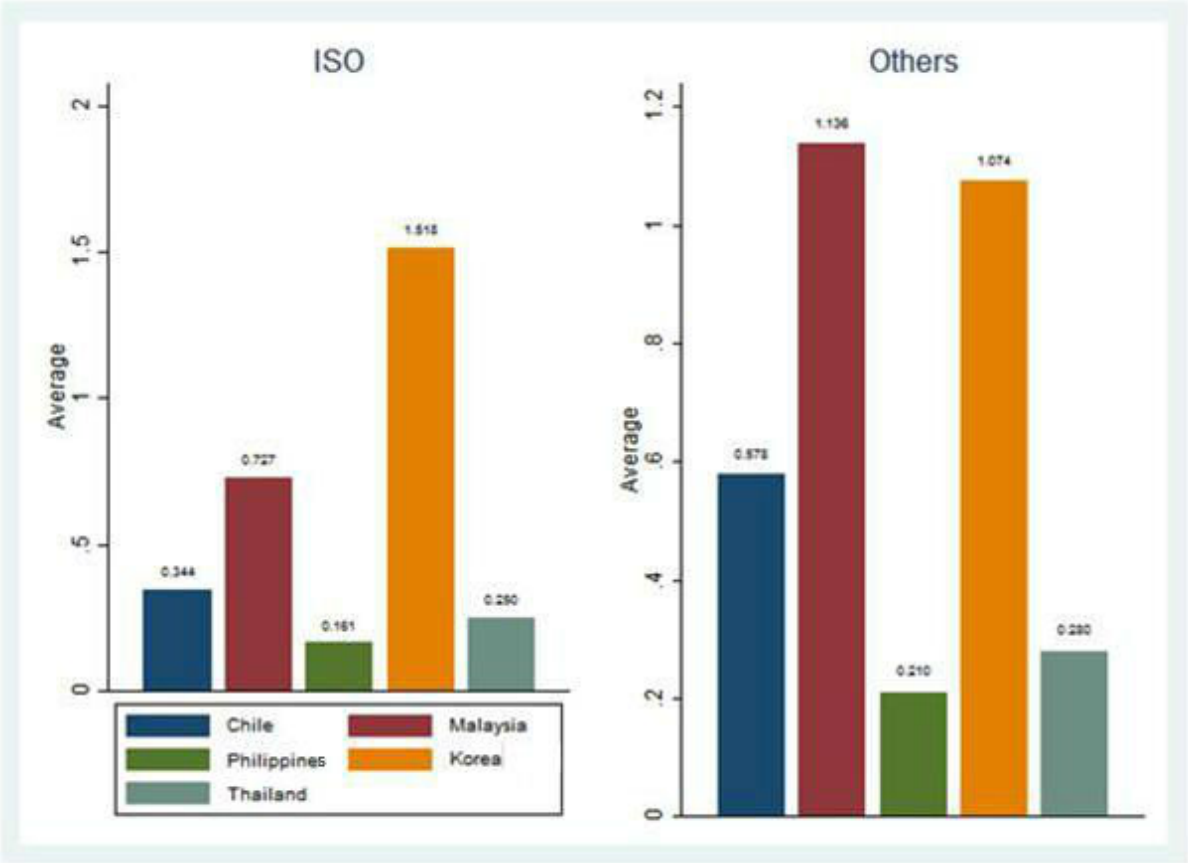
<Figure 18> shows that other domestic IPRs, apart from patents, are mostly held by Korea; with Chile following in second place. For overseas IPRs (excluding patents), Korea also holds the greatest number; Malaysia comes next with only a slight difference in average. The degrees of retention for other domestic and overseas IPRs by the Philippines and Thailand are at very similar levels.

<Figure 18> Average Number of Other IPRs



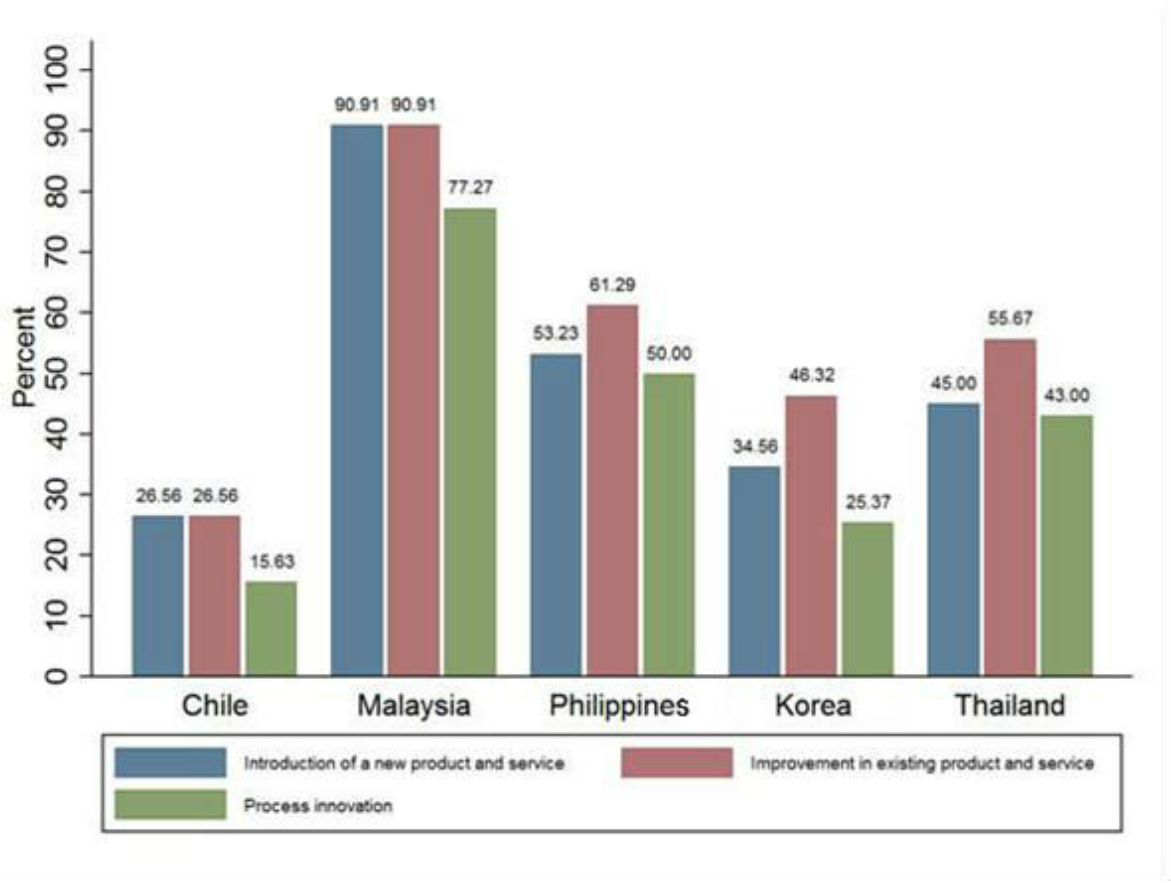
In terms of the average number of certifications, Korea holds the most ISO and other certifications; Malaysia and Chile have relatively advanced certification numbers; while the Philippines and Thailand hold fewer than 0.5 certifications (<Figure 19>).

<Figure 19> Average Number of Certifications



<Figure 20> shows that the most popular way to achieve innovation in internationalization is through "Improvement in existing product and service" followed by "Introduction of a new product and service" and "Process Innovation." The percentage of firms engaging in innovation is highest in Malaysia, but this data may be unreliable due to the limited sample size. In descending order, the remaining member economies are listed as Philippines; Thailand; Korea; and Chile.

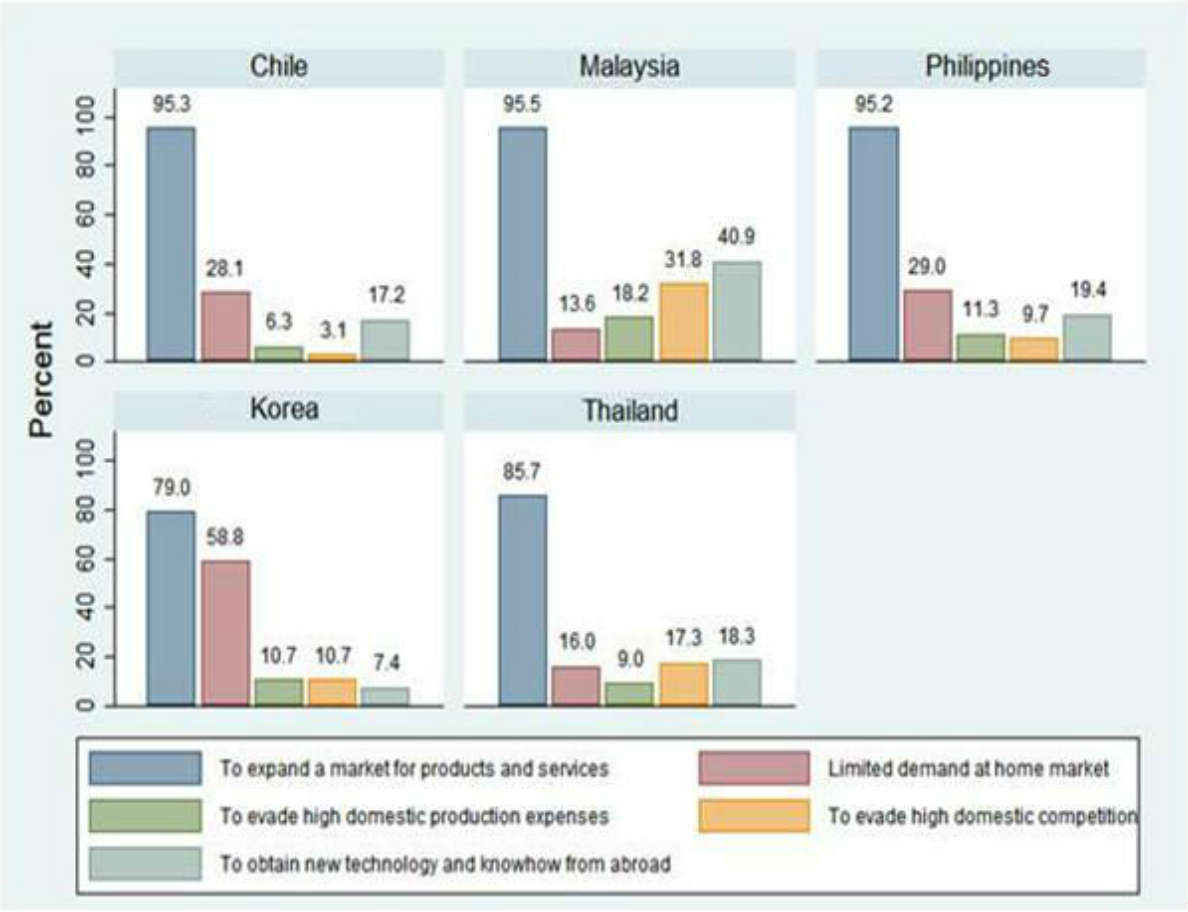
<Figure 20> Percentage of Firms Engaged in Innovation for Internationalization by Type



3.3. Motivation for Internationalization

Across all the economies investigated in this paper, the most important motive for SME internationalization is “To expand the market for products and services.” However, the second most important motive varies for the different economies. Korea; Chile; and the Philippines list “Limited demand in home market” as the second most important motive, while “To obtain new technology and knowhow from abroad” is second for Malaysia and Thailand. In Korea, “To expand a market for products and services” is closely followed by “Limited demand in home market.” This implies that Korean SMEs have been active in seeking international marketplaces for sustainable growth. On the other hand, Malaysia and Thailand are trying to improve technological expertise through internationalization, while Chile and the Philippines, responded that “Limited demand in home market” was the second main factor, as with Korea.

<Figure 21> Motivations for Internationalization

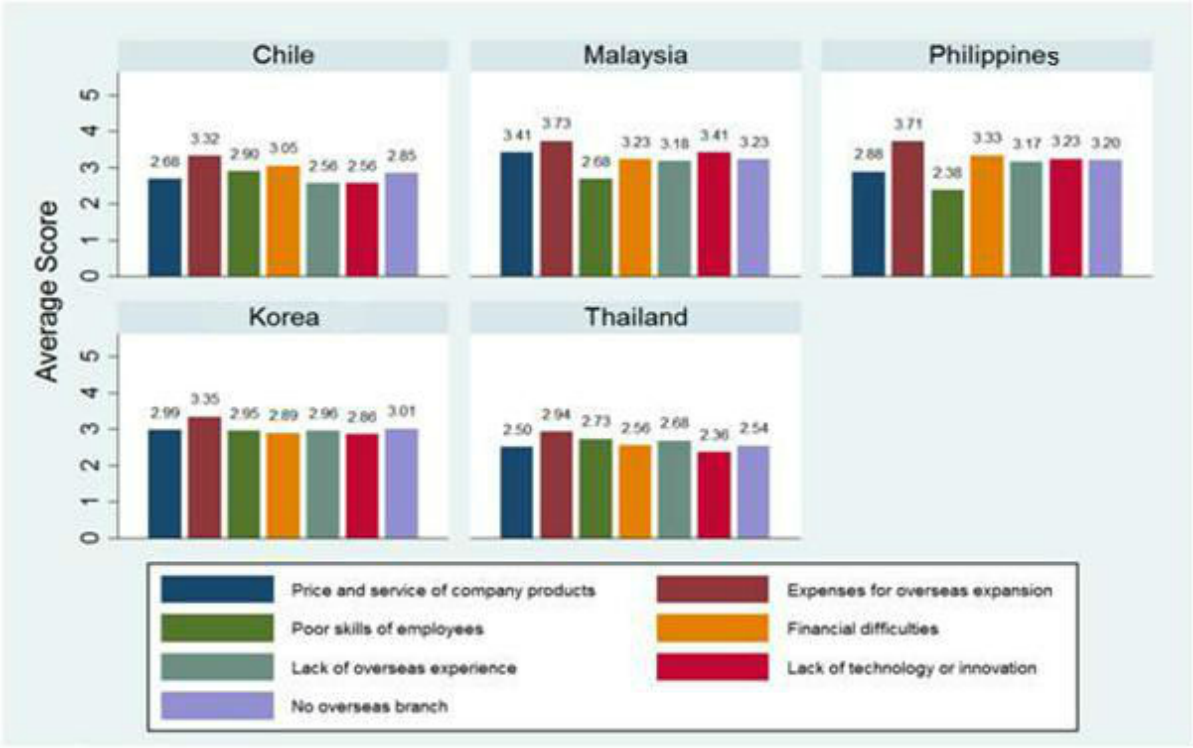


3.4 Difficulties in Internationalization

3.4.1. Internal Difficulties

The biggest difficulty in internationalization is “Expenses for overseas expansion” across all the selected economies. The second biggest difficulty varies among the economies. For Chile and the Philippines, it is “Financial difficulties”; for Malaysia “Lack of technology or innovation”; for Korea “No overseas branch”; and for Thailand “Lack of overseas experience.” In the case of the Philippines, the ranking of “Poor skills of employees” as a hindrance to internationalization is relatively low, indicating that in the Philippines, SME satisfaction with their employees is generally high compared to in the other economies. In the case of Korea, except for “Expenses for overseas expansion,” the ratings for most of the difficulties remain around at the average (3 points). This indicates that the Korean SMEs do not perceive significant difficulties in internationalization. In the case of Thailand, the perceived difficulties in “Technology innovation” are relatively low. As for Chile; Malaysia; and the Philippines, caution must be applied in reading the results as the given sample sizes are small. The specific statistics for each economy are presented in Appendix A4.

<Figure 22> Internal Difficulties in Internationalization

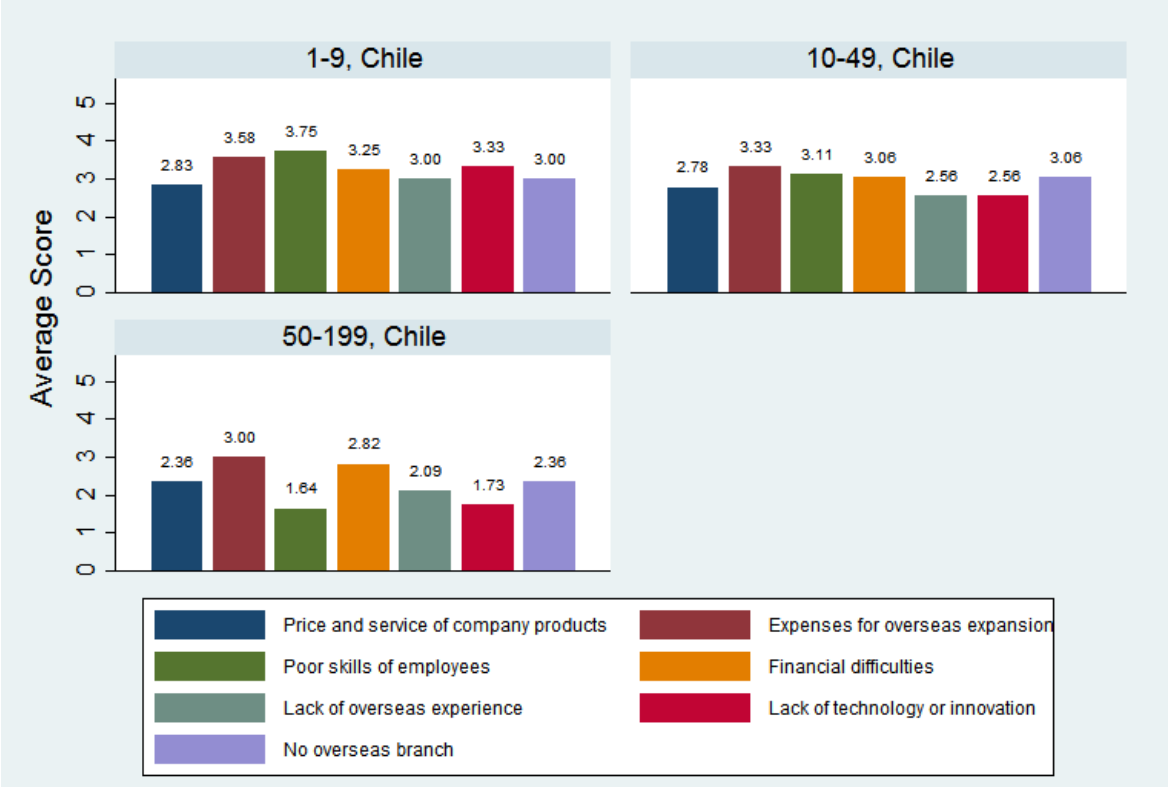


Let us now look at the internal difficulties in internationalization according to each member economy and firm size.

Chile

The main difficulty for Chilean SMEs with fewer than 10 employees is “Poor skills of employees.” Dissatisfaction with the quality of employees seems to decrease as the size of the SME grows. The rating for “Lack of technology or innovation” decreases with SME size. However, the response reliability is low because of the small sample size.

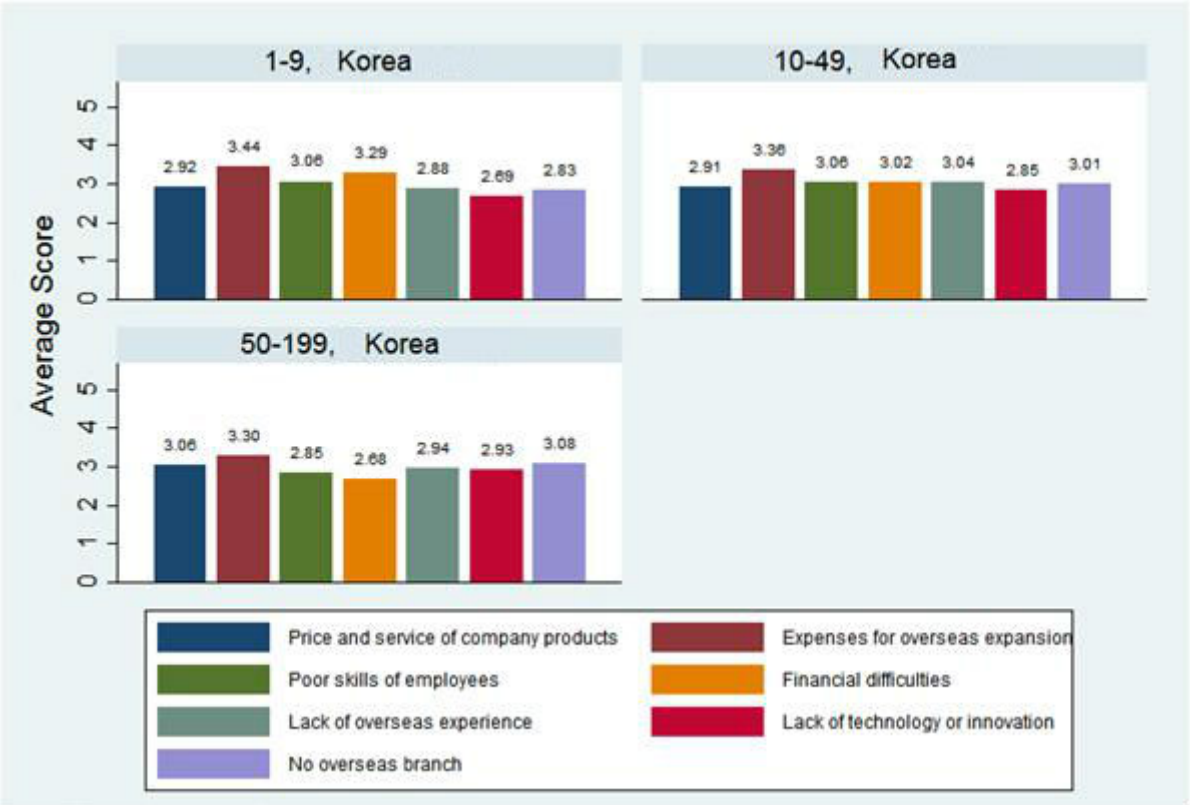
<Figure 23> Internal Difficulties: Chile



Korea

There are no significant differences in terms of difficulty levels among SMEs of different sizes. However, the ratings for “Financial difficulties” increase as SME size decreases, and vice versa.

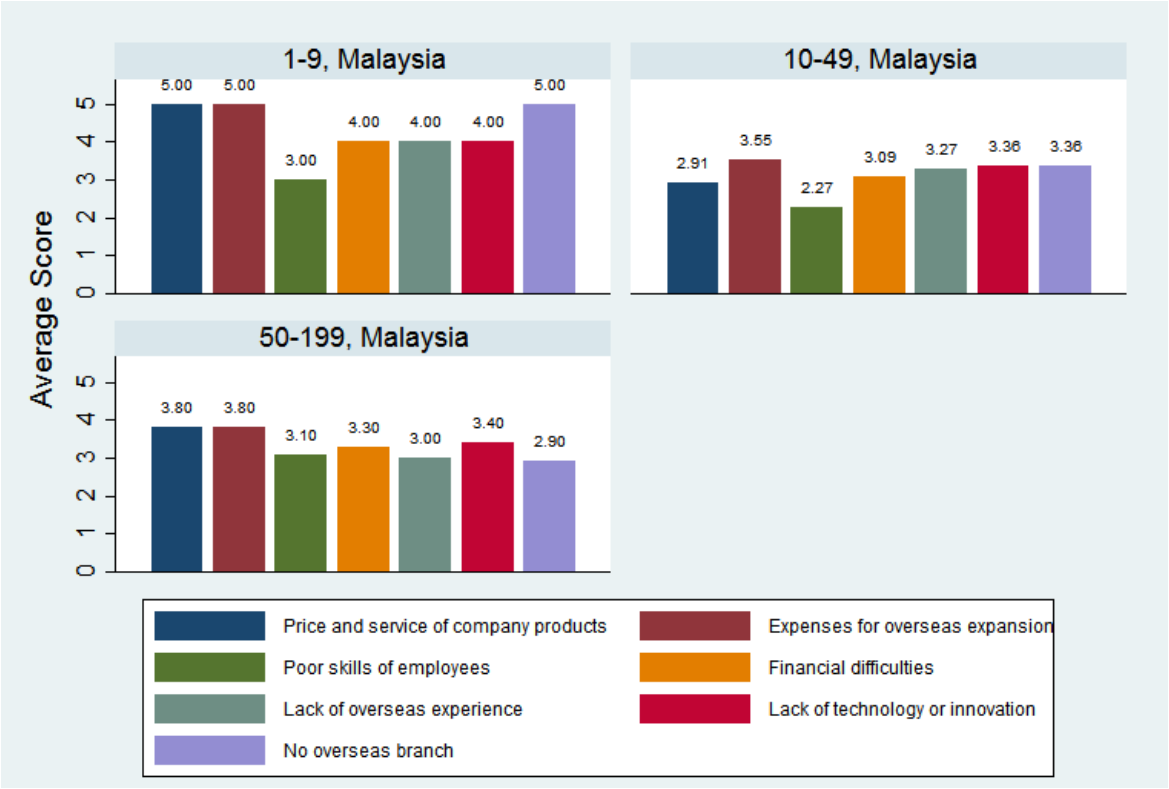
<Figure 24> Internal Difficulties: Korea



Malaysia

SMEs with fewer than 10 employees in Malaysia are experiencing the highest level of difficulties in internationalization. Distinct trends for SMEs with 10-49 employees and for SMEs with 50-199 are not observed. Reliability in response is low because of the small sample size.

<Figure 25> Internal Difficulties: Malaysia



Philippines

SMEs with fewer than 10 employees are experiencing the highest level of difficulty in internationalization in the Philippines. Overall, the larger the SME size, the lower the difficulty levels. Regardless of the SME size, “Expenses for overseas expansion” is listed as the main difficulty.

<Figure 26> Internal Difficulties: Philippines

Thailand

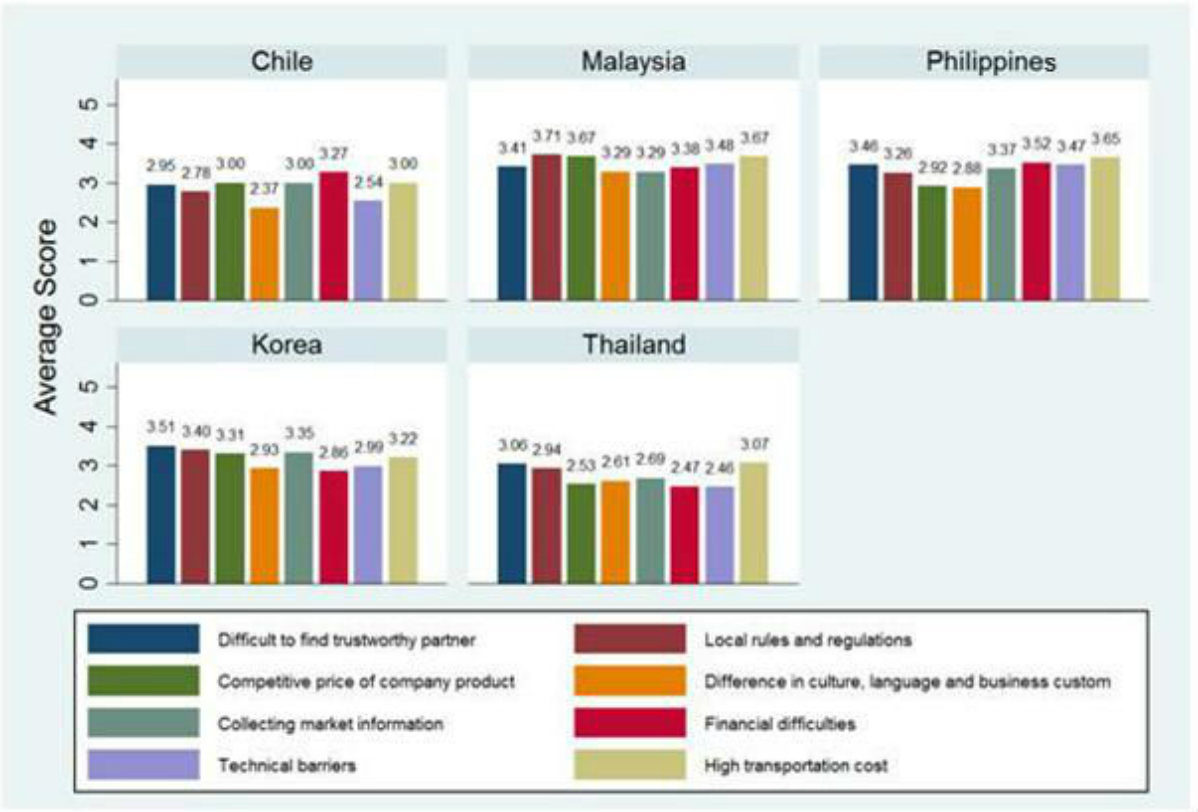
As the size of SMEs increases, the difficulties decrease in Thailand. Difficulties such as “Expenses for overseas expansion,” “Poor skills of employees,” “Financial difficulties,” and “No overseas branch” are the most serious for SMEs with fewer than 10 employees. The ratings for the difficulties decrease as SME size increases. The detailed statistics for each economy are presented in Appendix 2.

<Figure 27> Internal Difficulties: Thailand

3.4.2. External Difficulties

The main hindrance to internationalization varies across the economies investigated: “Financial difficulties” are the leading issue for Chile; while “Local rules and regulations” are highest for Malaysia; “High transportation cost” for the Philippines; “Difficult to find trustworthy partner” for Korea; and “Difficult to find trustworthy partner” and “High transportation cost” for Thailand. The detailed statistics for each economy are presented in Appendix A4.

<Figure 28> External Difficulties in Internationalization

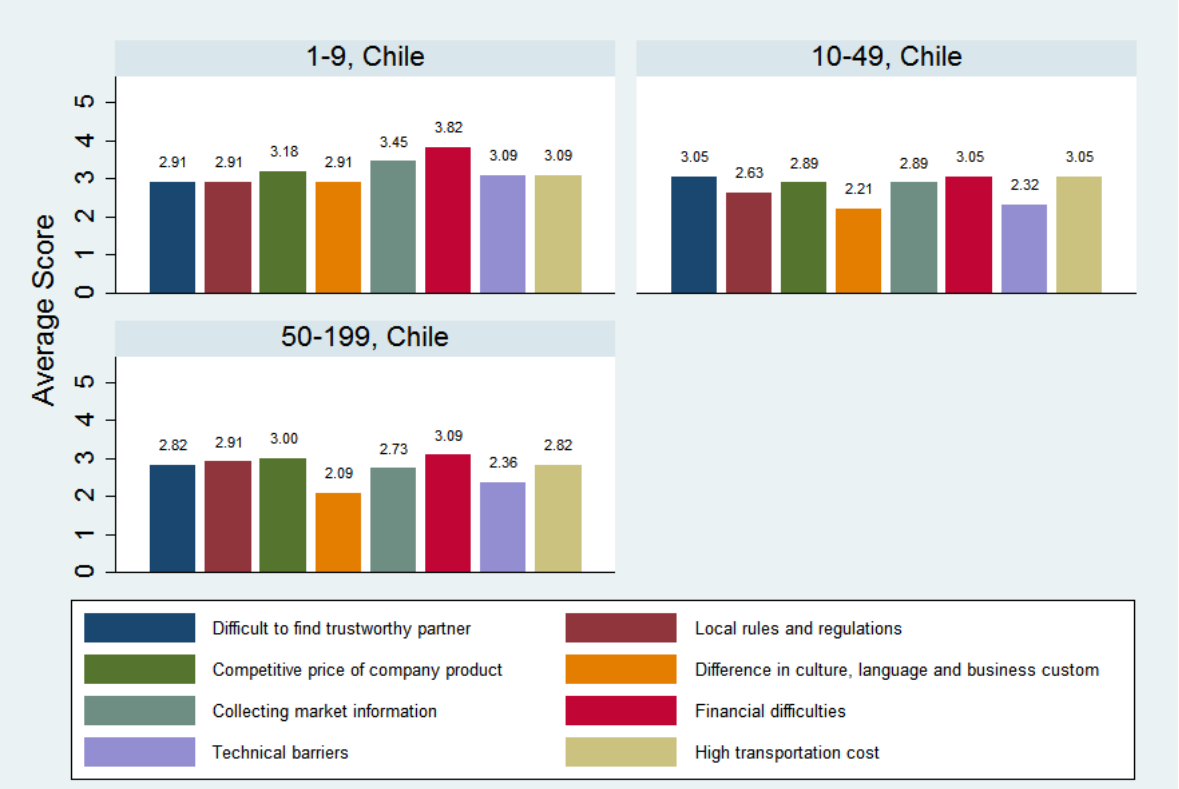


Let us now look at the external difficulties for each member economy and firm size in relation to internationalization.

Chile

In every employment size, the most serious hindrance to internationalization is “Financial difficulties.” This trend becomes even more evident for SMEs with fewer than 10 employees. As the size of the SMEs increases, the difficulties for “Collecting market information” and “Difference in culture, language, and business custom” decrease.

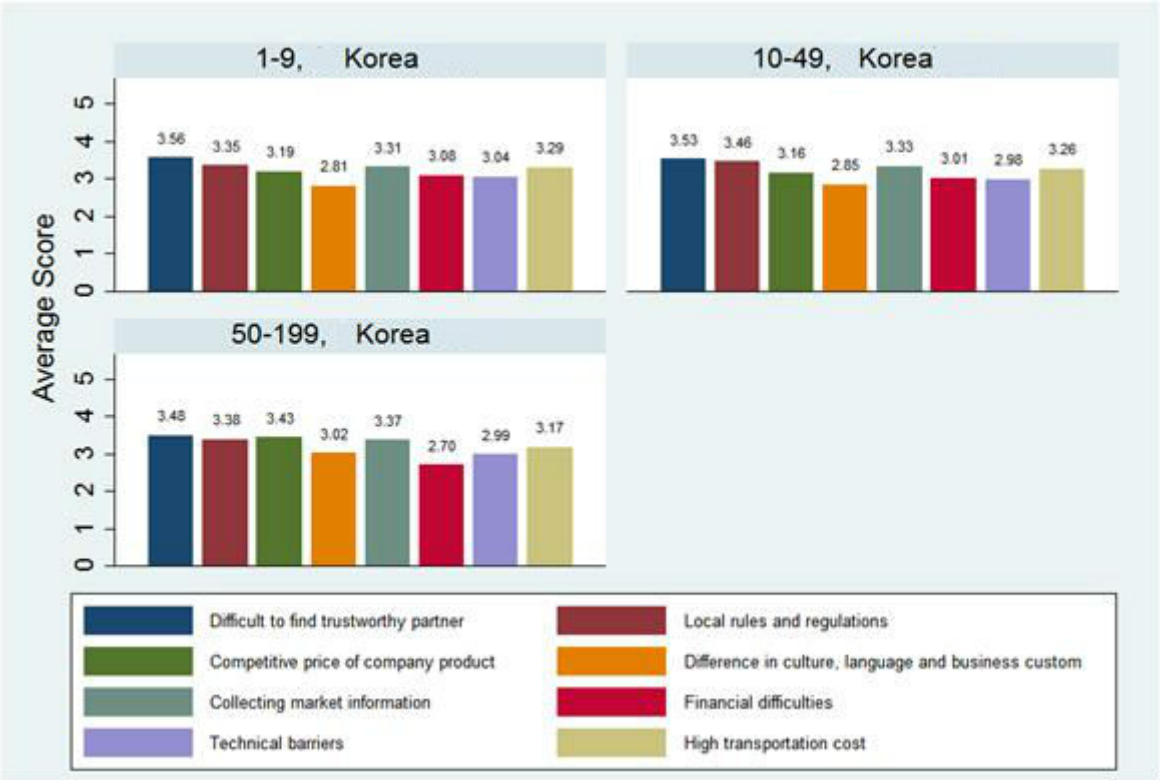
<Figure 29> External Difficulties: Chile



Korea

Generally, the ratings for the difficulties are similar across the different SME sizes. However, as SME size increases, the level of “Financial difficulties” generally decreases.

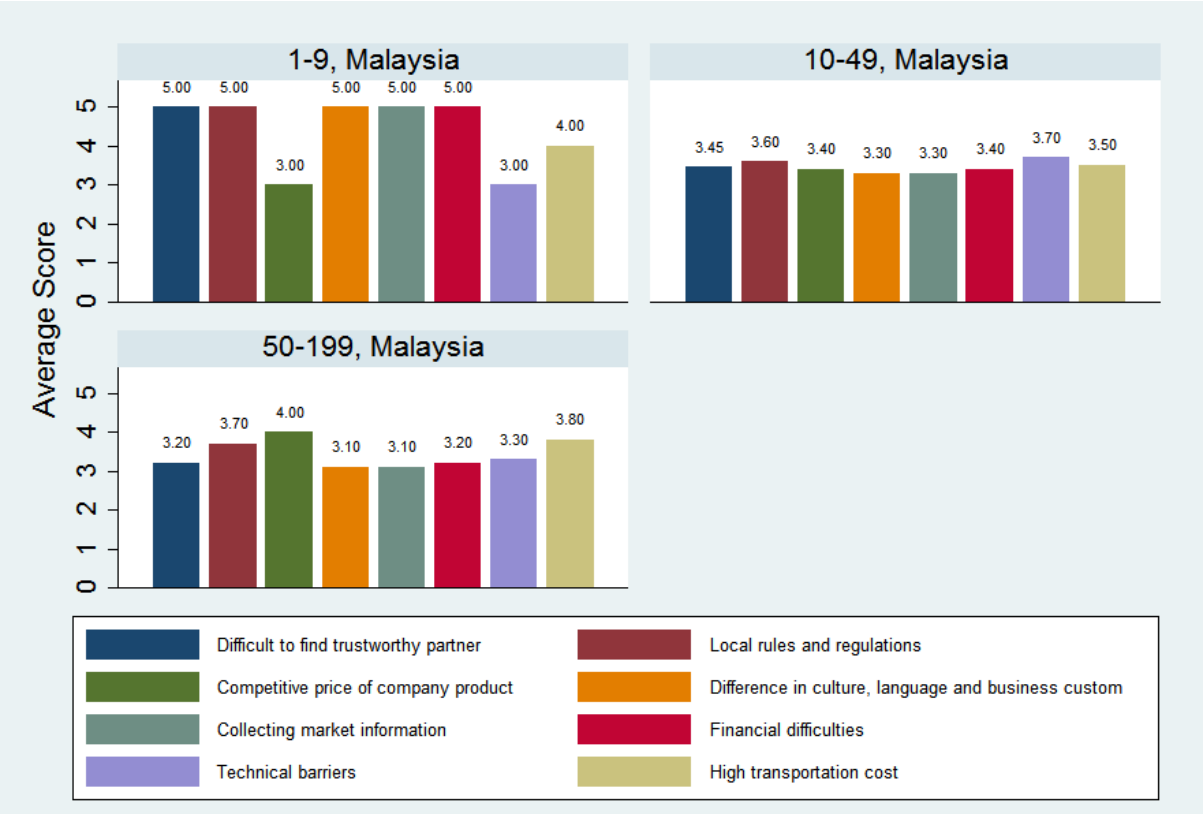
<Figure 30> External Difficulties: Korea



Malaysia

For SMEs with 10-49 employees and SMEs with 50-199 employees, the most serious difficulties in internationalization are “Technical barriers” and “Competitive price of firm product,” respectively. For SMEs with 10-49 employees, difficulties in every topic are of a similar level. The response reliability is low because of the small sample size.

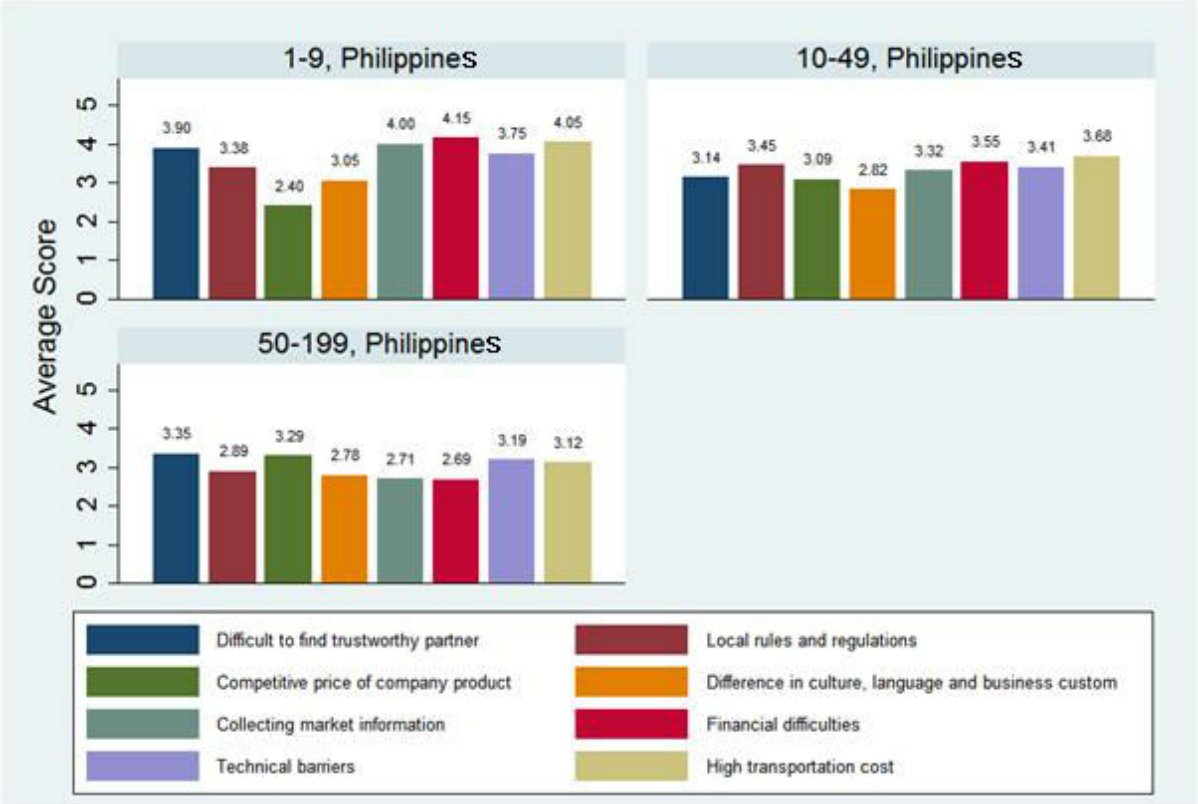
<Figure 31> External Difficulties: Malaysia



Philippines

The largest hindrance is “Financial difficulties” for SMEs with 1-9 employees, “High transportation cost” for SMEs with 10-49 employees, and “Competitive price of firm product” for SMEs with 50-199 employees. The average level of difficulty decreases with the size of the SME.

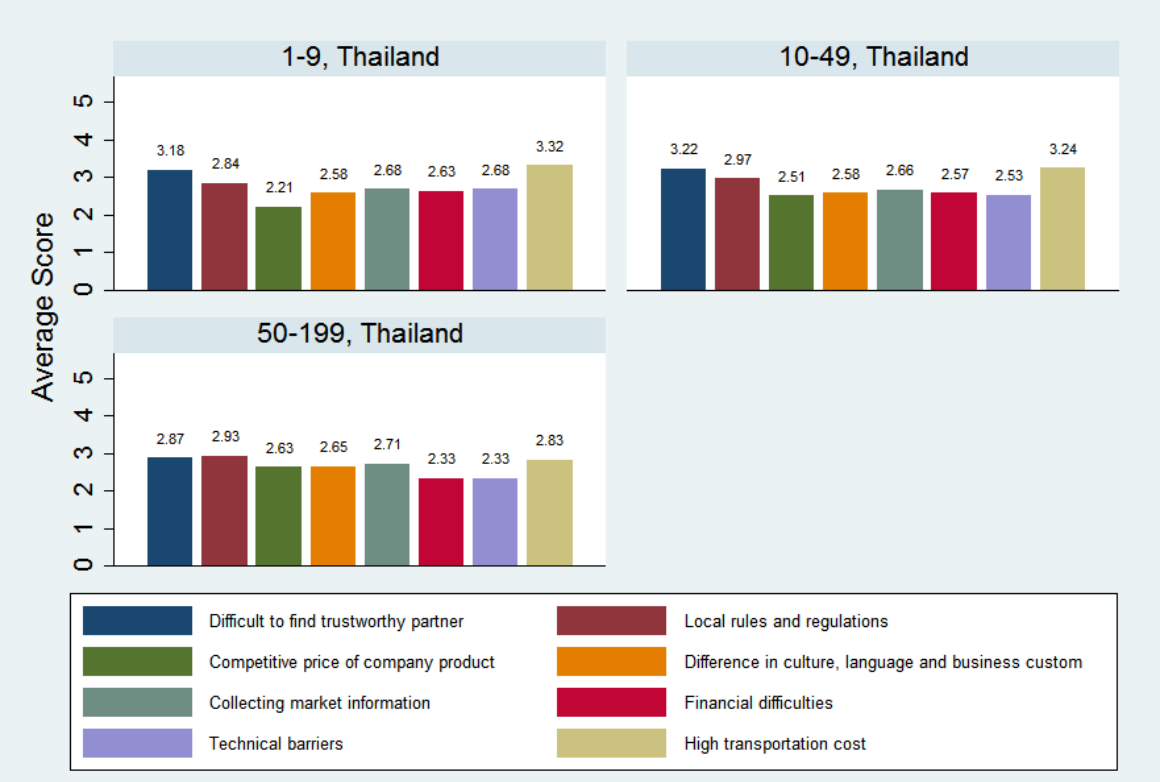
<Figure 32> External Difficulties: Philippines



Thailand

The main hindrances to internationalization for both SMEs with fewer than 10 employees and SMEs with 10-49 employees are “Difficult to find trustworthy partner” and “High transportation cost.” The detailed statistics of each economy are presented in Appendix 2.

<Figure 33> External Difficulties: Thailand

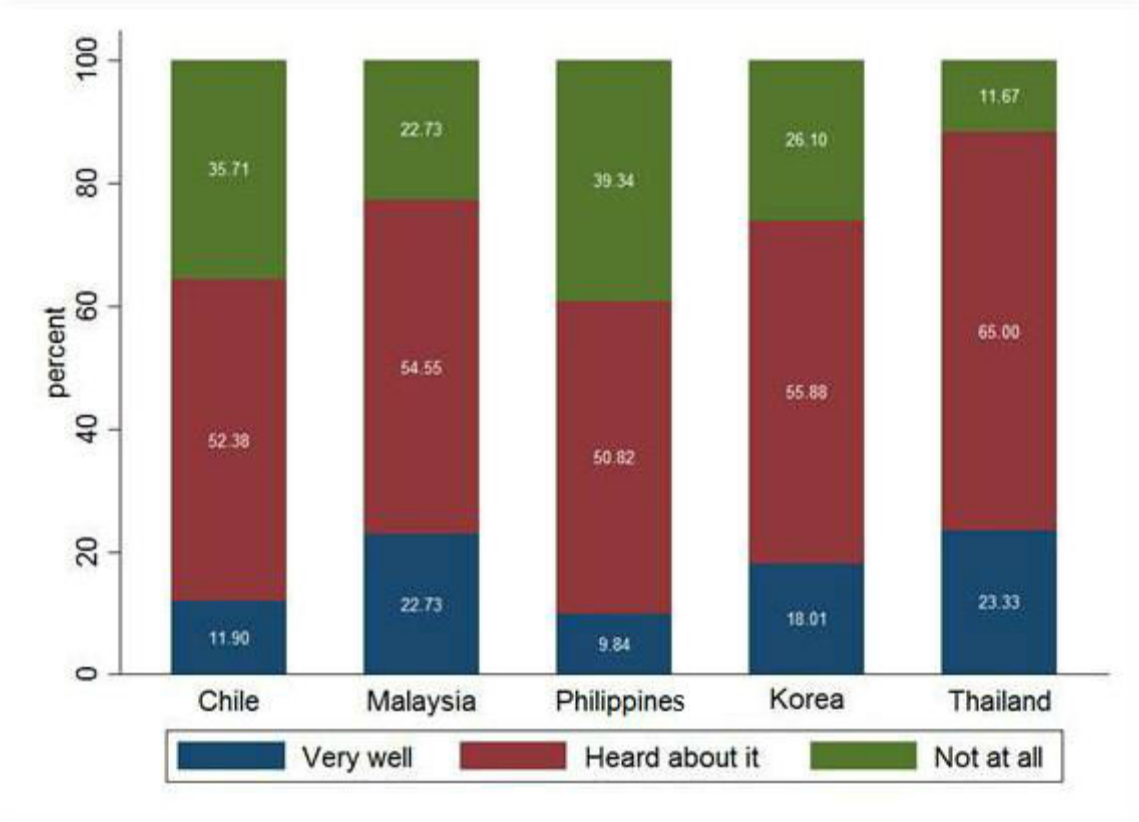


3.5. Government Support

3.5.1. Awareness of Government Support

The descending ranking of economies by its awareness level of government support is as follows: Thailand; Malaysia; Korea; Chile; and finally the Philippines. In the case of Chile and the Philippines, the response rate for “Very well aware of” was low, and the response rate for “Not at all aware of” was high, which shows the lack of Public Relations activities for government support and policies. In Korea, the response rate for “Not at all aware of” was 26%, bringing Korea to the second lowest level of awareness. Korean SMEs who answered “Very well aware of” made up 18% of responses. In the case of Thailand, the awareness level was relatively high. About 90% of SMEs in Thailand responded that they are well aware of or have heard of government supports and policies.

<Figure 34> Awareness of Government Policies



3.5.2. Beneficiaries of Government Support

The rate of beneficiaries of government support are 20.21% for Chile; 29.3% for Thailand; 50% for Malaysia; 41.93% for the Philippines; and 48.89% for Korea. The descending order of economies by beneficiary rate is as follows: Korea; the Philippines; Malaysia; Thailand; and finally Chile. Although the awareness level of Thailand is relatively high, the actual beneficiaries of government support are quite low. In contrast, Korea and the Philippines, which have low awareness levels, show high ratios of beneficiaries. This implies that benefits from government support have not spread to many SMEs.

Analyzing beneficiaries by firm size of SMEs, it is found that Korea and Philippines have high rates of support for SMEs with 1-9 employees. In the case of Thailand, the bigger the size of the SME, the higher the rate of beneficiaries. The beneficiary rate for SMEs with fewer than 10 employees is very low compared to other sizes of SMEs. It is not easy to extract implications from the data for Chile and Malaysia due to their smaller sample sizes.

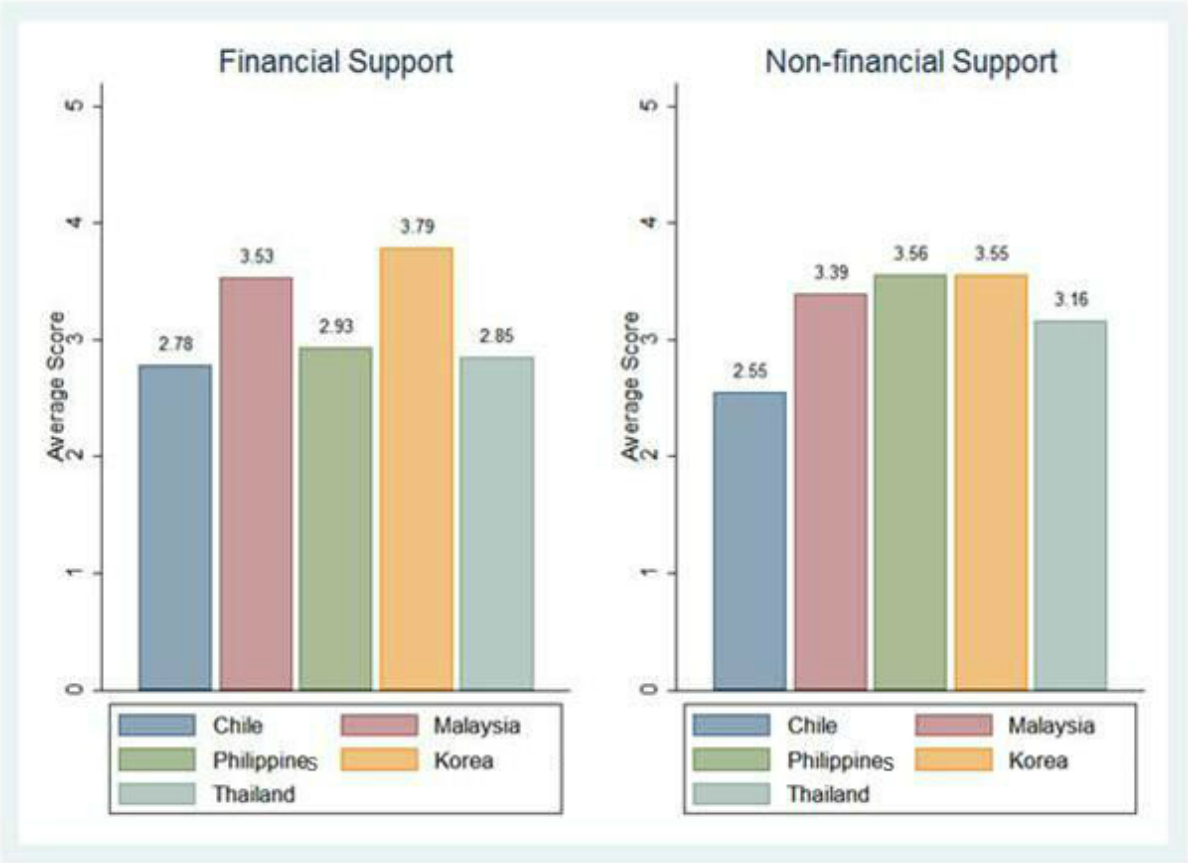
<Figure 35> Beneficiaries of Government Support by Firm Size

3.5.3. Perceived Effectiveness of Government Support

The descending order of economies by SME perception of the effectiveness of financial support policies is as follows: Korea; Malaysia; the Philippines; Thailand; and Chile. Malaysia and Korea have similar levels of perceived effectiveness. However, compared to these two economies, the Philippines; Thailand; and Chile have significantly lower levels of perceived effectiveness.

As for non-financial government support, the descending order of economies by perceived effectiveness is as follows: the Philippines; Korea; Malaysia; Thailand; and Chile. Overall, perceived effectiveness in Korea and Malaysia is favorable. In the case of the Philippines, there is a large gap in the perceived effectiveness of financial supports and non-financial supports.

<Figure 36> Perceived Effectiveness of Government Support



3.5.4. Policy Needs of SMEs

In Malaysia and the Philippines, the number of SMEs in need of government support is high compared to those of the other economies. The SMEs of Thailand and Chile demand support in “Marketing,” while those of Malaysia; Korea; and the Philippines demand support in “Funds” and “Marketing.” In Thailand and Chile, SME needs for government support in “Marketing” are particularly large.

<Figure 37> SME Needs for Government Support

VI. Conclusions and Recommendations

1. Summary and Conclusion

This study defined the concepts of SME internationalization and developed the Model Indices needed to measure the degree of SME internationalization in the APEC region. SME internationalization is defined as the process through which SMEs strengthen their positions for global business by diversifying overseas markets and sourcing methods based on their capabilities. The APEC SME Internationalization Model Indices, based on the New-new Trade Theory, can be utilized to measure the internationalization of firms using an Intensity Index and Diversity Index as well as a Participation Index.

In order to test the feasibility of the Model Indices, this study collected data on SME internationalization from APEC members, through pilot projects, and applied them to the data. The Model Indices were considered feasible, and the major findings and recommendations are listed below.

First, Korea has shown the most active internationalization of SMEs compared to the other economies studied including Thailand and Chile. In particular, Korea has recorded high scores for the Diversity Index and Intensity Index, implying that Korean SMEs have a broad range of internationalization with many different economies and a considerable amount of trades per economy. For Thailand and Chile, there are no statistically significant differences between them in terms of Diversity Index and Intensity Index. These results are quite understandable, given the lack of government support in those economies. As for Malaysia and Philippines, these economies recorded high Participation Indices, implying that SMEs in these economies are more active in internationalization. However, these results may be inaccurate given on the broad confidence interval of the mean estimates.

Second, overall, it is obvious that the bigger the firm, the higher the Diversity Index and Participation Index. This result is consistent with a report by the European Commission noting that the level of a firm's international activity is directly linked to its size. This is also in line with the argument that firm size is defined as the determinant for firm competence (Ali

2004) and internationalization (Sustar and Sustar 2005). The difference between micro enterprises of 1-9 employees and small and medium-sized firms of 10-199 employees is statistically significant, meaning that internationalization is highly correlated with firm size. Therefore, it can be concluded that the smaller the firm, the more government support required to expand overseas markets. According to the survey, smaller firms typically face more difficulties in internationalization, especially with respect to funding. However, this study also finds that the amount of government support needed does not change with respect to firm size, which raises doubt as to the efficacy of these supports.

Third, as emphasized in the literature, industry characteristics hold great importance. The European Commission (2011) noted that there exist industries where internationalization is more active: a very high share of exporting SMEs are engaged in manufacturing and wholesale trade, while a very low share are found in personal services and the construction industry; on the other hand, FDI shows the opposite. The survey of this study, targeting the manufacturing sector, found that textiles and apparel, chemicals, rubber and plastics, metals and electronics were shown to be sectors where SMEs are relatively active in internationalization. In other words, industry characteristics are clearly recognized in the APEC region.

Fourth. the most effective determinant of SME internationalization is R&D. While the survey results are not enough to prove any cause-and-effect relationship between R&D and innovation, it can be reasonably concluded that a considerable feedback effect exists between aggressive R&D and innovation and active internationalization. This is consistent with the Altomonte et al. (2013) argument that internationalization is associated with growth in productivity, for which innovation is an important channel. In the survey, many firms focus on “Improvement in existing product and service” to promote their businesses overseas. A firm's export age and openness, measured as the foreign capital ratio, prove to be additional determinants. However, other factors like the presence of an export department and of foreign promotional materials are not found to significantly affect internationalization. Moreover, as the government support factor turns out to be insignificant, the effectiveness of government support turns out to be highly questionable.

Fifth, overall government support in Korea is found to be relatively useful, but support in Chile and Thailand is found to be less effective. It is obvious that the effectiveness of government support significantly affects the internationalization of SMEs. In case of Korea, the share of SMEs receiving government support is high although many SMEs do not know much about such government policies. Accordingly, the Korean government's support should not be heavily weighted for those who are familiar with it. On the other hand, in Thailand, although many SMEs are familiar with government policies, the share of SMEs being supported by the government is relatively low, meaning that the Thailand government must plan more intensive government programs.

<Table 37> Summary of Internationalization Indices and Circumstances

			Chile	Korea	Malaysia	Philippines	Thailand
Internationalization Index			48.39	51.53	51.37	40.38	42.41
Motivation	First Motivation		To expand the market for products and services				
	Second Motivation		Limited demand in home market	Limited demand in home market	To obtain new technology and knowhow from abroad	Limited demand in home market	To obtain new technology and knowhow from abroad
Difficulties	Internal (Enterprise)	①	Expenses for overseas expansion				
		②	Financial difficulties	No overseas branch	Price and service of firm product	Financial difficulties	Lack of overseas experiences
	External (International Environment)	①	Financial difficulties	Difficult to find trustworthy partner	Local rules and regulations	High transportation cost	High transportation cost
		②	Product competitiveness/ Collecting market info/ Transportation cost	Local rules and regulations	High transportation cost/ Competitive price of firm product	Financial difficulties	Difficult to find trustworthy partner
Government Support Policy	Awareness rate		11.90%	22.73%	18.01%	22.73%	9.84%
	Beneficiary rate		20.31%	50%	48.89%	50%	41.93%
	Perceived Effectiveness (5 point Likert scale)	Financial	2.78	3.79	3.53	2.93	2.85
		Non-Financial	2.55	3.55	3.39	3.56	3.16
	Future Needs	①	Marketing	Funds	Funds	Marketing	Marketing
		②	Funds	Marketing	Marketing	Funds	Loosening of regulations for entry and exit

2. Limitations and Future Work

This study initiated with the necessity for models and indices that consider the situations of SMEs with fewer international activities than those of larger enterprises. Thus, this study is not limited to the Participation Index but also analyzes the internationalization of SMEs from various aspects by developing and applying the Diversity Index and Intensity Index.

However, this study has some limitations. First, the model indices can be applied to both the manufacturing and service sectors, but this study focused only on the former because of concerns relating to time and budget. In particular, regarding the latter, it is necessary to develop and add more indices that reflect the various types of overseas expansions and the characteristics of services. Considering the reality that services occupy a substantial part of the modern economy, and service trades are rapidly increasing between economies thanks to the development of information communication technology and the digital economy, future study is necessary for the internationalization activities of SMEs working in the service sector.

Second, only exporting SMEs were included in this survey, again due to time and budget constraints. As such, the results are limited in comprehensively identifying the internationalization level of an economy. In particular, given the possibility that non-exporting SMEs tend to participate in international cooperation or FDI, the size and scope of the samples must be further expanded in future work.

Third, the response rate for this survey was low in some economies. As such, the estimated results for those economies were not as reliable and the comparative analyses across economies and industries were limited. For future work, it is necessary to develop a survey which takes into consideration the culture and business practices of each economy. A government-led survey is strongly recommended, as well.

Fourth, this study conducts the AHP to decide the weights of the internationalization activities, targeting only Korean experts. However, future work needs to include experts from a diverse range of APEC economies or to include more sophisticated techniques for deciding on the weights.

It is not an easy task to collect reliable data on internationalization from all APEC members. However, collecting the statistics is essential, as it will enable policy makers to recognize the problems and policy needs of their SMEs, as well as the degree and trends of internationalization. It will also allow policy makers to make timely and due policy responses for their situations, and foster efficient and effective government support. Therefore, APEC members should make substantial commitments to this task – collecting formal statistics on SME internationalization and devising diverse policy options.

The setup of databases on internationalization at the APEC level can be processed in two ways. In the short-run, members should conduct a survey every three years and report the findings to the APEC Secretariat taking references in the case of the EU. However, unlike in the case of the EU, the governments of each economy, rather than one single organization, should be responsible for the data due difficulties in conducting the survey resulting from differences in culture and business practices across members. In the long-term, by collecting the survey results, members can build up a database related to SME internationalization similar to Eurostat. Therefore, it is recommended to constantly expand studies to go beyond the limits of one-time research and to establish a system for building data. To achieve this purpose, the cooperation of related international organizations and governments, as well as APEC, is strongly requested.

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APPENDIX

A1. Internationalization Indices with Weight Applied to Internationalization Activity

<Table A1-1> Standardized International Participation and Composite Indices (Average Weight)

Economy	Number of Firms	**Participation**	**Diversity 1**	Diversity 2	Intensity 1	**Intensity 2**	Intensity 3
			No. of Economies	No. of Firms	Sales Amount	**No. of Economies**	No. of Firms
APEC	720	46.246	45.663	45.875	55.1633	44.986	44.638
Chile	64	49.393	46.156	44.558	56.761	41.246	41.356
Korea	272	43.824	52.581	52.786	54.558	52.181	51.392
Malaysia	22	57.396	43.035	45.516	54.332	45.258	44.547
Philippines	62	36.589	42.928	44.655	56.018	45.360	44.716
Thailand	300	44.030	43.614	41.861	54.146	40.887	41.182

<Table A1-2> Standardized Internationalization Indices (Average Weight)

Economy	Index 1	**Index 2**	Index 3	Index 4	Index 5	Index 6
	Participation Diversity1 Intensity 1	Participation **Diversity 1 Intensity 2**	Participation Diversity 1 Intensity 3	Participation Diversity 2 Intensity 1	Participation Diversity 2 Intensity 2	Participation Diversity 2 Intensity 3
APEC	50.426	45.480	45.311	50.482	45.536	45.367
Chile	52.118	44.577	44.630	51.694	44.154	44.207
Korea	51.360	50.205	49.821	51.414	50.259	49.875
Malaysia	52.104	47.694	47.349	52.761	48.351	48.005
Philippines	47.711	42.531	42.218	48.168	42.988	42.675
Thailand	48.837	42.393	42.536	48.373	41.928	42.072

A2. Calculation Results of Indices by Firm Size and by Industry

<Table A2-1> Participation Index by Firm Size: Chile

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	18	0.278	0.156	0.037	1.786	0.200	0.200	0.800	-0.249	37.212
10-49	28	0.371	0.151	0.029	2.457	0.400	0.200	0.600	0.402	59.711
50-199	18	0.433	0.220	0.052	1.973	0.400	0.200	1.000	0.831	65.615

<Table A2-2> Participation Index by Firm Size: Korea

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	48	0.292	0.116	0.017	2.506	0.200	0.200	0.600	-0.152	43.829
10-49	85	0.320	0.139	0.015	2.307	0.200	0.200	0.600	0.044	49.090
50-199	139	0.327	0.116	0.010	2.820	0.400	0.200	0.600	0.090	52.528

<Table A2-3> Participation Index by Firm Size: Malaysia

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	1	0.200	-	-	-	0.200	0.200	0.200	-0.789	21.505
10-49	11	0.327	0.135	0.041	2.427	0.400	0.200	0.600	0.095	51.642
50-199	10	0.480	0.140	0.044	3.432	0.400	0.400	0.800	1.156	80.331

<Table A2-4> Participation Index by Firm Size: Philippines

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	21	0.229	0.096	0.021	2.390	0.200	0.200	0.600	-0.591	27.563
10-49	23	0.270	0.097	0.020	2.768	0.200	0.200	0.400	-0.306	39.268
50-199	18	0.278	0.122	0.029	2.286	0.200	0.200	0.600	-0.249	39.922

<Table A2-5> Participation Index by Firm Size: Thailand

Size	Sample	Mean	Std.	Std. Error	C. of	Med.	Min	Max	Mean of	Mean of

	Size				Variation				Modified z-score	Modified F(z)
1-9	38	0.284	0.110	0.018	2.576	0.200	0.200	0.600	-0.204	42.324
10-49	127	0.301	0.159	0.014	1.890	0.200	0.200	0.800	-0.089	42.456
50-199	135	0.314	0.157	0.014	1.994	0.200	0.200	0.800	0.003	45.917

<Table A2-6> Participation Index by Industry[9]: Chile

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	36	0.294	0.122	0.020	2.418	0.200	0.200	0.600	-0.133	44.177
2	9	0.556	0.240	0.080	2.311	0.600	0.200	1.000	1.680	81.354
3	7	0.486	0.227	0.086	2.142	0.600	0.200	0.800	1.195	72.649
4	10	0.360	0.126	0.040	2.846	0.400	0.200	0.600	0.322	59.762
5	2	0.300	0.141	0.100	2.121	0.300	0.200	0.400	-0.095	47.039

<Table A2-7> Participation Index by Industry: Korea

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	88	0.330	0.121	0.013	2.714	0.400	0.200	0.600	0.111	52.812
2	40	0.315	0.119	0.019	2.650	0.400	0.200	0.600	0.010	49.571
3	53	0.332	0.124	0.017	2.685	0.400	0.200	0.600	0.128	53.269
4	83	0.299	0.126	0.014	2.364	0.200	0.200	0.600	-0.103	44.854
5	8	0.325	0.149	0.053	2.184	0.300	0.200	0.600	0.079	50.176

<Table A2-8> Participation Index by Industry : Malaysia

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	8	0.350	0.177	0.063	1.974	0.200	0.200	0.600	0.253	53.312
2	4	0.350	0.100	0.050	3.500	0.600	0.200	1.000	0.253	59.807

[9] 1: Food & Beverage, Textile & Apparel and Chemicals; 2: Metals; 3: Electronics; 4: Machinery and Transport Equipment; 5 : Miscellaneous

3	-	-	-	-	-	-	-	-	-	-
4	10	0.440	0.158	0.050	2.789	0.400	0.200	0.600	0.878	72.715
5	-	-	-	-	-	-	-	-	-	-

<Table A2-9> Participation Index by Industry: Philippines

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	26	0.277	0.127	0.025	2.173	0.200	0.200	0.600	-0.255	39.148
2	1	0.400	-	-	-	0.400	0.400	0.400	0.600	72.574
3	2	0.300	0.141	0.100	2.121	0.300	0.200	0.400	-0.095	47.039
4	2	0.200	0.000	0.000	-	0.200	0.200	0.200	-0.789	21.505
5	31	0.239	0.080	0.014	2.972	0.200	0.200	0.400	-0.520	31.389

<Table A2-10> Participation Index by Industry: Thailand

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	227	0.296	0.149	0.010	1.993	0.200	0.200	0.800	-0.122	42.220
2	14	0.371	0.133	0.035	2.801	0.400	0.200	0.600	0.402	61.567
3	16	0.275	0.100	0.025	2.750	0.200	0.200	0.400	-0.268	40.656
4	33	0.358	0.185	0.032	1.928	0.400	0.200	0.800	0.305	53.275
5	10	0.280	0.193	0.061	1.449	0.200	0.200	0.800	-0.233	34.457

<Table A2-11> Intensity Index by Firm Size: Chile

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	9	44915.21	115183.9	38394.6	0.390	7200	1960.2	352000	-0.261	39.775
10-49	23	46544.08	54752.78	11416.7	0.850	20445.46	1900	207270	-0.258	39.827
50-199	16	152853.2	392196.6	98049.2	0.390	27250	281.86	1600000	-0.107	43.953

<Table A2-12> Intensity Index by Firm Size: Korea

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified	Mean of Modified

									z-score	F(z)
1-9	47	219070.4	1161220	169381.3	0.189	25000	200	8000000	-0.012	41.295
10-49	84	487203.7	1111523	121277.1	0.438	185000.1	400	8512800	0.371	53.944
50-199	137	450732.5	790674.3	67551.9	0.570	173060	2808.3	4287350	0.319	54.560

<Table A2-13> Intensity Index by Firm Size: Malaysia

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9										
10-49	9	70656.55	130167.2	43389.1	0.543	8000.2	2900	400000.2	-0.224	41.199
50-199	8	250794.2	218150.8	77128.0	1.150	218871.2	0.2	693586.4	0.033	51.141

<Table A2-14> Intensity Index by Firm Size: Philippines

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	16	15651.11	19772.21	4943.1	0.792	4750	86.957	62000	-0.303	38.115
10-49	20	115390.1	301280.3	67368.3	0.383	18523.81	666.67	1333333	-0.160	42.816
50-199	16	360920.5	562167.6	140541.9	0.642	122300.4	400	2000000	0.191	53.160

<Table A2-15> Intensity Index by Firm Size: Thailand

Question	Sample Size	Mean	Std.	Std. Error	c of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	33	11304.22	14426.7	2511.4	0.784	5010	160	60900	-0.309	37.876
10-49	114	31719.32	109890.9	10292.2	0.289	5082.1	17.143	1080000	-0.280	38.941
50-199	120	137402.3	556023.4	50757.8	0.247	16000	100	5757800	-0.129	42.477

<Table A2-16> Intensity Index by Industry [10]: Chile

Question	Sample Size	Mean	Std.	Std. Error	c of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)

[10] 1: Food & Beverage, Textile & Apparel and Chemicals; 2: Metals; 3: Electronics; 4: Machinery and Transport Equipment; 5 : Miscellaneous

1	26	116770.5	316029.7	61978.5	0.369	10733.33	281.86	1600000	-0.158	42.652
2	9	39690.13	42678.41	14226.1	0.930	26050	5000	142000	-0.268	39.440
3	6	29266.99	23308.14	9515.5	1.256	23725.08	1960.2	60000	-0.283	38.859
4	6	57798.17	51210.79	20906.7	1.129	49102.84	7550	130500	-0.242	40.444
5	1	4766.66	-	-	-	4766.667	4766.7	4766.667	-0.318	37.519

<Table A2-17> Intensity Index by Industry: Korea

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	85	310902	508828.5	55190.2	0.611	200000	200	4133900	0.119	51.880
2	40	402023.8	793203.3	125416.5	0.507	133430.8	2808.3	4133334	0.249	51.991
3	52	650875.6	1481262	205414.1	0.439	80511.76	400	8512800	0.605	53.654
4	83	430316.6	1042592	114439.3	0.413	121600	480	8000000	0.290	52.035
5	8	112791.2	131475.5	46483.6	0.858	48199.16	1600	319047.6	-0.164	43.570

<Table A2-18> Intensity Index by Industry: Malaysia

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	7	121271.5	167161.2	63181.0	0.725	8000.2	2900	400000.2	-0.152	44.055
2	3	105114.2	105124.2	60693.5	1.000	75000.2	18333	222009.1	-0.175	43.107
3										
4	7	211145.6	251282.8	94976.0	0.840	197156.6	0.2	693586.4	-0.023	48.888
5										

<Table A2-19> Intensity Index by Industry: Philippines

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	25	158321.4	405209.2	81041.8	0.391	21333.33	86.957	2000000	-0.099	44.103
2	1	59100	-	-	-	59100	59100	59100	-0.241	40.496
3	2	542255.4	758026.2	536005.5	0.715	542255.4	6250	1078261	0.449	63.191
4	1	4400	-	-	-	4400	4400	4400	-0.319	37.500

5	23	140300	346355.8	72220.2	0.405	22966.67	400	1333333	-0.125	43.902

<Table A2-20> Intensity Index by Industry: Thailand

Question	Sample Size	Mean	Std.	Std. Error	C. of Variation	Median	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	199	37001.43	91618.88	6494.7	0.404	8142.857	17.143	800000	-0.272	39.295
2	13	208489.2	358185.2	99342.7	0.582	54942.86	2074.3	1080000	-0.027	47.924
3	15	204838.4	413180.5	106682.7	0.496	57000	160	1450000	-0.032	46.883
4	31	232797.8	1029563	184915.0	0.226	12000	200	5757800	0.008	41.897
5	9	12707.22	27235.8	9078.6	0.467	1178.2	200	83333.33	-0.307	37.957

<Table A2-21> Diversity Index by Firm Size: Chile

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	11	0.800	0.645	0.194	1.240	0.600	0.200	2.400	-0.209	41.782
10-49	25	1.296	1.473	0.295	0.880	0.800	0.200	7.200	-0.089	46.033
50-199	17	7.576	21.459	5.204	0.353	1.600	0.200	90.400	1.425	57.881

<Table A2-22> Diversity Index by Firm Size: Korea

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	48	1.129	1.024	0.148	1.103	0.600	0.200	4.200	-0.130	44.869
10-49	85	1.972	2.213	0.240	0.891	1.200	0.200	10.400	0.074	51.297
50-199	139	3.004	4.178	0.354	0.719	1.600	0.200	30.000	0.323	56.138

<Table A2-23> Diversity Index by Firm Size: Malaysia

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9										
10-49	9	0.867	0.616	0.205	1.406	0.800	0.200	2.000	-0.193	42.413
50-199	9	1.400	1.000	0.333	1.400	1.000	0.400	3.000	-0.064	47.441

<Table A2-24> Diversity Index by Firm Size: Philippines

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	16	0.475	0.334	0.083	1.424	0.300	0.200	1.200	-0.287	38.721
10-49	20	0.690	0.358	0.080	1.926	0.600	0.200	1.400	-0.236	40.720
50-199	16	1.038	0.533	0.133	1.947	1.000	0.400	2.000	-0.152	44.013

<Table A2-25> Diversity Index by Firm Size: Thailand

Size	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1-9	34	0.588	0.341	0.058	1.725	0.600	0.200	2.000	-0.260	39.765
10-49	119	0.849	0.716	0.066	1.185	0.600	0.200	4.800	-0.197	42.220
50-199	126	1.068	0.895	0.080	1.193	0.600	0.200	5.200	-0.144	44.282

<Table A2-26> Diversity Index by Industry [11] : Chile

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	30	4.133	16.356	2.986	0.253	0.800	0.200	90.400	0.595	46.556
2	9	1.556	1.688	0.563	0.922	1.400	0.200	5.800	-0.027	48.368
3	6	3.100	2.925	1.194	1.060	2.200	0.200	7.200	0.346	60.571
4	6	1.800	1.409	0.575	1.278	1.200	0.600	4.400	0.032	51.004
5	2	1.300	0.141	0.100	9.192	1.300	1.200	1.400	-0.088	46.477

<Table A2-27> Diversity Index by Industry: Korea

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	88	2.314	2.574	0.274	0.899	1.600	0.200	16.000	0.156	53.621
2	40	1.990	2.362	0.373	0.843	1.000	0.200	12.000	0.078	51.124

[11] 1: Food & Beverage, Textile & Apparel and Chemicals; 2: Metals; 3: Electronics; 4: Machinery and Transport Equipment; 5 : Miscellaneous

3	53	3.064	4.501	0.618	0.681	1.200	0.200	24.000	0.337	55.119
4	83	2.067	3.635	0.399	0.569	1.200	0.200	30.000	0.097	50.168
5	8	2.775	2.422	0.856	1.146	2.100	0.400	7.600	0.267	58.532

<Table A2-28> Diversity Index by Industry: Malaysia

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	7	0.857	0.670	0.253	1.278	0.800	0.200	2.000	-0.195	42.332
2	3	1.733	1.137	0.657		1.400	0.800	3.000	0.016	50.589
3										
4	8	1.150	0.880	0.311	1.307	0.700	0.400	3.000	-0.125	45.074
5										

<Table A2-29> Diversity Index by Industry: Philippines

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	25	0.624	0.401	0.080	1.555	0.600	0.200	1.400	-0.251	40.113
2	1	1.400		0.000		1.400	1.400	1.400	-0.064	47.435
3	2	1.000	0.849	0.600	1.179	1.000	0.400	1.600	-0.161	43.679
4	1	0.200		0.000		0.200	0.200	0.200	-0.354	36.177
5	23	0.817	0.478	0.100	1.709	0.800	0.200	2.000	-0.205	41.928

<Table A2-30> Diversity Index by Industry: Thailand

Group	Sample Size	Mean	Std.	Std. Error	C. of Variation	Med.	Min	Max	Mean of Modified z-score	Mean of Modified F(z)
1	208	0.828	0.676	0.047	1.225	0.600	0.200	4.800	-0.202	42.027
2	13	0.923	0.520	0.144	1.776	0.800	0.200	2.200	-0.179	42.921
3	16	0.788	0.573	0.143	1.375	0.600	0.200	2.600	-0.212	41.645
4	32	1.344	1.218	0.215	1.103	0.800	0.200	5.200	-0.078	46.809
5	10	1.580	1.093	0.346	1.445	1.800	0.200	3.000	-0.021	49.203

A3. Survey Questionnaire

Survey on the Internationalization of SMEs	ID	(1)

Hello!

We wish you every success with your business.

Korea Small and Medium Institute (KOSBI) is conducting a survey on the "internationalization status of SMEs in the APEC region." The purpose of this survey is to identify the internationalization activities of SMEs and draw more effective support policies henceforth. The information or data you provide is kept strictly confidential, which will be protected by law and used only statistical purposes.

Your answer is used as a valuable basis for a proper government policy formulation, therefore we would greatly appreciate it if you please take the time to fill in the questionnaire.

13 January, 2016

Managing department of the survey	Research organization	Executing organization of the survey
중소기업청 (Small and Medium Business Administration)	KOSBI 중소기업연구원 Korea Small Business Institute	hri 현대리서치연구소 Hyundai Research Institute

Inquiry and return of survey	Inquiry : Researcher 000 of (name of organization) (☏ 02-3218-9635)
	Return : E-mail (@) and FAX (02-3444-8715)

■ General status of responding companies

Name of company	(2)	Year of establishment	(3)
Name of the respondent	(4)	Dep./Position	(5)
		Contact details	(6)

Industry	1) Food & beverage 2) Textile & apparel 3) Woods 4) Chemicals 5) Rubber & Plastics 6) Metals 7) Electronics 8) Machinery 9) Transport equipment 10) Miscellaneous manufacturing ( )	Answer
		(7)

Q1. Are you an exporting (including indirect export) company? [(8)]

1) Yes (☞ SQ2) 2) No (☞ Quit the questionnaire)

Q2. What is your industry? [(9)]

1) Manufacturing (☞ SQ3) 2) Non-manufacturing (☞ Quit the questionnaire)

Q3. How many employees do you have? [(10)]

1) Less than 299 employees (☞ Continue with the questionnaire)

2) More than 299 employees (☞ Quit the questionnaire)

Ⅰ. General information of the company

※ Unless otherwise mentioned, please respond to all questions based on the year 2015.

1. Form of the company

		Answer
Type of the company	1) independent company 2) subsidiary (domestic) 3) subsidiary (foreign)	(11)
No. of employees	1) 1-9 2) 10-49 3) 50~199	(12)

2. Financial status

	2014	2015
Sale*	_ _ _, _ _ _, _ _ _ RM(13)	_ _ _, _ _ _, _ _ _ RM(14)
R&D*	_ _ _, _ _ _, _ _ _ RM(15)	_ _ _, _ _ _, _ _ _ RM(16)
Foreign capital ratio**	%(17)	%(18)

* Please write in the local currency for the amount (RM is Ringgit Malaysia).
****** Foreign capital ratio is defined as a ratio of foreign capital in total capital.

3. Intellectual property right and Certification (as of 2015)

	IPR		Certification	
	Patent	Others (Utility model, Design, etc.)	ISO	Others
Domestic	(19)	(20)	(23)	(24)
Overseas	(21)	(22)		

* Please write the no. of intellectual property right and certification.

4. Status of organization

No. of employees*	Domestic employees		(25)		Persons
	Overseas employees		(26)		Persons
Export department and staff retention	① Yes ② No(27)	Answer	No. of staff in export department		
			(28)		Persons
Retention of overseas corporation	① Yes ② No(29)	Answer	No. of overseas corporation	(30)	Economies
Retention of overseas contact branch	② Yes ② No(31)	Answer	No. of overseas branch	(32)	Economies

* No. of employees: Please include both full-time and part-time employees, including daily, family workers, etc.

II. Status of Internationalization in General?

In this survey, **internationalization** means that your company is having a business with a foreign company or overseas market. Therefore, it includes not only those companies that export and import, but also the companies that have established overseas branches through foreign investment. It also covers companies that do international OEM or ODM as being subcontractors to foreign companies or having foreign contractors, or companies that have developed products or technologies in cooperation with foreign companies.

Q1. What kind of internationalization is your company involved in? [(33), (34), (35), (36), (37)]
(Multiple answers are possible)
1) Export 2) Import 3) FDI 4) International subcontracting
5) International cooperation (joint venture, strategic alliance, licensing, franchising etc.)

Q2. What is the motivation of your company's internationalization activities? [(38), (39), (40), (41), (42)]
(Multiple answers are possible)
1) To expand a market for products and services 2) Limited demand at home market
3) To evade high domestic production expenses 4) To evade high domestic competition
5) To obtain new technology and knowhow from abroad

Q3. Do you have any foreign promotion materials of your company or product? [(43)]
1) Yes 2) No

Q4. How often do you update your company's foreign homepage? [(44)]
1) Once a week 2) Once a month
3) Once in three months 4) Once every half a year
5) Once a year 6) No foreign homepage
7) No update

Q5. What is your main e-commerce form? [(45)]
1) B2B 2) B2C 3) B2G
4) No e-commerce

III. Status of internationalization in different types

※ Please, answer the questions only you have answered, as your internationalization activities, in II. Q1.

[Export]

Q1. Please answer the following questions about export of 2015, based on your company's export type.

Export type	Yes or no	Export amount	No. of economy	No. of company
Direct export	① Yes ② No(46)	**US $** _ _ _, _ _ _, _ _ _ (47)	(48)	(49)
Indirect export	① Yes ② No(50)	**US $** _ _ _, _ _ _, _ _ _ (51)	(52)	(53)

※ Direct export means the case that manufacturers export directly after registering their goods at the relevant customs. Indirect export means the case that manufacturers export their goods indirectly via trading companies or consolidators,

Q1-1. Which year did your company start exporting? [(54) YEAR]
Q1-2. Write your three major exporting economies and the ratio for each in total export.
(① (55) , (56) %) (② (57) , (58) %) (③ (59) , (60) %)

[Import]

Q2. Please answer the following questions about import of 2015, based on your company's import type.

Import type	Yes or no	Import amount	No. of economy	No. of company
Direct import	① Yes ② No(61)	US $ _ _ _, _ _ _, _ _ _ (62)	(63)	(64)
Indirect import	① Yes ② No(65)	US $ _ _ _, _ _ _, _ _ _ (66)	(67)	(68)

※ Direct import means the case that manufacturers import directly after registering their goods at the relevant customs. Indirect import means the case that manufacturers import their goods indirectly via trading companies or consolidators,

Q2-1. Which year did your company start importing? [(69) YEAR]
Q2-2. Write your three major importing economies and the ratio for each in total import.
(① (70) , (71) %) (② (72) , (73) %) (③ (74) , (75) %)

[International subcontracting]

Q4-1. Please answer the following questions about providing as a subcontractor in 2015.

Subcontractor* to foreign company	Yes or no	Amount	No. of economy	No. of company
	① Yes ② No(87)	US $ _ _ _, _ _ _, _ _ _ (88)	(89)	(90)

*A subcontractor provides commissioned work, such as specific parts and components, processes and services, or in some cases finished products.

Q4-1-1. If yes, since when have you been a subcontractor to foreign companies? [(91) YEAR]
Q4-1-2. Write your three major subcontracting economies and the ratio of each in total international subcontracting.
(① (92) , (93) %) (② (94) , (95) %) (③ (96) , (97) %)

Q4-2. . Please answer the following questions about procuring from subcontractors abroad in 2015

Having foreign subcontractors*	Yes or no	Amount	No. of economy	No. of company
	② Yes ② No(98)	US $ _ _ _, _ _ _, _ _ _ (99)	(100)	(101)

* Having any foreign subcontractors usually starts with sales representatitves and distribution agen ts.

Q4-2-1. If yes, since when have you had foreign contractors? [(102) YEAR]
Q4-2-2. Write your three major subcontracting economies and the ratio of each in total international subcontracting.
(① (103) , (104) %) (② (105) , (106) %) (③ (107) , (108) %)

[International cooperation]

Q5. Please answer the following questions about international cooperation during 2013~2015*?

Type of international cooperation	Yes or No	No. of cases	No. of economy	No. of companies
· Joint venture	① Yes ② No(109)	(110)	(111)	(112)
· Strategic alliances	① Yes ② No(113)	(114)	(115)	(116)
· Licensing	① Yes ② No(117)	(118)	(119)	(120)
· Franchising	① Yes ② No(121)	(122)	(123)	(124)

* International cooperation can span one year, two years or three years, all of which are included.

Q5-1. Write your three major economies for international cooperation.

(① (125)) (② (126)) (③ (127))

[FDI]

Q3. Please answer the following questions about FDI during 2013~2015*

FDI	Yes or no	FDI amount	No. of economy	No. of company
	③ Yes ② No(76)	**US $** _ _ _, _ _ _, _ _ _(77)	(78)	(79)

* FDI can span one year, two years or three years, all of which are included.

Q3-1. Which year did your company start investment? [(80) YEAR]

Q3-2. Write your three main FDI partner economies and the ratio for each in total FDI

(① (81) , (82) %) (② (83) , (84) %) (③ (85) , (86) %)

Ⅳ. Difficulties in internationalization activities and government policy

Q1. What are the difficulties in the internationalization in your company?

Items	Not at all	←	Average	→	Very high	Answer
1) Price and service of company products	①	②	③	④	⑤	(128)
2) Expenses for overseas expansion	①	②	③	④	⑤	(129)
3) Poor skills of employees (language, skill for negotiation)	①	②	③	④	⑤	(130)
4) Financial difficulties (loan, credit guarantee, etc.)	①	②	③	④	⑤	(131)
5) Lack of overseas experience	①	②	③	④	⑤	(132)
6) Lack of technology or innovation	①	②	③	④	⑤	(133)
7) No overseas branch	①	②	③	④	⑤	(134)

Q2. What are the difficulties in the internationalization at overseas field?

Items	Not at all	←	Average	→	Very high	Answer
1) Difficult to find trustworthy partner	①	②	③	④	⑤	(135)
2) Local rules and regulations	①	②	③	④	⑤	(136)
3) Competitive price of company product	①	②	③	④	⑤	(137)
4) Difference in culture, language and business custom	①	②	③	④	⑤	(138)
5) Collecting market information	①	②	③	④	⑤	(139)
6) Financial difficulties (loan, credit guarantee, etc.)	①	②	③	④	⑤	(140)
7) Technical barriers (standard, certification, etc.)	①	②	③	④	⑤	(141)
8) High transportation cost	①	②	③	④	⑤	(142)

Q3. How well are you aware of the government's support policy regarding the internationalization? [(143)]

1) Very well 2) Heard about it before 3) Not at all

Q4. Have you ever received any government support related to the internationalization? [(144)]

1) Yes 2) No

Q5. If you have received government support, how effective was it for the internationalization of your company?

Items	Ineffective	←	Average	→	Effective	Answer
1) Financial support	①	②	③	④	⑤	(145)
2) Non-financial support	①	②	③	④	⑤	(146)

Q6. What kind of innovation did your company carry out in the process of internationalization?

Type of international cooperation	Yes or No	No. of case	
Introduction of a new product and service	① Yes ② No(147)	(148)	
Improvement in existing product and service	① Yes ② No(149)	(150)	
Process innovation	① Yes ② No(151)	(152)	

Q7. Which area would you like to receive more support for internationalization? [(153) **]**

1) Funds 2) Technology 3) Marketing 4) Loosening of regulations for the entry and exit
5) Others ( )

A4. Survey Results (not including statistics related to indices)

<Table A4-1> Internal Difficulties in Internationalization

Questions		1	2	3	4	5	6	7
Chile	Mean	2.683	3.317	2.902	3.049	2.561	2.561	2.854
	S.E. of mean	0.202	0.211	0.228	0.209	0.188	0.215	0.217
Korea	Mean	2.985	3.346	2.952	2.893	2.960	2.860	3.015
	Std. Error of mean	0.060	0.058	0.065	0.069	0.063	0.058	0.064
Malaysia	Mean	3.409	3.727	2.682	3.227	3.182	3.409	3.227
	Std. Error of mean	0.252	0.220	0.232	0.237	0.234	0.215	0.271
Philippines	Mean	2.883	3.712	2.383	3.333	3.167	3.233	3.200
	Std. Error of mean	0.186	0.190	0.165	0.182	0.183	0.185	0.224
Thailand	Mean	2.503	2.937	2.733	2.557	2.683	2.360	2.543
	Std. Error of mean	0.068	0.077	0.072	0.070	0.071	0.065	0.086

<Table A4-2> Internal Difficulties in Internationalization by Firm Size: Chile

Size	Stat.	1	2	3	4	5	6	7
1-9	Mean	2.833	3.583	3.750	3.250	3.000	3.333	3.000
	Std. Error	0.386	0.379	0.351	0.279	0.389	0.414	0.408
10-49	Mean	2.778	3.333	3.111	3.056	2.556	2.556	3.056
	Std. Error	0.308	0.313	0.312	0.328	0.258	0.305	0.328
50-199	Mean	2.364	3.000	1.636	2.818	2.091	1.727	2.364
	Std. Error	0.388	0.447	0.338	0.501	0.343	0.304	0.411

<Table A4-3> Internal Difficulties in Internationalization by Firm Size: Korea

Size	Stat.	1	2	3	4	5	6	7
1-9	Mean	2.917	3.438	3.063	3.292	2.875	2.688	2.833
	Std. Error	0.148	0.152	0.164	0.157	0.175	0.143	0.134
10-49	Mean	2.906	3.365	3.059	3.024	3.035	2.847	3.012
	Std. Error	0.112	0.100	0.123	0.137	0.108	0.101	0.117
50-199	Mean	3.058	3.302	2.849	2.676	2.942	2.928	3.079
	Std. Error	0.080	0.081	0.085	0.088	0.086	0.081	0.093

<Table A4-4> Internal Difficulties in Internationalization by Firm Size: Malaysia

Size	Stat.	1	2	3	4	5	6	7
1-9	Mean	5.000	5.000	3.000	4.000	4.000	4.000	5.000
	Std. Error	-	-	-	-	-	-	-
10-49	Mean	2.909	3.545	2.273	3.091	3.273	3.364	3.364
	Std. Error	0.392	0.247	0.304	0.392	0.407	0.388	0.310
50-199	Mean	3.800	3.800	3.100	3.300	3.000	3.400	2.900
	Std. Error	0.249	0.389	0.348	0.300	0.258	0.221	0.458

<Table A4-5> Internal Difficulties in Internationalization by Firm Size: Philippines

Size	Stat.	1	2	3	4	5	6	7
1-9	Mean	2.762	4.400	2.200	4.150	3.850	3.900	4.250
	Std. Error	0.275	0.234	0.247	0.196	0.310	0.250	0.289
10-49	Mean	2.591	3.429	2.478	3.217	2.957	3.130	2.739
	Std. Error	0.333	0.328	0.266	0.326	0.270	0.303	0.362
50-199	Mean	3.412	3.278	2.471	2.529	2.647	2.588	2.588
	Std. Error	0.344	0.378	0.365	0.298	0.331	0.354	0.412

<Table A4-6> Internal Difficulties in Internationalization by Firm Size: Thailand.

Size	Stat.	1	2	3	4	5	6	7
1-9	Mean	2.263	3.158	2.763	2.605	3.026	2.447	2.658
	Std. Error	0.176	0.234	0.218	0.191	0.201	0.191	0.265
10-49	Mean	2.496	2.953	2.843	2.606	2.835	2.567	2.795
	Std. Error	0.102	0.119	0.114	0.110	0.106	0.102	0.137

50-199	Mean	2.578	2.859	2.622	2.496	2.444	2.141	2.274
	Std. Error	0.104	0.111	0.101	0.105	0.105	0.092	0.116

<Table A4-7> External Difficulties in Internationalization

Questions		1	2	3	4	5	6	7	8
Chile	Mean	2.951	2.780	3.000	2.366	3.000	3.268	2.537	3.000
	Std. Error	0.218	0.190	0.198	0.190	0.191	0.221	0.192	0.167
Korea	Mean	3.511	3.401	3.305	2.930	3.346	2.864	2.993	3.221
	Std. Error	0.058	0.056	0.057	0.056	0.057	0.065	0.055	0.052
Malaysia	Mean	3.409	3.714	3.667	3.286	3.286	3.381	3.476	3.667
	Std. Error	0.260	0.171	0.126	0.171	0.184	0.201	0.203	0.187
Philippines	Mean	3.458	3.262	2.915	2.883	3.373	3.517	3.466	3.650
	Std. Error	0.183	0.150	0.186	0.141	0.167	0.203	0.191	0.169
Thailand	Mean	3.057	2.937	2.527	2.613	2.687	2.473	2.460	3.067
	Std. Error	0.073	0.073	0.070	0.071	0.064	0.074	0.071	0.069

<Table A4-8> External Difficulties by Firm Size: Chile

Size	Stat.	1	2	3	4	5	6	7	8
1-9	Mean	2.909	2.909	3.182	2.909	3.455	3.818	3.091	3.091
	Std. Error	0.436	0.285	0.377	0.415	0.282	0.352	0.368	0.251
10-49	Mean	3.053	2.632	2.895	2.211	2.895	3.053	2.316	3.053
	Std. Error	0.301	0.278	0.295	0.271	0.323	0.320	0.297	0.223
50-199	Mean	2.818	2.909	3.000	2.091	2.727	3.091	2.364	2.818
	Std. Error	0.483	0.456	0.405	0.315	0.333	0.495	0.310	0.444

<Table A4-9> External Difficulties by Firm size: Korea

size	stat.	1	2	3	4	5	6	7	8
1-9	Mean	3.563	3.354	3.188	2.813	3.313	3.083	3.042	3.292
	Std. Error	0.146	0.131	0.145	0.122	0.134	0.165	0.133	0.130
10-49	Mean	3.529	3.459	3.165	2.847	3.329	3.012	2.976	3.259
	Std. Error	0.110	0.104	0.100	0.102	0.105	0.119	0.096	0.090
50-199	Mean	3.482	3.381	3.432	3.022	3.367	2.698	2.986	3.173
	Std. Error	0.077	0.076	0.078	0.078	0.079	0.086	0.078	0.072

<Table A4-10> External Difficulties by Firm Size: Malaysia

Size	Stat.	1	2	3	4	5	6	7	8
1-9	Mean	5	5	3	5	5	5	3	4
	Std. Error								
10-49	Mean	3.455	3.600	3.400	3.300	3.300	3.400	3.700	3.500
	Std. Error	0.390	0.267	0.163	0.213	0.153	0.340	0.213	0.269
50-199	Mean	3.200	3.700	4.000	3.100	3.100	3.200	3.300	3.800
	Std. Error	0.359	0.213	0.149	0.233	0.314	0.200	0.367	0.291

<Table A4-11> External Difficulties by Firm Size: Philippines

Size	Stat.	1	2	3	4	5	6	7	8
1-9	Mean	3.900	3.381	2.400	3.050	4.000	4.150	3.750	4.048
	Std. Error	0.240	0.176	0.303	0.211	0.218	0.264	0.339	0.244
10-49	Mean	3.136	3.455	3.091	2.818	3.318	3.545	3.409	3.682
	Std. Error	0.318	0.261	0.315	0.234	0.266	0.376	0.333	0.311
50-199	Mean	3.353	2.889	3.294	2.778	2.706	2.688	3.188	3.118
	Std. Error	0.383	0.332	0.329	0.298	0.329	0.326	0.306	0.296

<Table A4-12> External Difficulties by Firm Size: Thailand

Size	Stat.	1	2	3	4	5	6	7	8

1-9	Mean	3.184	2.842	2.211	2.579	2.684	2.632	2.684	3.316
	Std. Error	0.206	0.218	0.185	0.187	0.193	0.234	0.239	0.207
10-49	Mean	3.220	2.969	2.512	2.583	2.661	2.575	2.528	3.244
	Std. Error	0.109	0.111	0.111	0.111	0.096	0.114	0.108	0.100
50-199	Mean	2.867	2.933	2.630	2.652	2.711	2.333	2.333	2.830
	Std. Error	0.109	0.107	0.104	0.107	0.097	0.107	0.102	0.102