



## Study on the Exhibition Performance and Efficiency of Exhibitors in Overseas Trade Show: Company Characteristics and Exhibition Participation

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### ABSTRACT

**Purpose:** This study aims to analyze the efficiency of performance of exhibitors in overseas trade shows and identify the causes of inefficiency and differences according to their characteristics.

**Design/methodology/approach:** This study employed a theoretical approach based on a literature research and an empirical analysis of companies that benefited from overseas exhibition support policies. Data envelopment analysis was used as a research method for analyzing the efficiency of 221 participating companies in overseas trade shows.

**Findings:** The result exhibited little difference in the overall efficiency of exhibition performance according to the characteristics of exhibitors. However, performance in terms of the development of overseas markets differed dependent on the sales and export volume of exhibitors and the region of the trade shows. Furthermore, the finding demonstrated that net sales, exports, items, frequency of exhibiting in a trade show, and the rate of self-expenditure of the total costs of trade shows influence export promotion performance.

**Research limitations/implications:** This study is significant in that it measured the efficiency of exhibition performance compared with the input of exhibitors in trade shows. However, the input variable was fixed and efficiency was analyzed using only a combination of three output variables. Thus, employing various input and output variables determine the causes of efficiency and inefficiency will lead to meaningful studies.

**Originality/value:** This study measured the effectiveness of the overseas exhibition support policies of the government and the differences in the efficiency of exhibition performance according to the characteristics of beneficiary companies. This study differed from previous studies that simply analyzed the exhibition performance of companies. The results can be used as basic data necessary for establishing support policies for decision makers through measures for improvement, such as standards, contents, methods, and methods, as well as measures for the maximization of the efficiency of exhibition performance according to the characteristics of exhibitors.

*Keywords:* Exhibitor, Overseas exhibition, Exhibition performance, Exhibition, Trade Show, Efficiency, Data envelopment analysis

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## I. Introduction

An exhibition is a marketplace or venue where buyers (visitors) and sellers (exhibitors) convene to transact business for a certain period. In general, the exhibition is recognized as a cost-effective marketing tool (Kim et al., 2020; Kirchgeorg et al., 2010; Morrow, 2002; Tafesse & Skallerud, 2017). In particular, participating companies may discover opportunities for trade promotion activities, such as the promotion of products, technologies, and services and trade consultations, due to the numerous foreign buyers who visit the exhibition (Lee et al., 2018; OHara, 1993; Seringhaus & Rosson, 2001; Tafesse & Skallerud, 2015; Tanner, 2002). According to The Global Association of the Exhibition Industry (UFI, 2019), approximately 3,200 exhibitions were held in 180 countries worldwide in 2018 with nearly five million participants and 330 million visitors. With the development of advanced ICTs, such as AI, big data, and mobile technologies, exhibitions are increasingly recognized as a competitive integrated marketing tool (AUMA, 2019; Hai-sen, 2004; Hansen, 2004; Kim et al., 2020; Lee & Kim, 2008; Sridhar & Gopalakrishna, 2015; Tanner, 2002).

For this reason, many countries, such as Germany, the UK, China, and Hong Kong actively support their companies in participating in overseas exhibitions (AUMA, 2021; Hong Kong Trade Development Council [HKTDC], 2021; UK Trade & Investment [UKTI], 2020). Specifically, the South Korean government promulgated the *Exhibition Industry Development Act* in 2008 to help companies participate in overseas exhibitions under the provisions of the Act. Moreover, the government and organizations that support exhibitors improve the *performance evaluation model* to measure not only the satisfaction but also the quantitative exhibition performance of exhibitors (Association of Korean Exhibition Industry [AKEI], 2017). They aim to collect and analyze data on actual exhibition performance, aid exhibitors in exploring overseas markets, and promote exports.

As such, the government and organizations are

evaluating the performance of the support policies. However, the exhibitors who are the target of the support cannot receive it due to problems, such as the lack of manpower, company scale, and budget. Given that the company is the actual entity that should create performances through exhibitions, a company's decision to participate in exhibitions is a crucial process, which includes analysis of expected effects against various projected costs (Spence, 2003). Regarding exhibition marketing and performance, prior studies investigate the effectiveness of the marketing aspects, factors of choice, performance factors, and quality of service of exhibitions (Gopalakrishna & Lilien, 2012; Hansen, 2004; Seringhaus & Rosson, 1994; Shoham, 1999). However, the majority of these studies focus on measuring and analyzing the exhibition performance of companies regardless of the support policies of the government.

Central and local governments are investing substantial funds to support participation in overseas exhibitions, whereas companies are participating through these support policies. Thus, although reviewing the effectiveness of support policies is a crucial task, studies that examine the content, method, performance, and efficiency of support policies are few. Moreover, less research is conducted on the efficiency of support policies according to the characteristics of beneficiary companies. Therefore, the current study aims to analyze the exhibition performance and efficiency of beneficiary companies that participate in overseas exhibitions under support policies and examine if a difference exists in efficiency according to the characteristics of exhibitors. In doing so, the results of the study can be used not only to formulate plans for maximizing the efficiency of exhibition performance according to company characteristics but also to establish customized support policies through measures for improvement, such as standards, contents, and methods of support.

## II. Literature Review and Conceptual Background

### A. Exhibition as a Marketing Tool

A trade show (i.e., fairs and exhibitions) pertains to a traditional market held at a fixed place and within a limited time as a medium of trade. Moreover, it is a venue for total marketing activities between visitors and exhibitors (Freyer & Kim, 2001; Tafesse & Skallerud, 2017). In the past, exhibitions have been considered a means of sales promotion among marketing mix (4P) as a particular platform designed to connect buyers and sellers (Hansen, 2004; Tafesse & Skallerud, 2017; Zhou et al., 2012). Recently, however, exhibitions are recognized and used as an integrated marketing tool for achieving the marketing objectives of exhibitors apart from sales promotion (AUAM, 2019; Kim et al., 2020; Kotler & Keller, 2001).

In particular, exhibitors may identify opportunities for developing abroad markets through the many overseas buyers that visit exhibitions (OHara, 1993; Seringhaus & Rosson, 2001; Tanner, 2002). Through such opportunities, exhibitors may increase sales volume by developing new markets and expanding exports (AUMA, 2013; Gopalakrishna & Lilien, 1995; Lee & Kim, 2008; Tafesse & Skallerud, 2017). However, exhibitors may fail to achieve their goals due to the lack of preparation to exhibit in overseas trade fairs. To maximize corporate performance through efficient participation in exhibitions, a thorough preparation of the marketing process is required (Rosson & Seringhaus, 1995; Tanner, 2002).

Prior research categorizes the marketing process for exhibitions in three phases, namely, pre-exhibition, during the exhibition, and post-exhibition, and analyzes the major marketing activities at each stage. In particular, Ramsaran (2004) named these phases as pre-show, on-show, and post-show activities. Pre-show activities include setting targets, preparing exhibits, and inviting potential customers, whereas on-show activities pertain to identifying customer needs and establishing networking events for current and potential

customers. Lastly, post-show activities include a direct follow-up of sales leads and dissemination of requested materials. Kim (2003a) termed the three phases as potential, process, and result. The first pertains to the preparation of work and the establishment of usefulness before the show. The process phase refers to the interchange between exhibitors, organizers, and visitors during the display of the exhibitors' products. Finally, the result phase denotes the outcomes of a combination of participants, organizers, and visitors after the show. Moreover, Seringhaus (2004) analyzed the marketing activities of the exhibitions of participating companies with the following primary objectives: finding new customers, enhancing the corporate image, forming and maintaining customer relationships, and promoting sales of existing products. The author also categorized marketing activities into three stages, namely, pre-show, on-show, and post-show. During the pre-show activities, exhibitors present their goals for participating, the decision and **preparation** of exhibits, and invitation for potential customers. On-show activities include visiting buyer information collection, identifying customer needs, and establishing networking events for existing and prospective customers. Post-show activities indicate the direct follow-up of sales representatives and distribution of consultation-related data.

### B. Overseas Exhibition Support Policies for Exhibitors

Previous scholars propose that SMEs experience difficulty in gathering new prospects as they venture into new overseas markets (Blythe, 2002; Borghini et al., 2006; Crick et al., 2011; Godar & O'Connor, 2001). To solve these issues, the majority of companies use the government's export support policies to participate in overseas trade fairs and trade missions (Seringhaus & Rosson, 1998; Zhou et al., 2012). According to Forrester (2014), companies allocate more than 20% of their total marketing projections and media (digital advertising: 13%; content marketing: 12%) to participate in exhibitions (Tafesse & Skallerud,

2017). Furthermore, exhibitions continue to hold a high position as a marketing tool for inter-company transactions according to the AUMA (2019) Messe Trend from 2015 to 2018. Moreover, domestic and foreign companies recognize these shows as a significant overseas marketing tool (Kim et al., 2020).

Support policies for overseas exhibition participation may boost export performance by providing direct or indirect support from the government to enable exhibitors to utilize exhibitions in an efficient manner (Seringhaus & Rosson, 2004; Zhou et al., 2012). Many countries are promoting various types of support policies for companies participating in exhibitions and establishing a unified support system for overseas exhibitions through related organizations at the national level. In the UK, the UKTI is in charge of support projects for overseas exhibition and operates an especially effective performance-oriented management system through the *Tradeshow Access Programme* (UKTI, 2020). Germany is supporting companies participating in the German Pavilions through the *Foreign Trade Fair Participation Program of Germany* by the AUMA or the German Exhibition Association, a private organization (AUMA, 2021). Under the leadership of the HKTDC, an organization dedicated to overseas marketing, Hong Kong is supporting companies participating in overseas exhibitions by creating various types of funds for SMEs and start-ups, such as the *Branding, Upgrading and Domestic Sales Fund* and the *Export Marketing Fund* (HKTDC, 2021).

Korea also provides institutional support for holding exhibitions and participating in domestic and overseas exhibitions through the Exhibition Industry Development Act to develop overseas markets and promote exports. In particular, Korea is highly dependent on exports due to its economic structure. Therefore, expanding exports is essential for sustained economic growth (Aw et al., 2000; Awokuse, 2005; Lawrence & Weinstein, 2001; Onam & Stockhammer, 2005; Zang & Baimbridge, 2012). Therefore, the Korean government continues to support participation in overseas exhibitions as one of its policies for trade promotion. According to the Exhibition Industry

Development Act, support programs for the participation of SMEs in overseas exhibitions are divided into three categories, namely, *the Korean Pavilion* for overseas exhibitions, *individual participation exhibitions*, and *special overseas exhibitions*. In Korea (i.e., central and local governments and related organizations), the organizations in charge of support projects for participation in overseas exhibitions are diverse and lack unity. Thus, the current study aims to analyze the companies that received support for participation in overseas exhibitions in 2018 through the Korea Trade-Investment Promotion Agency, which is the overseas exhibition agency of the government and is the most commonly used program at the time.

### C. Exhibition Performance

Performance pertains to the result or effect of an entity after the achievement of its objective using various means. Thus, exhibitor performance may be defined as a result of the participation of an enterprise in an exhibition (Hansen, 2004; Kim et al., 2020; Shoham, 1999). Moreover, support agencies and exhibitors aim to achieve maximum results by investing within a limited budget (Gopalakrishna & Lilien, 1995; Gopalakrishna & Williams, 1992; He et al., 2019; Smith et al., 2004; Yoon et al., 2012). Thus, the need to measure and analyze the performance of exhibitors is consistent (Bonoma, 1983; Hansen, 1996, 2004; Kerin & Cron, 1987; Lee & Kim, 2008; Lin et al., 2018; Seringhaus & Rosson, 1998; Sridhar et al., 2015; Zhou et al. 2012;).

Many studies examined the performance of exhibitors from different viewpoints. However, a general agreement is that performance is primarily classified as sales performance and communication performance (Bonoma, 1983; Kerin & Cron, 1987; Hansen, 2004; Kim et al., 2009; Zhou et al., 2012). Hansen (2004) approached exhibitor performance from several perspectives and recognized that participation in exhibitions is a process that involves various activities. The author measured exhibitor performance by distinguishing between sales performance (i.e., launching and testing

of new products, gaining on-site sales, and finding new buyers and markets) and non-sales performance (i.e., collecting information, establishing customer relationships, and building the corporate image). Moreover, Kerin and Cron (1987) derived 13 objectives for participation that influence the exhibition performance of marketers in companies with experience in exhibition participation. The authors grouped the objectives into sales and non-sales and analyzed their relationship to achievement.

Regarding the concept and measurement of exhibitor performance, Venkatraman and Ramanujam (1986) stated that the achievement of goals is determined by exhibitor performance based on control systems related to outcomes and behaviors from marketing theory as the direction of exhibitor action. In addition, exhibitors proposed that performance measurements, such as action structure and design, execution process, and implementation issues, enabled them to examine their marketing activities for exhibitions from various perspectives. Tanner and Chonko (1992) aimed to determine exhibitor performance in terms of return on investment from exhibitions. The authors proposed that sales leads collected on-site should be linked to actual sales and measured whether they generated sales. However, measuring exhibitor performance is challenging because signing contracts with potential customers contacted at exhibitions and, thus, generating sales may span at least two years. Lastly, Cobanoglu and Turaeva (2014) cited that exhibitors should display performance in terms of sales and information collection at the pre-show; information collection, relationship improvement, and brand building on-site; and motivation performance at the post-show.

#### D. Data Envelopment Analysis

Charles, Cooper, and Rhodes (1978) developed DEA as a method for measuring the relative efficiency between multiple inputs and decision-making units (DMUs) where multiple outputs occur (Charnes et al., 1978; Charnes et al., 1985; Cook & Seiford, 2009; Cooper et al., 2000). In particular, companies

or organizations who wish to remain competitive used DEA to accurately measure inefficiencies in their management and operations and implemented improvements by evaluating results. Scholars provided various interpretations of efficiency. To date, however, the most basic concept is the ratio of input to output. Specifically, Prugger and Miller (1991) defined efficiency as the relationship of input to output, means and methods, and costs and benefits.

Several models for DEA were developed. From them, the Charles, Cooper, and Rhodes (CCR) and the Banker, Chang, and Cooper models are the most utilized. In addition, these models are grouped into input- and output-oriented depending on the focus (Cooper et al., 2000). Input-oriented models are mainly used for non-competitive scenarios, such as the public sector, to minimize input as the output is fixed. Conversely, output-oriented models are mainly utilized for competitive cases that aim for maximum performance, such as ordinary companies, to maximize the output as the input is fixed (Banker et al., 1984; Zhu, 2001). The subsequent text discusses prior studies that used DEA.

Prado-Román et al. (2012) analyzed the efficiency of exhibitor performance in the International Art Trade Show (ARCO). The results suggested that exhibitors in the ARCO need information, sales, and images among many output variables to improve their efficiency. Moreover, Assaf (2012) used DEA to measure and compare the efficiency of travel agencies and hotels in major countries across the Asia-Pacific region. The study found that travel agencies and hotels in Australia, Singapore, and Korea were more efficient than those in other countries and that international hotels were more efficient than local hotels in the region. Yin et al. (2020) employed DEA to survey 68 international tourist hotels in Taiwan and to analyze the influence of the cooperative mechanisms of internal departments, such as operations and marketing, on performance. Alternatively, Cano et al. (2017) analyzed the efficiency of an export target country by correlating various variables through DEA. Öztürk and Girginer (2015) investigated the export efficiency of apparel and textile companies in Turkey using

DEA and the analytic hierarchy process to analyze the factors that influence the efficiency of export manufacturing companies. Lastly, Hwang and Koo (2016) measured the number of employees and capital as input variables and revenue as output variables.

On the basis of the abovementioned studies, the current study aims to analyze the effectiveness of exhibition performance of companies that receive support for participating in overseas exhibitions. Specifically, the study intends to measure efficiency based on exhibition performance according to the internal characteristics of companies and characteristics of exhibition participation. The rationale underlying these objectives is to examine the effectiveness of the government's overseas exhibition support policies. Furthermore, the study employs the DEA method, which is considered suitable for measuring the efficiency of exhibitors through performance calculated against input resources. The study focuses on the output-oriented model. The results are expected to contribute to the literature by determining the types of company and exhibition participation that are most efficient. In this manner, the results can serve as reference for establishing standards for participation support.

### III. Research Method

#### A. Research Question

This study aims to analyze the efficiency of companies participating in overseas exhibitions with the support of the government and to determine whether and why differences exist in efficiency according to the general characteristics of companies and characteristics of exhibition participation. Toward this end, analysis is based on the CCR model, which is an output-oriented DEA method. The reason for using the CCR is due to the nature of the model, which can grasp the concept of efficiency using output under a fixed input situation. In this study, the input resources are set as *support items for participation in the exhibition* under the government policy. In this

regard, the CCR model is suitable due to its capability to identify efficiency through performance.

Companies invest through costs and human resources to engage in various marketing activities in exhibitions and obtain performance output. In other words, the development of overseas markets and export promotion activities of companies compose the process of converting input variables into output variables. Thus, the study infers that companies that obtained more output compared to input have engaged in efficient activities related to exhibition participation. Therefore, if one understands the characteristics of effective business groups (i.e., according to DMUs), then such characteristics can be used for the selection of companies that warrant government support.

The study poses the following research questions:

Do exhibitors in overseas trade fairs differ in terms of performance in (Q1) efficiency, (Q2) development of overseas markets, and (Q3) export promotion according to their general characteristics and the characteristics of exhibition participation?

#### B. Sample and Data Settings

To achieve the objectives of the study, questionnaires were disseminated to 1,015 exhibitors supported by the Korean government in 2018. Analysis was focused on determining the collective efficiency of the sample. Data were obtained from 269 companies. After screening for missing values, the final sample for analysis was 221.

Korea is a representative export-driven country in terms of industrial structure. It actively utilizes overseas exhibitions as one of the major marketing tools for penetrating overseas markets (Aw et al., 2000; Awokuse, 2005; Song & Kim, 2018; Zang & Baimbridge, 2012). In particular, the Korean government selects and fosters the meetings, incentives, conferences, and exhibitions industry as a high value-added new growth engine in 2009 (Park, 2021). The government provides continued support for participation in overseas exhibitions. Through this support system, the Korean government plans to

**Table 1.** Sample settings

| Component | Content                                                     |
|-----------|-------------------------------------------------------------|
| Target    | 1,015 exhibitors supported by the Korean government in 2018 |
| Period    | August 19 to 31, 2019 (13 days)                             |
| Method    | Online research                                             |
| Sample    | Probability sampling                                        |

**Table 2.** Combination of input and output variables

| Input                          | Output                              |                                                   |                                    |
|--------------------------------|-------------------------------------|---------------------------------------------------|------------------------------------|
|                                | Total Performance<br>(Comparison 1) | Development of overseas markets<br>(Comparison 2) | Export promotion<br>(Comparison 3) |
| Size of exhibition area        | Number of prospects gathered        |                                                   |                                    |
| Number of staff for exhibition | Number of qualified leads           | Number of prospects gathered                      | Number of orders                   |
| Total cost of exhibition       | Number of orders                    | Number of qualified leads                         | Contract amount                    |
|                                | Contract amount                     |                                                   |                                    |

enable more than 6,800 Korean companies to participate in 448 overseas exhibitions as of 2021 (MOTIE Press Release, 2021). As such, overseas exhibitions are an important means of pioneering overseas markets and for marketing products overseas for Korean companies. Therefore, analyzing the efficiency of exhibition performance of companies participating in overseas exhibitions through the support of the government can be an effective method for verifying the effectiveness of government exhibition support policies.

An essential factor in the analysis of exhibitor efficiency in overseas trade fairs using the DEA model is selecting the input and output variables. Thus, the study set the input and output variables necessary for efficiency analysis through literature reviews to formulate the questionnaire. In this study, the input variables of exhibitors are the size of booths, number of staff, and total cost of the exhibition (AKEI, 2017; AUMA, 2019; Fang & Ding, 2020; Kim, 2003b). The objective of support projects is to develop overseas markets and promote exports, whereas the output variables are selected accordingly. These factors are related to the exploration of overseas markets, number of prospects collected, and the number of qualified leads and export promotion variables, such as the

number of orders and contract amount (Cobanoglu & Turaeva, 2014; Hansen, 2004; Kerin & Cron, 1987; Lee & Kim, 2008; Tanner and Chonko, 1992). Moreover, DMU consists of three general characteristics, namely, sales volume, export volume, and the items of exhibitors, and is composed of three exhibiting characteristics, namely, region, frequency of participating in exhibitions, and rate of self-expenditure out of the total costs for exhibitions.

Various causes of efficiency and inefficiency can be identified because the results of efficiency analysis may vary according to the combination of input and output variables. In this study, the input variables are fixed, whereas the output variables are grouped into variables related to the development of overseas markets and export promotion to verify efficiency by group and to achieve the goals of support projects. Moreover, the study utilized the CCR model to obtain efficiency scores for each DMU and analyze differences and causes of efficiency and inefficiency, respectively. Frontier Analysis 4.4.0 is used for analysis.

## IV. Results

### A. Characteristics of the Sample

Table 3 summarizes the general characteristics of exhibitors for analysis. The table indicates that the sales of 32.6%, 29.4%, and 15.4% of the companies range from 10 million USD to less than 50 million USD, from 1 million USD to less than 5 million USD, and from 5 million USD to less than 10 million, respectively. The proportions of companies with export volumes of <5 billion USD and 10-50 billion USD are 40.3% and 33.0%, respectively. In terms of products, companies that produce consumer goods, general machinery, high-tech convergence, and electronics compose 20.8%, 19.5%, 17.6%, and 12.7% of the sample.

Table 4 summarizes the company characteristics. The proportions of companies participating in exhibitions with subsidies are 27.6%, 17.6%, and

17.2% in Europe, North America, and Asia/China, respectively. From 2015 to 2017, the proportions of companies that participated once, thrice, and never participated are 32.6%, 30.3%, and 22.2%, respectively. The proportion of companies with self-charges at more than 50% (excluding subsidies among the total cost for exhibition participation) is 79.2%.

Table 5 presents the descriptive statistics of the input and output variables. In the case of input variables, the average size of booths, number of staff, and the total cost are 17.3 m<sup>2</sup> (SD: 15.5), 3.0 people (SD: 1.8), and 21,769 USD (SD: 20,927 USD). For the output variables, the number of prospects gathered is 81.9 (SD: 83.4); the number of qualified leads is 15.8 (SD: 20.0); the number of orders is 4.1 (SD: 7.6); and the contract amount is 132,093 USD (SD: 327,812 USD). The results indicate significant gaps in the input and output variables of all exhibitors.

**Table 3.** General characteristics of exhibitors (n = 221)

|               | Subject                         | n  | (%)  |
|---------------|---------------------------------|----|------|
| Sales volume  | <1 million USD                  | 38 | 17.2 |
|               | 1-5 million USD                 | 65 | 29.4 |
|               | 5-10 million USD                | 34 | 15.4 |
|               | 10-50 million USD               | 72 | 32.6 |
|               | >50 million USD                 | 12 | 5.44 |
| Export volume | <500,000 USD                    | 89 | 40.3 |
|               | 500,000-1,000,000 USD           | 16 | 7.2  |
|               | 1,000,000-5,000,000 USD         | 73 | 33.0 |
|               | 5,000,000-10,000,000 USD        | 24 | 10.9 |
|               | >10,000,000 USD                 | 19 | 8.6  |
| Items         | Construction/Building Materials | 11 | 5.0  |
|               | High Value-added                | 10 | 4.5  |
|               | Consumer Goods                  | 46 | 20.8 |
|               | Textile/Fashion                 | 19 | 8.6  |
|               | Transportation Machinery        | 8  | 3.6  |
|               | General Machinery               | 43 | 19.5 |
|               | Electronics                     | 28 | 12.7 |
|               | ICT                             | 10 | 4.5  |
|               | High-tech Convergence           | 39 | 17.6 |
|               | Environment/Energy              | 7  | 3.2  |

**Table 4.** Characteristics of exhibition participation (n=221)

|                                                      | Subject       | n  | (%)  |
|------------------------------------------------------|---------------|----|------|
| Regions                                              | North America | 39 | 17.6 |
|                                                      | Asia          | 38 | 17.2 |
|                                                      | Europe        | 61 | 27.6 |
|                                                      | China         | 38 | 17.2 |
|                                                      | Middle East   | 35 | 15.8 |
|                                                      | CIS           | 10 | 4.5  |
| Frequency of participation in exhibitions            | 0 time        | 49 | 22.2 |
|                                                      | One time      | 72 | 32.6 |
|                                                      | Two times     | 33 | 14.9 |
|                                                      | Three times   | 67 | 30.3 |
| Rates of self-expenditure apart from the total costs | ~40%          | 14 | 6.3  |
|                                                      | 40%-50%       | 32 | 14.5 |
|                                                      | 50%-60%       | 35 | 15.8 |
|                                                      | 60%-70%       | 35 | 15.8 |
|                                                      | 70%-80%       | 50 | 22.6 |
|                                                      | 80%-90%       | 38 | 17.2 |
|                                                      | ~90%          | 17 | 7.7  |

## B. General Characteristics of Exhibitors

Exhibitors with sales of <1 million USD, from >1 million USD to <5 million USD, and from >10 million USD to <50 million USD display relatively high levels of efficiency in terms of total performance. However, exhibitors with sales of >5 billion USD and from <10 million USD to >50 million USD indicate low efficiency rates of 76.59% and 88.53%, respectively.

In terms of development of overseas markets, companies with sales of <1 million USD and from 1 billion USD to <5 million USD point to relatively high levels of efficiency. Companies with sales from >5 million USD to <10 million USD, from 50 million USD to 10 million USD, and <50 million USD comprise 72.62%, 81.34%, and 84.41%, respectively, of the sample and indicate low levels of efficiency. For efficiency in export promotion, companies with sales from >1 million USD to <5 million USD and from >10 million USD to 50 million USD are considered highly efficient.

The efficiency scores denote that 67.89%, 77.78%, and 88.53% of the companies reached sales from 5 million USD to 10 million USD and from <1 million USD to >50 million USD.

Reviewing the results of the measurement of efficiency according to sales, exhibitors with sales is >1 billion USD and <5 million USD indicate 100% efficiency in total performance, development of overseas markets, and export promotion. In contrast, exhibitors with sales from >5 million to <10 million USD and >50 million USD indicate low efficiency. In the case of exhibitors with sales from >10 billion to <50 million USD, export promotion performance is significantly higher. However, their performance in the development of overseas markets indicates relatively low levels of efficiency.

Exhibitors with sales of >10 million and <50 million USD display high levels of efficiency in export promotion but low levels of efficiency in the development of overseas markets. Moreover, exhibitors with low levels of efficiency in all analyses with sales from >5 million to 10 million USD and >50

**Table 5.** Basic statistics of the input and output variables

|        | Variables                       | Max       | Min   | Average | Standard Deviation |
|--------|---------------------------------|-----------|-------|---------|--------------------|
| Input  | Size of booth (m <sup>2</sup> ) | 108       | 7     | 17.3    | 15.3               |
|        | Number of staff                 | 14        | 1     | 3.0     | 1.8                |
|        | Total cost (USD)                | 152,555   | 3,298 | 21,769  | 20,927             |
| Output | Number of prospects gathered    | 500       | 4     | 81.9    | 83.4               |
|        | Number of qualified leads       | 150       | 0     | 15.8    | 20.0               |
|        | Number of orders                | 60        | 0     | 4.1     | 7.6                |
|        | Contract amount (USD)           | 3,000,000 | 0     | 132,093 | 327,812            |

**Table 6.** Results of analysis using the CCR model by sales volume

| Units             | Score             |                                 |                  |
|-------------------|-------------------|---------------------------------|------------------|
|                   | Total performance | Development of overseas markets | Export promotion |
| <1 million USD    | 100.0%            | 100.0%                          | 77.78%           |
| 1-5 million USD   | 100.0%            | 100.0%                          | 100.0%           |
| 5-10 million USD  | 76.59%            | 72.62%                          | 67.89%           |
| 10-50 million USD | 100.0%            | 84.41%                          | 100.0%           |
| >50 million USD   | 88.53%            | 81.34%                          | 88.53%           |

**Table 7.** Results of efficiency analysis of export volume using the CCR model

| Units                    | Score             |                                 |                  |
|--------------------------|-------------------|---------------------------------|------------------|
|                          | Total performance | Development of overseas markets | Export promotion |
| <500,000 USD             | 98.73%            | 98.73%                          | 78.24%           |
| 500,000-1,000,000 USD    | 100.0%            | 100.0%                          | 100.0%           |
| 1,000,000-5,000,000 USD  | 100.0%            | 100.0%                          | 79.66%           |
| 5,000,000-10,000,000 USD | 100.0%            | 60.63%                          | 73.72%           |
| >10,000,000 USD          | 100.0%            | 68.13%                          | 100.0%           |

million USD show slightly high levels of efficiency. Exhibitors with sales of >50 million USD show slightly high levels of efficiency in the development of overseas markets and export promotion. This finding shows that exhibitors with low and high sales are less and more likely efficient in export promotion, respectively. Furthermore, the study infers that exhibitors with more sales tend to invest relatively more in the size of the booth, number of staff, and budget than exhibitors with negligible sales. This finding suggests that exhibitors with sales ranging from >1 billion USD to <5 billion USD exhibit 100% efficiency. In comparison, exhibitors with sales ranging from <1 million to <5 million USD are less efficient compared with exhibitors with sales of >50 million USD.

In terms of export volume, Table 7 indicates that an efficiency score of 100% excludes exhibitor with sales of <5 billion USD, whereas an efficiency score of 98.73% pertains to exhibitors with sales of <5 billion USD. In other words, the difference in efficiency according to export volume is negligible. Efficiency in the development of overseas markets is relatively high (100%) for exhibitors with sales ranging from >USD 500,000 to <1,000,000 USD, >USD 1,000,000, and <5,000,000 USD. Moreover, exhibitors with sales ranging from >5,000,000 USD to <1,000,000 USD and <500,000 USD indicate low efficiency scores of 60.63%, 68.13%, and 98.73%, respectively. Exhibitors with sales of >500,000 USD and <1,000,000 USD indicate relatively high levels of efficiency at 100% in export promotion. Lastly, exhibitors with low efficiency are those with sales ranging from

>5,000,000 USD to <1,000,000 USD, <500,000 USD, and from >1,000,000 USD to <5,000,000 USD at efficiency scores of 73.72%, 78.24%, and 79.66%, respectively.

According to export volume, exhibitors with sales ranging from >500,000 USD to <1,000,000 USD are 100% efficient in terms of total performance, the development of overseas markets, and export promotion. Thus, exhibitors with sales of <500,000 USD are considered less efficient. In terms of total performance, exhibitor with sales ranging from >1,000,000 USD to <5,000,000 USD are highly efficient but relatively low efficiency. Exhibitors with sales ranging from >5,000,000 USD to <10,000,000 USD and sales of >10,000,000 USD are highly efficient in export promotion but are relatively less efficient in the development of overseas markets. Exhibitors with sales of <500,000 USD are considered less efficient in all analyses but are relatively highly efficient in the development of export promotion compared with their performance of export promotion, which is similar to exhibitors with sales ranging from >1,000,000 USD to <5,000,000 USD. Export volume is similar to sales volume, such that export promotion efficiency is low among exhibitors with less export volumes and high among exhibitors with significant export volumes.

In terms of efficiency according to total performance, the efficiency scores of companies in the ICT, high value-added, and general machinery sectors are 44.90%, 87.55%, and 90.54%, respectively. In other words, exhibitors display relatively low levels of efficiency for each item and high levels of efficiency

**Table 8.** The efficiency analysis results using CCR model by item

| Items                           | Score             |                                 |                  |
|---------------------------------|-------------------|---------------------------------|------------------|
|                                 | Total performance | Development of overseas markets | Export promotion |
| Construction/Building Materials | 100.0%            | 100.0%                          | 34.53%           |
| High Value-added                | 87.55%            | 87.55%                          | 24.46%           |
| Consumer Goods                  | 100.0%            | 100.0%                          | 70.25%           |
| Textile/Fashion                 | 100.0%            | 97.18%                          | 100.0%           |
| Transportation Machinery        | 100.0%            | 100.0%                          | 15.18%           |
| General Machinery               | 90.54%            | 90.14%                          | 65.19%           |
| Electronics                     | 100.0%            | 94.73%                          | 100.0%           |
| ICT                             | 44.90%            | 37.98%                          | 44.53%           |
| High-tech Convergence           | 100.0%            | 100.0%                          | 94.18%           |
| Environment/Energy              | 100.0%            | 100.0%                          | 43.08%           |

(100%) in total.

Companies belong to the construction/building materials, consumer goods, transportation machinery, high-tech convergence, and environment/energy sectors exhibit 100% efficiency in the development of overseas markets. Companies from other categories, such as ICT, high value-added, general machinery, electronics, and textile/fashion display low efficiency scores at 37.98%, 87.55%, 90.14%, 94.73%, and 97.18%, respectively each. Among them, ICT companies hold the lowest level of efficiency, whereas the differences among the other companies are small. Textile/fashion and electronics indicate relatively high levels of efficiency at 100% in export promotion. Other sectors, such as transportation machinery (15.18%), high value-added (24.46%), construction/building materials (34.53%), environment/energy (43.08%), ICT (44.53%), general machinery (65.19%), consumer goods (70.25%), and high-tech convergence (94.18%) indicate distinct differences per item.

Moreover, the study analyzes efficiency per items. No items achieved 100% efficiency in total performance, the development of overseas markets, and export promotion. Companies in the high value-added, general machinery, and ICT sectors exhibited low levels of efficiency for all items measured. Among items with 100% efficiency in total performance, companies in the construction/building materials,

consumer goods, transportation machinery, high-tech convergence, and environment/energy sectors display 100% efficiency in the development of overseas markets but low levels of efficiency in export promotion. The textile/fashion and electronics industries indicated 100% efficiency in export promotion. This result indicates that performance in the development of overseas markets is similar to performance in them. However, the difference in export promotion per item is notable. For example, the textile/fashion industry is keen to initiate trends, which may last from six months to one year. Therefore, the life cycle of products in this industry is short, which requires short-term contracts. In contrast, the transportation machinery industry is representative of the shipbuilding sector, which indicates complicated deliveries. Therefore, several sessions of consultation and adjustment are required regarding the equipment to use in line with the basic design. As such, this process is time-intensive as transactions are only considered completed according to the time required to manufacture a product. The study acknowledges that such a difference is a limitation of the study due to the differences in the number of companies per industry, which may be less than 10 for others. Thus, the results may not be generalizable to all sectors.

### C. Exhibitor Characteristics and Characteristics of Exhibition Participation

When analyzing exhibitor performance by region, the results indicate show that all companies from various regions except for Asia display 100% efficiency. However, the difference between these regions and Asia (97.67%) is small. For performance in the development of overseas markets, only exhibitors in the Middle East achieved 100% efficiency in contrast to those in North America (63.97%), China (69.74%), CIS (72.55%), Europe (84.94%), and Asia (97.67%). In terms of export promotion, all efficiency scores reach 100% except for Asia (37.44%).

In terms of efficiency by region, exhibitors from the Middle East display 100% efficiency in terms of total performance, development of overseas market, and export promotion, whereas Asia shows the lowest level of efficiency. Other regions exhibit 100% efficiency in performance in terms of participation and export promotion, which indicates distinct differences per region in efficiency in the development of overseas markets. This finding suggests that, in contrast to the analysis results for efficiency per item, efficiency

in export promotion is similar across regions but shows a big gap in terms of the development of overseas markets.

In terms of efficiency of exhibitions in total performance and the development of overseas markets, the efficiency scores are 100%. Specifically, export promotion indicates 100% efficiency when companies participate three times, whereas participating once and twice lead to 42.07% and 55.69% efficiency.

Reviewing efficiency according to the frequency of participating in exhibitions, a frequency of three indicates 100% efficiency in terms of total participation, the development of overseas markets, and export promotion. In contrast, other companies exhibited low levels of efficiency in export promotion than those for the development of overseas markets. That is, the number of participants in a fair does not significantly impact efficiency in the development of overseas markets. However, attendance influences efficiency in terms of export promotion. Moreover, the time elapsed between contract signing and gaining sales from potential customers met in exhibitions may take approximately two years (Tanner & Chonko, 1992). In other words, exhibitors who participated

**Table 9.** Results of efficiency analysis of export region using the CCR model

| Regions       | Score             |                                 |                  |
|---------------|-------------------|---------------------------------|------------------|
|               | Total performance | Development of overseas markets | Export promotion |
| North America | 100.0%            | 63.97%                          | 100.0%           |
| Asia          | 97.67 %           | 97.67%                          | 37.44%           |
| Europe        | 100.0%            | 84.94%                          | 100.0%           |
| China         | 100.0%            | 69.74%                          | 100.0%           |
| Middle East   | 100.0%            | 100.0%                          | 100.0%           |
| CIS           | 100.0%            | 72.55%                          | 100.0%           |

**Table 10.** Results of efficiency analysis of frequency of participating in exhibitions using the CCR model

| Frequency | Score             |                                 |                  |
|-----------|-------------------|---------------------------------|------------------|
|           | Total performance | Development of overseas markets | Export promotion |
| Once      | 100.0%            | 100.0%                          | 42.07%           |
| Twice     | 100.0%            | 100.0%                          | 55.69%           |
| Thrice    | 100.0%            | 100.0%                          | 100.0%           |

**Table 11.** Results of efficiency analysis of the ratio of self-expenditure to total costs for exhibitions using the CCR model

| Units   | Score             |                                 |                  |
|---------|-------------------|---------------------------------|------------------|
|         | Total performance | Development of overseas markets | Export promotion |
| <40%    | 100.0%            | 100.0%                          | 44.99%           |
| 40%-50% | 100.0%            | 100.0%                          | 64.74%           |
| 50%-60% | 100.0%            | 100.0%                          | 56.92%           |
| 60%-70% | 100.0%            | 99.85%                          | 100.0%           |
| 70%-80% | 100.0%            | 100.0%                          | 100.0%           |
| 80%-90% | 87.19%            | 75.77%                          | 87.19%           |
| >90%    | 76.47%            | 76.47%                          | 46.41%           |

in exhibitions for more than three times may maximize efficiency in terms of export promotion.

Furthermore, the study analyzes efficiency in terms of total performance according to the ratio of self-expenditure to total costs for the exhibition. All efficiency scores reached 100%, except for ratios of over 90% (76.47%) and >80% to <90% (87.19%). Performance in terms of the development of overseas markets indicates 100% efficiency, except for ratios of >90% (76.47%), >80% to <90% (75.77%), and >60% to <70% (99.85%). Performance in export promotion shows 100% efficiency for ratios of >60% to <70%, >70%, and <80%. The level of efficiency in export promotion is low for ratios of <40% (44.99%), >90% (46.41%), >50% to <60% (56.92%), >40% to <50% (64.74%), and >80% and <90% (87.19%).

Analysis of efficiency according to the ratio of self-expenditure to total costs of exhibitions, total performance displays 100% efficiency, whereas the development of overseas markets and export promotion reached >70% and <80% efficiency, respectively. Units that show low efficiency in all units are more than 80% and less than 90%, over 90%. In addition, the ratios that display nearly no difference in efficiency in terms of the development of overseas markets (99.85%) are >60% and <70%. This finding implies that exhibitors with ratios of self-expenditure to total costs of >60% and <80% are highly efficient in achieving the objectives of support policies.

Other ratios indicate 100% efficiency in total

performance and development of overseas markets, excluding ratios of >60% and <70%. This finding indicates a difference in the efficiency of export promotion in terms of the self-expenditure to total cost ratio, that is, efficiency decreases at self-expenditure ratios of <60% and >90%. The subsequent text explains the following reasons that underlie these results.

First, the budget for the exhibition is extremely small or exceeds a certain level, which leads to low levels of efficiency in performance. Second, a high rate of self-expenditure indicates that exhibitors invest in area size, staff, and cost over certain levels if sales volume or export volume is high. However, exhibitors display low levels of performance when participating in fairs held at markets that lack development initiated by exhibitors. Lastly, exhibitors participate in exhibitions for objectives other than promoting export, which leads to low levels of efficiency. As the study considered only the objectives of support policies and not those of exhibitors, the last finding indicates that the government provided support to the inappropriate exhibitors.

Other reasons may be possible for 100% efficiency in the development of overseas markets for exhibitors with low self-expenditure rates versus those with rates of >80%. In summary, the study proposes that the difference in self-expenditure rate alone does not influence the efficiency in the development of overseas markets. However, other findings suggest that exhibitors with low self-expenditure rates achieve

low sales or export volume or lack experience in exhibition, whereas exhibitors with high self-expenditure rates exhibit a distinct tendency of them. Exhibitors with low self-expenditure rates may not provide accurate measurement of efficiency in the development of overseas markets and responses. However, exhibitor with high rates of self-expenditure may provide accurate measurement of performance in terms of the development of overseas markets and responses.

## V. Conclusion and Implications

This study analyzed the efficiency of groups of companies that benefited from the overseas exhibition participation support policies of the government using the CCR output-oriented DEA model. It intended to provide references for exhibitors and to support policymakers in making decisions by identifying factors among units that influence the efficiency of performance in overseas exhibition. The study prepared and distributed a questionnaire that aimed to identify input (size of booth, number of staff, and total cost) and output (number of prospects gathered, number of qualified leads, number of orders, and contract amount) for empirical analysis. A total of 221 companies were classified according to general characteristics and the characteristics of exhibition participation. Analysis was conducted using Frontier Analysis 4.4.0. Based on the results, the study draws the following conclusions.

First, little difference existed in overall efficiency according to the general characteristics of exhibitors in overseas trade fairs and participation in exhibitions. Many units displayed high levels of performance in terms of the development overseas markets through various characteristics. In contrast, others depicted low levels of performance in terms of export promotion. Furthermore, DEA is capable of analyzing the relative efficiency of a target. Thus, the current study demonstrated differences in the efficiency of total performance according to units have not been

evident.

Second, the results indicated that the efficiency of exhibitors varies by sales volume, export volume, and region in terms of the development of overseas markets. Moreover, analysis of efficiency in the development of overseas markets indicated that exhibitors with high sales and export volumes displayed less efficiency. This finding suggested that exhibitors with high sales and export volumes may have participated in exhibitions for objectives other than the development of overseas markets. In addition, the clear difference in efficiency by exhibitors per region in terms of developing overseas markets can be interpreted that performance in developing overseas markets differs significantly across regions.

Third, the findings pointed to differences in efficiency according to export promotion by sales volume, export volume, and general characteristics of exhibitors, export promotion in terms of frequency of participating in exhibitions, and the ratio of self-expenditure to total costs for an exhibition.

Contrary to efficiency in terms of the development of overseas markets, exhibitors with high sales and export volumes displayed higher levels of efficiency in export promotion. In addition, efficiency according to items indicated similar performances for the development of overseas markets but different performances in export promotion.

In terms of frequency of participating in exhibitions, exhibitors with a frequency of three displayed high levels of efficiency in export promotion. However, this efficiency may only be improved if they participated in one exhibition for more than three times. Moreover, this factor clearly showed differences in the efficiency for export promotion for self-expenditure to total cost ratios of <60% and >80%. In other words, exhibitors with self-charge ratios of >60% and <80% displayed high levels of efficiency to achieve the objectives of the support policies. Moreover, exhibitors with ratios of >60% and <80% displayed high levels of efficiency, which indicates that the government will efficiently achieve the objectives of its support policies when it subsidizes approximately 40% of the total cost of the participating

companies.

The study elucidated the differences in the efficiency of performance for the development of overseas markets and export promotion according to the general characteristics of the companies that benefited from the overseas exhibition support policies of the government and the characteristics of exhibition participation. Identifying the causes of such inefficient exhibition performance and differences in efficiency between groups can be used as reference for the formulation of strategic plans for support policies.

### A. Theoretical and Practical Implications

This study is of great academic significance because it used DEA to investigate the efficiency of performance according to the characteristics of exhibitors. Many researchers have examined exhibitor performance. However, the majority of them analyzed performance determinants (e.g., Hansen, 2004; Seringhaus & Rosson, 1998; Tafesse, 2014; Tafesse & Korneliussen, 2011; Yoon, Lim & Park, 2012). Thus, the research on the measurement and analysis of exhibitor performance in terms of efficiency according to their various investments for exhibitions. Therefore, the study is of great academic significance because it defines the factors for input and output of exhibitor characteristics, measures efficiency accordingly, and analyzes differences to determine the causes of inefficiency as follows:

1. For total performance, exhibitors displayed poor performance either in the development of overseas markets or export promotion or both.
2. In terms of the development of overseas markets, exhibitors displayed high sales and export volumes and frequent participation in specific regional exhibitions.
3. According to promotion performance, exhibitors exhibited low sales and export volumes, specific items, low and high ratios of self-expenditure to total costs for exhibition, and low frequencies in participating in one exhibition.

Many companies participate in overseas exhibitions through the support policies of the government. However, the effectiveness of such policies lacks investigation. Therefore, this study presented the following grounds that are considered necessary for decision-making by exhibitors and policymakers by analyzing performance efficiency between groups of companies participating in overseas exhibitions with government subsidy. First, from the perspective of exhibitors, setting appropriate targets for exhibitions according to sales, exports, items, and regions is necessary. Moreover, the study confirmed that participation in one exhibition for at least three times and a certain level of self-investment is required to obtain efficiency in export promotion. Second, providing additional support is possible for policymakers if customized policies are set based on the characteristics of companies. In addition, the study confirmed that at least three years of support should be provided to enable companies to participate in one exhibition as doing so will increase their efficiency in export promotion. Lastly, the amount of the support fund should be approximately 40% of the total costs for the exhibition.

### B. Limitation and future research

This study has its limitations in the data collection and survey target. By complementing these limitations, future studies can offer academic and practical development in efficiency through detailed investigations. Future studies should compensate for the current study as follows.

First, the results of inter-unit analysis cannot represent other units because only data from a few subjects were collected and analyzed. Therefore, subsequent studies analyze this aspect using the overall data of beneficiaries if possible. In this manner, the results will ensure representativeness of the unit. Second, the study analyzed the input and output variables for one year, which limits the view of the study in terms of changes in efficiency over time. Given that generating sales after participating in

exhibitions may occur after two years, a follow-up study can be a meaningful study to confirm the actual efficiency of exhibitor performance. Third, this study analyzed the quantitative results for the development of overseas markets and export promotion based on the overseas exhibition support policies of the government only to meet the research objectives.

Further implications could be provided by analyzing the causes of inefficiency among the input and output variables of exhibitors. Fourth, the study employed fixed input variables, whereas the output variables were combined into three units to analyze participation and efficiency. In this regard, analysis may lead to different results depending on the combination of input and output variables. Thus, future studies should analyze various combinations of input and output variables to identify the causes of efficiencies and inefficiencies.

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