



An Empirical Study on the Firefighting Industries' Global Expansion Policies

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ABSTRACT

This study aims to empirically investigate the determinants of overseas expansion of firefighting industry in South Korea. For the government, it is important to make this industry and its companies developed by supporting a various strategies. Among them, supporting overseas expansion is one of the major policies for firefighting industry. However, there have been few studies about this issue. Considering the increasing importance of firefighting industry around the globe, it is necessary to find implications on how to support business in this field. In other words, it is significant to find proper policy support for these people. For the empirical investigation, this study uses logit model and the result shows that the size of the business, R&D, industrial property rights, government support, and the production of firefighting goods were found to be statistically significant for overseas advancement. These results indicate that this study can be used as a useful example to formulate and implement government policy.

Key words: firefighting industry, overseas expansion, policy support, South Korea

Introduction

Korean government enacted the 「Fire-fighting Industry Promotion Act」 in May 2008 to establish an institutional basis for the systematic development of the domestic firefighting industry. This can be seen as an increase in public demand for the quality of firefighting services in a rapidly changing society and a response to domestic and international environments. In the past, the domestic firefighting industry has been recognized as a production-intensive industry, mostly small businesses, but recently the transition to knowledge-based service industries (Shin, 2010). The knowl-

edge-based service industry can be referred to as “an industry that improves productivity and value-added products, creates new technology industries, or provides high-value knowledge services themselves by making the most of human knowledge and intellectual ability in the production process.” (Shin, 2010: 1) It also argues that some firefighting industries require a shift to the digital economy for various global environments (Jung, 2010).

Although there is a great importance of firefighting industry, the proportion of the domestic industry's gross domestic product (GDP) is significantly lower than that of advanced countries (United States, Japan, United Kingdom, and Germany). Besides, the market size and technology level of the industry is also less competitive

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than these countries (Shin, 2010). Furthermore, Jung (2010) points to the problem that relatively low importance in government policies and significantly lower development rates than other industries due to limited market size and subcontracting practices. Above all, about 96% of domestic companies have no experience in import and export, and mainly concentrate on the domestic market (Ku, 2015). It was also pointed out that the growth rate of imports is relatively higher than exports.

Korea Institute of Fire Industry and Technology (2009) points out that domestic firefighting industry companies have problems due to technical and capital weaknesses and excessive competition in the domestic market. This is related to the relatively small aspect of domestic firefighting industry companies. Besides, the domestic industry has an imbalance in trade, the size of imports that exceeds that of exports (KFI, 2009). This phenomenon is attributed to a steady increase in imports since 2004, compared with a drop in exports between 2003 and 2006. It has also been pointed out that the overseas markets of the South Korean firefighting industry are relatively small (KFI, 2009). The export of the industry also shows that the government lacks support for overseas expansion.

In response to this phenomenon, Minister of Public Safety and Security, Park In-yong said that the government would actively encourage the domestic firefighting industry to improve its global competitiveness by supporting the domestic industry's overseas expansion in 2015.

In addition, KFI reported that it will actively support the overseas expansion of the domestic firefighting industry, focusing on Southeast Asian countries (Vietnam, Cambodia, and Laos) in 2018. In particular, Vietnam has a high outlook for the market because of its well-configured fire-related infrastructure among Southeast Asian countries.

However, despite the government's efforts to expand its overseas presence, there is still a lack of an academic discussion about whether the policy change affects or not. In other words, the government's policy efforts for the overseas expansion of the industry have been continuously discussed, but specific results and academic approaches to this have been lacking.

For the above issues, this study aims to identify the characteristics of the firefighting industry's overseas expansion by utilizing the data from the firefighting industry statistics survey and derive more specific policy implications and alternatives.

To analyze main research question, the constitution of this study is as follows. Chapter 2 reviews the concept of the firefighting industry and its overseas advancement as a theoretical discussion. Chapter 3 looks at the current status and characteristics of Korea's firefighting industry. Chapter 4 constructs a research model for empirical analysis and introduces the variables to be utilized. Chapter 5 uses statistical packages to derive results for empirical analyses. Finally, Chapter 6 suggests conclusions and policy implications.

Theoretical Background

Concepts of Firefighting Industry

In South Korea, the purpose of the Fire Industry Promotion Act (Article 1) of states, "The Act aims to protect the safety of the people's lives and contribute to the development of the national economy by prescribing necessary matters to create a foundation for the development of the firefighting industry and strengthen the competitiveness of the domestic fire industry".

Second, this industry covers all industries related to the manufacture and sale of firefighting facilities, firefighting facility management, firefighting equipment, manufacturing and selling hazardous materials containers, and the production and sale of dangerous goods. In addition, under Article 3 of this Act, the central and local governments can establish and implement policies for the promotion of the domestic fire industry. A more specific description of this may be given as shown in <Table 1> below.

Accordingly, the definition and concepts can be described below table (<Table 1>). Regarding the concept of this industry, "The fire industry can be defined as an industry related to the safety,

<Table 1> Definition of firefighting industry

Law	Related Industry
Act on Fire Prevention and Installation, Maintenance, and Safety Control of Firefighting Systems	<ul style="list-style-type: none"> • Business of manufacturing and selling firefighting systems • Firefighting system management business
Firefighting System Installation Business Act	<ul style="list-style-type: none"> • Firefighting system business
Act on the Safety Control of Hazardous Substances	<ul style="list-style-type: none"> • Business of manufacturing and selling containers for transporting dangerous substances • Business of designing and constructing factories • Business of manufacturing and selling dangerous substance tanks

* Source: <http://www.law.go.kr>

construction, supervision, and promotion of welfare of the people by preventing, guarding, and manufacturing fire, disaster, and other emergency situations". (Ku, 2015: 56) It classifies the characteristics of these firefighting industries by detailed industries and presents them (Jung, 2010).

Discussions on the overseas expansion of the firefighting industry

The purpose of overseas expansion of the firefighting industry is to expand overseas activities of individual companies and to secure global competitiveness. The basis for the government's institutional support for this industry is specified in relevant statutes.

Government efforts to develop and promote the firefighting industry can be made in various ways. Among them, this study focuses on expanding the overseas expansion of the domestic firefighting industry. Projects related to the overseas expansion of the fire industry shall be implemented based on the Fire Industry Promotion Act. The overseas expansion of the fire industry can be seen as an important policy and strategy for the industry promotion. To this end, the government will provide support for holding and participating in the fire industry exhibition, overseas marketing, and promotion activities, foreign investment attraction, information on overseas expansion, overseas market development and overseas

certification, and other projects necessary for international cooperation and overseas. This show that the role of government is very important in promoting firefighting industry. This can be summarized as shown in <Table 2> below.

More specifically, regarding the details of the support, various way is provided for domestic and foreign exhibitions, overseas market development teams, individual participators in overseas exhibitions, and overseas certification. For example, cash support of up to 6 million KRW to 10 million KRW will be provided for individual participation in overseas exhibitions and overseas certification. It also supported participation in the conference, exhibition, and expo (<Table 3>).

Through this, it is believed to contribute to the increase in exports of domestic companies. More specifically, technology cooperation and marketing of overseas firefighting, international standardization agency, certification test agency, overseas marketing support site operation, firefighting industry overseas certification support project and individual overseas exhibitions are supported.

The expected effects of this support can be summarized as follows. By providing support for participation in domestic and international firefighting exhibitions, the export growth of firefighting industrial enterprises can be improved. In the case of technical cooperation and marketing support from overseas firefighting agencies, technical cooperation with related overseas institutions may be expanded to contribute to exports. It can serve

<Table 2> Overseas expansion of firefighting Industry

	Description
Purpose	• Support overseas market to develop domestic industry and improve global competitiveness by establishing overseas promotion system
Overview	• Domestic and international exhibition support • Operation team for overseas market • Participation in overseas exhibitions individually • Acquisition of overseas certification
Legal Basis	• Article 20 in 「Firefighting Industry Promotion Act」
Target	• Domestic firefighting industry interested in foreign market • Acquisition of overseas certification: a company that has the approval of the agency

* Source: <https://www.nfa.go.kr/>

<Table 3> Support policy for firefighting

Category	Exhibitions at home & abroad	Overseas market exploration board	Independent participation in overseas exhibitions	Overseas certification obtained
Form	Booth rental fees, logistics expenses, etc.	Interpreters, consulting desk rental, etc.	Retrospective booth rental fees	Retrospective certification expenses
Amount	-	-	KRW 6 Million (max)	KRW 10 Million (max)
Limitation	-	-	Up to 50% of booth rental fees	Up to 50% of certification expenses
Criteria	US (10 companies), Vietnam (14 companies)	10 companies	Once per company	Once per company

* Source: <https://www.nfa.go.kr/>

as channels that reflect the voices of the domestic fire industry, and certification tests can contribute to the improvement of the quality of the successful overseas entry by the domestic fire industry. Besides, various support projects such as overseas market development and operation of overseas marketing support sites are provided in a policy.

Regarding the overseas expansion of the fire industry, the globalization of the fire industry from legal, policy, and industrial perspectives, and thus presents policy implications (Ku, 2015). More specifically, policy implications are derived on how to support and promote the fire industry overseas, the fire industry's technology, and the overseas market. In addition, it argues that the establishment of an organization such as a global business group is necessary within the 'Fire Industry Promotion Center' in promoting the fire industry (Ha, *et. al.*, 2017).

As one of the reasons why domestic fire industry companies have not been active in overseas expansion, problems related to overseas certification may be pointed out. In the case of South Korea, some countries (Japan and China) have similar standards, but for Western countries (North American and European regions), the standards appear to be different, which are major problems (Ku, 2015). That is, the standards are significantly different among countries and it would be a barrier for overseas expansion for companies (<Table 4>).

Through this, the activation of firefighting industry businesses

into the global market can be systematically carried out, and the government should support and help domestic companies, most of all, overseas expansion can be recognized by the strategic value of companies.

Status and Characteristics of Domestic and Foreign Firefighting Industry

General Status of Firefighting Industry

First of all, regarding the number of companies corresponding to the domestic fire industry, the total number of fire industry companies was 7,893 as of 2013, but this continued to increase to 8,627 in 2017. Moreover, 243 additional companies were registered with fire industry companies, up 2.9% in 2016. More specifically, the largest portion of the total number of businesses is the firefighting project, which averaged 58.21% over the 2013-2017.

Next, it is shown that the proportion of businesses in the firefighting manufacturing sector is mainly significant, with an average annual average of 10.45% during the same period (<Table 5>).

Next, considering the number of workers in the firefighting industry, it can see that there has been a steady increase over

<Table 4> Certification systems of domestic and Foreign firefighting industry

Division	Standard	Organization	Characteristic
Korea	Technical Std.	KFI	Mandatory
America	UL, FM Code	UL, FM	Optional
European Union	EN, SB, DIN Code	CE, BRE, VdS	Optional
Japan	Technical Std.	JFEII	Mandatory
China	Technical Std.	CCCF	Mandatory

* Source: Ku (2015: 57).

<Table 5> Status of Firefighting industry (2013-2017)

(Unit: number, %)

	2013	2014	2015	2016	2017
Total	7,893	8,004	8,136	8,384	8,627
Fire Design	605	630	632	633	640
Fire Construction	4,697	4,738	4,761	4,760	4,920
Fire Inspection	395	383	384	387	395
Fire Management	380	386	415	418	423
Flame Retardant	626	615	641	741	747
Fire Manufacturing	809	834	830	913	904
Fire Retail	381	418	473	532	598

* Source: KFI (2018: 9).

the years 2013-2017. In 2017, an additional 4,052 people were confirmed, up 2.6% from the previous year. Like fire industry companies, the largest number of workers are found to be involved in the firefighting project, accounting for an annual average of 64.14% during the 2013-2017 period. The firefighting manufacturing industry is the second-highest proportion, with the proportion of it being around 10.18% annually during the same period. The number of firefighting manufacturers has also been increasing year after year (<Table 6>).

Sales in the fire industry for the 2013-2017 period also continued to increase. In 2013, the fire industry's sales reached 12,114 billion KRW but increased to 15,561 billion KRW in 2017. As with the number of fire industry companies and workers, the proportion of firefighting businesses is the largest in the case of sales. In particular, the number of firefighting projects undertaken in 2017 increased by 13.2% (1,048 billion KRW) year-on-year, the largest increase over other industrial sectors (<Table 7>).

The Overseas Expansion and Characteristics of the Fire Industry

In order to understand the characteristics of the domestic fire industry's overseas expansion, it needs to look at the volume of trade (export and import) and various forms of overseas expansion. First of all, according to a survey conducted by KFI (2017), the proportion of businesses performing exports and imports in all industries related to the fire industry is quite low. When looking at the statistics of the industry, only 1.2% of businesses participate in exports, and imports are 1.8%. It indicates that most companies are not properly ready to enter into foreign market.

The firefighting manufacturing sector, which has a relatively high proportion of exports and imports, is a firefighting manufacturing industry with exports of 6.5% and imports of 6.7%. On the other hand, there are no import and export activities in the fire supervision and fire management industries. This result can be inferred that domestic fire industry-related businesses are not taking place despite recognizing the need for overseas expansion (<Table 8>).

In addition, regarding the specific form of overseas expansion, 97.9% of companies have never made inroads into foreign countries,

<Table 6> Labor in firefighting industry (2013-2017)

	(Unit: population, %)				
	2013	2014	2015	2016	2017
Total	143,846	146,696	149,048	157,266	161,318
Fire Design	11,825	11,583	11,245	12,101	12,920
Fire Construction	92,130	93,945	97,108	100,800	102,203
Fire Inspection	10,194	9,199	9,087	9,975	10,265
Fire Management	5,356	5,981	6,522	6,524	6,561
Flame Retardant	9,130	9,355	9,227	10,053	10,334
Fire Manufacturing	13,976	15,312	14,454	16,286	17,274
Fire Retail	1,236	1,321	1,403	1,527	1,761

* Source: KFI (2018: 10).

<Table 7> Sales in firefighting industry (2013-2017)

	(Unit: Billion KRW, %)				
	2013	2014	2015	2016	2017
Total	121,143	127,967	132,360	142,133	155,614
Fire Design	3,605	4,369	4,288	4,394	4,599
Fire Construction	67,003	70,181	72,601	79,441	89,923
Fire Inspection	4,727	4,677	4,652	4,793	5,038
Fire Management	3,616	4,304	4,966	5,200	5,483
Flame Retardant	13,079	12,032	12,313	12,564	12,820
Fire Manufacturing	25,805	28,415	28,486	30,648	32,387
Fire Retail	3,308	3,990	5,054	5,093	5,364

* Source: KFI (2018: 11).

<Table 8> Export and import in firefighting Industry

(Unit: %)

	Total	Export		Import	
		Yes	No	Yes	No
Total	100.0	1.2	98.8	1.8	98.2
Fire Design	100.0	0.3	99.7	0.3	99.7
Fire Construction	100.0	0.3	99.7	0.9	99.1
Fire Inspection	100.0	0.0	100.0	0.0	100.0
Fire Management	100.0	0.0	100.0	0.0	100.0
Flame Retardant	100.0	2.9	97.1	3.6	96.4
Fire Manufacturing	100.0	6.5	93.5	6.7	93.3
Fire Retail	100.0	0.6	99.4	3.2	96.8

* Source: KFI (2017: 33).

<Table 9> Overseas expansion in firefighting Industry

(Unit: %)

	Mode of Overseas Expansion					
	Establishing foreign branch	Transaction with foreign companies	With big companies	Foreign supplier	Lease office	No performance
Total	0.7	1.1	0.1	0.3	0.0	97.9
Fire Design	0.6	0.5	0.0	0.4	0.0	98.7
Fire Construction	0.6	0.3	0.1	0.0	0.0	99.0
Fire Inspection	0.6	0.0	0.5	0.0	0.0	98.9
Fire Management	0.0	0.0	0.0	0.0	0.0	100.0
Flame Retardant	2.1	2.7	0.0	1.2	0.0	94.4
Fire Manufacturing	0.6	5.7	0.3	1.0	0.1	92.6
Fire Retail	0.4	1.2	0.0	0.0	0.0	98.4

* Source: KFI (2017: 36).

including direct transactions with foreign companies (1.1%), the establishment of overseas branches (0.7%), connection with overseas partners (0.3%) and expansion with large companies (0.1%). In other words, the case of overseas expansion, like trade, is quite poor. In comparison by industry sector, the firefighting manufacturing industry is the highest among related firefighting industries, in which case direct transactions with foreign companies (5.7%), and links to overseas partners (1.0%). The industrial sector, which has the least overseas expansion, is found to be a fire management business, with no companies having carried out overseas expansion (<Table 9>).

Regarding the market size and status of the fire industry at the global level, with active fire protection (AFP) at the center, the annual growth outlook is more than 7% (compound annual growth rate, CAGR). It is also expected that urbanization in developing countries will lead to re-structuring around these markets (Ha, 2017).

Therefore, for the ever-increasing overseas market of the firefighting, the domestic industry's overseas expansion is more important, and it can be seen as inevitable in the global economy.

Research Method

The purpose of this study is to analyze and derive implications for the determining factors of South Korean firefighting industry's overseas expansion. The main analysis target can be seen as businesses classified as the fire industry, and it is to analyze the impact of their business characteristics on their expansion into overseas markets. Through this, it is possible to infer the results of which factors are carried out by domestic fire industry companies entering overseas markets.

To this end, logit analysis model was used as the analysis model. For logit analysis model, it can be utilized when the dependent variable is divided by 0 or 1. statistical packages for the analysis were performed using STATA 14.0.

Regarding variables, the data used for empirical analysis in this study were prepared as of the end of December 2016 for the 2017 Raw Data of the Fire Industry Statistics Survey. This survey has been investigated every year. Subject to an investigation

<Table 10> Variable description

	Variable	Description	Expected Sign
DV	Overseas expansion	if it experiences overseas expansion = 1, nor =0	
	ln(number of laborer)	the number of laborer	+
IV	Foreign patent	the number of any type of foreign patent	+
	Research and development	if it has any type of R&D = 1, nor=0	+
	Industrial property right	if it has industrial property right =1, nor =0	+
	Government support	if it takes government support =1, nor=0	+
	Manufacturing	if it is manufacturing company=1, nor=0	+

can be regarded as all enterprises included in the special classification system of the nation's fire industry. The contents of the major survey items shall consist of the general status of firefighting companies, the status of personnel, management status, R&D and overseas expansion status, the status of corporate status, etc. More specifically, the general status includes information related to the entity's information, and in the case of manpower, the current status of people working in the industry, new employment, retirement, etc. Management status includes industry sales, operating expenses, operating profit, sales weight and overseas transactions, R&D and overseas advancement status (investments and industrial property rights) and overseas entry forms, methods, countries, and instruments (Ministry of Public Safety and Security, 2015).

A variable used for more specific analysis was utilized to determine whether it would be used for overseas expansion as a dependent variable. Raw data are divided into 'establishment of overseas branches, 'direct transactions with overseas companies', 'cooperation with large companies', 'connection of overseas partners', 'rental overseas offices', 'other' and 'no overseas expansion record'. In this study, all types of advancement except 'no overseas advancement performance' were set to 1 through dummy variable, and 0 if they did not.

Next, to measure the size of the entity, the total number of workers were utilized, which was converted to natural log values for analysis. Next, variables related to industrial property rights in the firefighting sector were utilized. Registration of industrial property rights was treated as 1 and 0 if not registered.

More specifically, industrial property rights variables in the field of firefighting were used to treat the total number of registered cases for invention patents, utility model rights, design rights, and trademark rights. R&D is classified into 'Development of R&D department exclusively responsible for R&D development', 'Participation', 'Development supervised', 'Other' and 'None' depending on the classification of R&D types. Accordingly, none of the cases were treated as zero, and if they were included in the remaining variables, they were treated as one and participated in research and development. Next, government-funded variables are diverse,

including start-up funds, product development, human resources, facilities, business participation, technology development, operating funds, overseas expansion, and educational support. All of them were treated as 1 for dummy variable except when support was not received for analysis. Finally, the manufacture of firefighting equipment was treated as a dummy variable 1 or 0, depending on whether the firefighting equipment was manufactured. The variables can be summarized in <Table 10> below.

Empirical Results

The table below shows the underlying statistics for the variables used in this study. All variables except workers and the number of the overseas patent are shown in the form of dummy variables. The number of workers excluding dummy variables and the number of the overseas patent has shown a wide variation. According to statistics, there are small businesses such as one-man businesses in Korea, while there are also businesses with 30,056 workers. In addition, in the case of the number of overseas patents, 2,335 businesses have no patents at all, indicating that fewer than 1% of the businesses included in the survey have overseas patents (<Table 11>).

Next, in the case of overseas expansion, regarding the average value, almost all businesses did not enter overseas, and only 95 out of the total 2,349 companies have entered. R&D shows relatively high figures, with more than 20% of all businesses performing R&D in any form. In the case of industrial property rights, about 12.7%, 299 of the total businesses registered industrial property rights. According to descriptive statistics, the government support appears to be quite low. Finally, about 36% of businesses manufacture firefighting goods.

The results of the empirical analysis show that in all variables except for overseas patents, it has a positive effect on the overseas advancement of the firefighting industry. In other words, the larger

the size of the industry, the greater the possibility of overseas expansion, and the greater the possibility of overseas expansion than if R&D was not done. In addition, if industrial property rights are registered, they are more likely to enter overseas markets than if they are not, and industries that receive government support are more likely to enter overseas markets than businesses that do not. Finally, if firefighting equipment is manufactured, it can be said that the overseas expansion is greater than if it is not (<Table 12>).

More specifically, these results show that patents are not statistically significant that it because only 13 of the companies surveyed have patents overseas, which are significantly lower than 1%. However, there were some cases where there were more than 10 companies.

One of the important implications from the analysis results is that it may be difficult for the government's efforts to expand abroad to bring tangible policy results. This is because, as the analysis shows, most companies, except for those who are interested in overseas expansion and are willing to enter overseas businesses, are significantly less interested in overseas expansion.

<Table 11> Descriptive statistics

Variable	Observation	Mean	SD
Overseas expansion	2,349	.040442	.1970372
No. of Laborer	2,349	2.73418	1.61765
Foreign patent	2,349	.042571	1.028086
R & D	2,349	.209450	.4070033
Industrial property right	2,349	.127288	.3333665
Government support	2,349	.039591	.1950386
Manufacturing	2,349	.369093	.482662

<Table 12> Empirical result

	OR	SD (Robust)	P> z
No. of Laborer	1.445	.1344	0.000
Foreign patent	1.354	.2949	0.163
R & D	2.266	.6802	0.006
Industrial property right	3.016	.8659	0.000
Government support	2.557	.9356	0.010
Manufacturing	7.423	7.771	0.056
Number of Observation		1,979	
Prob > chi2		0.0000	
Pseudo R2		0.2308	

* Note: Regional and industry dummies are included, but not reported.

Conclusion and Policy Implications

This study empirically identified the current status and characteristics of South Korean firefighting industry's overseas expansion to provide policy implications for the promotion of South Korean firefighting industry's overseas advancement. The analysis showed that all variables except for overseas patents have a positive effect on overseas advancement. In other words, the larger the size of the business, the more likely it is to go abroad if it is registered for industrial property rights if it receives government support, and if it manufactures firefighting equipment.

In doing so, it proposes the following policy implications: first, for the government to efficiently implement overseas expansion support policies and generate results, the government needs to find companies that are practically feasible and suitable for overseas expansion and concentrate on supporting them. As the firefighting industry statistics survey also shows, most companies are relatively uninterested in overseas expansion, focusing on the domestic market, and actually, only a small number of companies have done so. To overcome this, the government should make companies more globalized by policy support.

Second, it is necessary to provide more specific procedures for domestic companies who lack information on overseas expansion and to establish effective expansion strategies for countries that the government perceives as strategic targets. In other words, as suggested by the KFI in 2018, it is necessary to carry out a government-led overseas promotion support strategy for certain regions and countries (Vietnam, Laos, and Cambodia) and other Southeast Asian countries.

Third, it is found that the level of overseas certification, which can be considered necessary for the related to enter overseas markets, is quite low (Ku, 2015). It is said that businesses with overseas certification appear at a fairly low rate. No matter how good the product is, this problem is perceived as a major barrier to actual overseas expansion. In the end, this leads to the hesitation of businesses entering foreign markets. It is also urgent to come up with a policy alternative. Therefore, the government needs to carry out policy efforts in supporting them to obtain overseas certification, focusing on major firefighting industry. In this regard, the government needs to support the entry into and development of overseas markets and the acquisition of overseas certification marks, as well as the awareness of the international test (KFI, 2009).

Fourth, to generate significant results of the firefighting industry's overseas expansion, it is necessary to establish governance through the expansion of a network of consultations for government, major institutions, and firefighting companies to enter the global market.

This is because more efficient policy enforcement and policy performance can be generated.

Finally, it is important to improve the related system. For example, it needs to consider that upgrading education system for the people in this industry (Kim & Hwang, 2018).

This study sought to derive specific implications for the overseas advancement of firefighting companies by utilizing the data from the survey. Nevertheless, there is a limitation that the analysis has been performed at a relatively limited level using the investigated data. Therefore, it would be necessary to specifically investigate the recognition of actual industrial enterprises' overseas advancement, satisfaction with government policy support, and factors that hinder their overseas advancement and use the data for analysis. It is also necessary to approach qualitative research that can reflect the voices of the site through interview with industry personnel.

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