

# Effects of AEO-MRA on the Performance of Exporters and Importers in Korea\*

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## Abstract

**Purpose** – This study analyzes the effect of the authorized economic operator–mutual recognition arrangement (AEO–MRA) on the performance of Korean exporters and importers. The effect of the import–export companies’ characteristics, such as annual sales, the number of foreign markets, and overseas experience, on the AEO–MRA is deduced; the relationship between this effect and firm performance is analyzed.

**Design/methodology** – An empirical research model was constructed and analyzed using structural equation modeling. The effect of AEO–MRA on logistics and operational performance was derived from the aforementioned characteristics as leading factors of the AEO–MRA. The regulatory influence of cooperation with logistics companies was analyzed in the AEO–MRA effect on logistics performance. Thus, 172 valid samples were obtained from import–export companies certified by the AEO–MRA.

**Findings** – Among the aforementioned characteristics, only “annual sales” has a positive effect on the AEO–MRA, whose effect enhances logistics and operational performances. The AEO–MRA effect did not directly affect operational performance. Owing to the adjustment effect analysis, the AEO–MRA effect and logistics performance relationship is strengthened if the cooperative relationship with the logistics company is higher than a certain level. If this cooperation falls below a certain level, the AEO–MRA effect on logistics performance reduces. Thus, logistics cooperation is an important factor in the AEO–MRA effect and logistics performance relationship.

**Originality/value** – Hinging on the resource-based theory and relational viewpoint, an empirical model that explains the relationship between the AEO–MRA effect and firm performance is established.

**Keywords:** AEO-MRA, Export and Import Companies, Logistics Cooperation, Logistics Performance, Operational Performance

**JEL Classifications:** F13, F14, L98

## 1. Introduction

It is difficult to simultaneously achieve the purpose of trade facilitation while strengthening the security of trade through the customs clearance system. Tightening procedures for import–export customs to secure trade safety would lead to an excessive use of time and manpower, delayed trade, and reduced trade activity. Simplifying these customs procedures would ease trade facilitation by speeding up import–export logistics. However, goods that impede social safety could potentially enter the market. Particularly, logistics security

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measures after the 9/11 terror attacks in the United States has brought about a delay in customs clearance and it has emerged as a new non-tariff barrier to international trade. Consequently, an authorized economic operator (AEO) system was introduced to harmonize the conflicting objectives of trade facilitation (Kim Chang-Bong, Chun Hong-Uk and Kwon Seung-Ha, 2016).

The AEO system was introduced to strengthen logistics security after 9/11. After its acceptance by the World Customs Organization (WCO), it spread worldwide. The WCO's adoption of the WCO SAFE Framework as an international standard for trade safety and facilitation recognizes the practical impossibility of strengthening the inspection of all import and export cargo. However, the AEO system strengthens the cooperation between customs authorities and private sectors for improving logistics security and promoting trade facilitation.

The United States consequently established the Customs–Trade Partnership against Terrorism (C-TPAT) system, while the European Union established an EU AEO system. The AEO system is built to prevent the import of goods that could threaten public health or social safety; it has diverse benefits for customs clearance procedures, such as expedited customs clearance and exemption of customs inspection for companies certified as an AEO (Diop et al., 2007; Furia et al., 2011). There are many benefits to becoming an AEO-certified company in Korea, the United States, and the European Union. First, Korea is institutionalizing its preferences in the customs procedure; according to an AEO company's rating, it omits inspection by each category or reduces the amount supported by customs (Korea AEO Association, n.d.). The United States also provides benefits to C-TPAT-participating companies in the certification stages. In the final stage, the customs clearance of import cargo and the guarantee of expedited cargo handling are provided (US Customs and Border Protection, n.d.).

The European Union also allows AEO-certified companies to simplify customs clearance procedures; it exempts them from physical inspection and document-based controls, allows preferential treatment for customs control procedures, and permits requests for processing at a specific location (Taxation and Customs Union, n.d.).

In the future, the World Trade Organization (WTO) will protect the global trade order via multilateral or regional trade agreements. Free trade, rather than trade protectionism, will reign as the universal value in the era of global economics. Moreover, the WTO Trade Facilitation Agreement (Free Trade Agreement or FTA) was enacted in 2017. It included streamlining customs clearance procedures and mandatory adoption of the AEO system by WTO members. It is thus important to develop and expand the AEO system to achieve greater supply chain safety and trade facilitation.

Nevertheless, the AEO system is limited to domestic customs clearance. Companies find it inconvenient to receive AEO certification separately for each exporting country. The authorized economic operator–mutual recognition arrangement (AEO–MRA) overcomes this limitation.

In other words, when an AEO–MRA is certified as an AEO in Korea, it can guarantee rapid customs clearance by a country's domestic customs for exports to a country where the MRA concludes. Therefore, countries globally have been promoting the AEO–MRA with major trading partners, so that their AEO companies are acknowledged as such in the exporting countries, and are thus able to receive customs benefits, such as omission of inspection of goods from customs authorities of other countries and overcoming non-tariff customs barriers.

The ultimate achievement of the AEO system is maximized by the AEO–MRA. However, it is necessary to examine the effects of the AEO–MRA. Despite the need for systematic research, such approaches are limited.

In most studies, the AEO–MRA system is described and the activation plan thereof proposed through literature review (Choi Jun-Ho, 2013; Ha Eui-Hyun, 2013; Kyung Yun-

Bum and Lee Il-Jae, 2013; La Kong-Woo and Kim Hee-Cheol, 2014). More recently, the AEO-MRA effect was analyzed using secondary data on trade facilitation and trade volume increase (Kim Chang-Bong, Yo Kyong-Chol and Park Sang-An, 2017; Shin Dae-Chul and Kwon Young-Min, 2015). Therefore, scant research estimates the effect of the AEO-MRA using field surveys and considering actual firm status.

We thus address a gap in the extant literature. We construct and verify a structural equation model based on Korea's AEO-MRA effect to substantiate its resource based theory and provide an empirical foundation. Finally, we offer policy implications based on our results.

## 2. Theoretical Background

### 2.1. Resource-Based Theory and the AEO-MRA

In the 1980s, a number of studies based on the industrial organization theory,—part of mainstream strategic management research,—focused on the environmental effect on the analysis of corporate competitiveness. These studies compared this effect with specific resources or capabilities accumulated within an enterprise.

The resource-based theory (RBT) focuses on the achievement of a company's sustainable competitive advantage through the role of intangible resources embedded in the firm (Carmeli, 2004; Clulow, 2007; Hall, 1992). It is one of the major theories that explain corporate competitiveness. Recently, it has begun to attract more attention because the industrial structures of our industries are being rapidly incorporated into a knowledge-based society. The creation of future competitive value is no longer limited to the role of resource types. Intangible resources are characterized by the heterogeneity and immobility of corporate resources, which allows firms to gain a distinct advantage in the competitive sector. Thus, focusing on the RBT and intangible resources provides useful perspectives in explaining competitive advantage.

We thus investigate the effect of import-export companies' characteristics, such as annual sales, number of foreign markets, and overseas experience, on the AEO-MRA effect. These characteristics, which represent the size of the company and international experience, are inimitable as they are unique capabilities or internal resources. Therefore, considering RBT, the AEO-MRA effect is expected to be further enhanced when the characteristics of these import-export companies are at a higher level.

### 2.2. Relational Perspective

According to Dyer and Singh (1998), who laid the foundation for organizational competitive advantage using a relational perspective, inter-organizational cooperation is a useful strategy for acquiring competitive advantage. This increases the relationship between the organization and organizational partnerships (Perry, 1989) if organizational assets are accumulated, such as increasing the duration of inter-organizational relationships and increasing inter-organizational transactions. Indeed, Dyer (1996) reported a positive relationship between investment-specific relationships and firm performance in an empirical study of vehicle manufacturers and suppliers.

In the relationship perspective, when mutual cooperation between firms is promoted, mutual trust and commitment occur. These not only improve firm performance, but also positively affect relationship quality as a social capital (Cullen et al., 2000). Relationship quality is a major resource for achieving competitive advantage as a strategic resource. This social capital enables companies to collect useful information more efficiently than their competitors can; it improves economic benefits by reducing transaction costs (Adler and Kwon, 2002).

## 2.3. Hypotheses Development

### 2.3.1. Characteristics of Import–Export Companies and the AEO–MRA Effect

The effects of AEO–MRA are expected to be better than those of small firms because the larger the size of a company, the more resources it has accumulated, and the greater its capacity to utilize them. Furia et al. (2010) reported that satisfaction with the US AEO–MRA effect was greater for larger firms. We thus expect the AEO–MRA effect to have a positive (+) effect on the annual sales of import–export companies, number of foreign markets, and overseas experience.

*H1: Characteristics of import–export companies will exhibit positive causality with the AEO–MRA effect.*

*H1-1: The AEO–MRA effect will increase with higher annual sales of import–export companies.*

*H1-2: The AEO–MRA effect will increase as the number of import–export companies to foreign countries increases.*

*H1-3: The AEO–MRA effect will increase as import–export companies move into the overseas market.*

### 2.3.2. The AEO–MRA Effect and Logistics Performance

The AEO–MRA shortens the inspection time by omitting or reducing the inspection of goods in a foreign market for certified companies. There are fewer documents required for customs clearance, as well as mandatory procedures for identification of government periods or organizations other than customs offices. This ultimately leads to better logistics performance owing to shorter customs clearance time. For example, Diop et al. (2007) and Furia et al. (2010) assert that C–TPAT accreditation reduces customs inspection times and rates. They also asserted that the AEO–MRA effect saves cost. Thus,

*H2: The AEO–MRA effect will have a positive effect on the logistics performance of the import–export companies.*

### 2.3.3. Logistics Performance and Operational Performance

In the context of the AEO's development, strengthening logistics security interferes with rapid flow of logistics between countries; logistics security itself often functions as a non-tariff barrier. Here, AEO–MRA-certified companies are able to deliver cargo in a timely manner by shortening the time required for cargo handling. This results in improved visibility of cargo and efficient logistics flow (Bruce et al., 2004; Qrunfleh and Tarafdar, 2013).

This process not only allows cargo safety and speed, but reduces various costs, such as operating costs (Thun and Hoenig, 2011), thereby satisfying customers. Thus, logistics performance is expected to increase the operational performance of an enterprise in the market.

*H3: The greater the logistics performance, the greater the operational performance of the import–export companies.*

### 2.3.4. The AEO–MRA and Operational Performance

As the AEO–MRA improves cargo visibility and safety by solving the constraints that may arise from import customs clearance, it is necessary for importers to select foreign partners in the importing country; the preference for AEO- or AEO–MRA-certified companies is consequently rising (Kim Chang-Bong and Roh Suk-Hwan, 2017). In the global market,

importers and others consider importing countries' AEO certification important. This implies that the AEO-MRA can directly affect an import-export company's performance. It reduces or exempts companies from numerous documentation and examination procedures, which, in turn, leads to reduced operating costs. Thus,

*H4: The AEO-MRA will directly affect the performance of import-export companies.*

### 2.3.5. Moderating Effect of Logistics Cooperation

AEO-MRA certification can improve logistics performance by shortening customs clearance times abroad and streamlining related procedures. However, cooperation with local logistics companies is expected to further strengthen the relationship of influence between AEO-MRA effects and logistics performance. Through these local logistics cooperative relationships, it is possible to overcome constraints that may arise during customs clearance and in other logistics. As the cooperative relationship continues, the learning effects that maximize efficiency also multiply (Das and Kumar, 2007). Therefore, logistics cooperation will positively affect the visibility of logistics performance by the AEO-MRA.

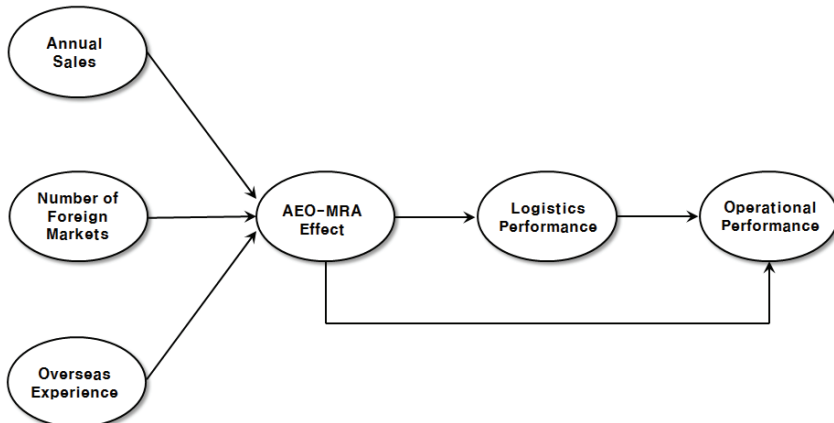
*H5: Logistics cooperation will play a moderating role on the relationship of influence between AEO-MRA effects and logistics performance.*

## 3. Methodology

### 3.1. Study Model

We first break down this study into three parts. First, as shown in Fig. 1, we analyze the effect of the import-export companies' characteristics on the AEO-MRA effect. Then, we deduce the AEO-MRA effect on logistics and operational performance. If this effect is clear, important implications for the use of the AEO-MRA will be derived. Lastly, we find the controlling role of cooperation with logistics companies between the effects of AEO-MRA and logistics performance. Analysis of these modulatory effects would provide a new perspective to maximize the effects of AEO-MRA. Fig. 1 is a conceptual model that reflects these views comprehensively.

**Fig. 1.** Study Model



## 3.2. Measure Development

### 3.2.1. Features of Import–Export Companies

We examine the features of import–export companies via the annual sales of exporters and importers, number of foreign markets, and overseas experience: that is to say, the period of overseas market entry. Since this information can be a sensitive issue for individual companies, its direct entry is likely to cause inconveniences, such as incorrect answers or exaggeration. Therefore, rather than writing the question directly, a method of checking a corresponding section by setting a certain range was adopted. The specific contents are as follows.

First, the annual sales are 1) less than 5 billion won, 2) between 5 to 50 billion won, 3) between 50–100 billion won, 4) between 100–200 billion won, 5) between 200–300 billion won, 6) between 300–500 billion won, or 7) 500 billion won or more.

The number of foreign markets are 1) fewer than three countries, 2) fewer than 10 countries, 3) between 10–15 countries, 4) between 15–20 countries, 5) between 20–30 countries, 7) between 30–40 countries, or 7) more than 40 countries.

The overseas experience is 1) less than three years, 2) between 3–10 years, 3) between 10–15 years, 4) between 15–20 years, 5) between 20–30 years, 6) between 30–50 years, or 7) more than 50 years.

### 3.2.2. The AEO–MRA Effect

We define the AEO–MRA as “the benefit of collectively referring to the simplification of customs clearance, shortening of the customs clearance time, and the cost savings through the AEO–MRA.”

We modified items from Diop et al. (2007) and Furia et al. (2010/ 2011) to fit this study, resulting in nine items: 1) benefit from exemption of inspection or reduction of inspection rate from abroad, 2) benefit from overseas inspection, 3) reduces waiting time and preparation time, 4) reduces AEO–MRA customs clearance documents, 5) reduces the time and procedures required for confirmation of other organizations by the AEO–MRA, 6) designates a customs contact point to solve difficulties during the customs clearance stage with the AEO–MRA, 7) site inspection with the AEO–MRA, 8) the AEO–MRA to review the requirements of foreign customs and mitigate FTA validation, and 9) reduces AEO accreditation and maintenance costs in other countries.

We use a seven-point Likert scale for measurement. (1 = not at all, 4 = normal, 7 = very much).

### 3.2.3. Logistics Cooperation

We define logistics cooperation as “the establishment of a mutual dependence relationship with logistics companies and the sharing of profit and burdens through long-term transaction relationship.”

We modified items from Ganesan (1994), Miguel et al. (2011) and Metzger et al. (2000) to fit this study, resulting in three items: 1) establishing a strong partnership with logistics companies, 2) actively accepting requests from logistics companies, and 3) maintaining long-term business relationships with logistics companies. We use a seven-point Likert scale for measurement (1 = not at all, 4 = moderate, 7 = very much).

### 3.2.4. Logistics Performance

We define logistics performance as the “improvement of logistics competitiveness through the efficiency and effectiveness of logistics.”

We modified items from Qrunfleh and Tarafdar (2013) and Bruce et al. (2004) to fit this study, resulting in four items: 1) improvement of predictability, such as shortening of lead time, 2) shortening of transportation time and timely delivery of cargo, 3) effect of preventing cargo theft, and 4) securing efficient flow of clearance. We use a seven-point Likert scale for measurement (1 = not at all, 4 = normal, 7 = very much).

### 3.2.5. Operational Performance

We define operational performance as “market performance achieved by operating AEO–MRA.”

We modified items from Blos et al. (2009), Giannakis and Louis (2011), and Thun and Hoenig (2011) to fit this study, resulting in four items: 1) increase in new transactions, 2) improvement in safety of cargo management in the supply chain, 3) reduction of various costs, such as operating costs, and (4) improvement of business relations with government agencies. We use a seven-point Likert scale for measurement (1 = not at all, 4 = normal, 7 = very much).

## 4. Research Method

### 4.1. Pilot Study

We aim to identify the leading factors of the AEO–MRA and the effect of operating it. Prior to conducting this survey, we conducted a preliminary survey to establish the study scale. The target includes 15 domestic import–export companies certified by the AEO in Seoul. Contact information and related materials were obtained from the list of AEO-certified companies on the website of the Korea AEO Promotion Association. As of January 1, 2017, 810 companies, including import–export companies and customs and logistics companies, have been certified by the AEO, except those who refuse to disclose AEO certification. We visited or telephoned relevant companies to explain the purpose of the study, and asked whether there were any inferior or uncertain questions in order to remove these items.

Through these processes, we checked the questionnaire for issues with content and constitutional validity. In the final survey, companies that underwent pilot testing were excluded.

### 4.2. Data Collection and Sampling

We revised and supplemented the contents of the pilot study, and furnished the final questionnaire. The completed questionnaire was sent to relevant companies with the help of the Korea AEO Promotion Association. This association conducts preliminary screening and document review for AEO officers. It manages AEO companies as a specialized agency for AEO-certified companies. The list of import–export companies obtained lists of companies with names, addresses, departments, and persons in charge. We collected the questionnaires through investigators and by e-mail. The data collection period was nearly five months: from April 3, 2017 to August 25, 2017. During this period, we distributed 700 questionnaires, of which we recovered 250 (recovery rate: 35.7%). We excluded inadequately or inaccurately answered questionnaires, resulting in 172 valid samples. These are import–export and related companies that benefit from the AEO–MRA.

### 4.3. Common Method Bias Test

We performed procedural means and statistical diagnosis together to avoid the common method bias that may occur in a questionnaire by the same respondent (Chang et al., 2010).

First, we attempted to prevent unnatural or arbitrary distortion in responses by emphasizing that anonymity was guaranteed to survey respondents procedurally, and that there was no correct answer expected from the questionnaire.

We examined the statistical diagnosis of the retrieved questionnaire using Harman's single factor test (Podsakoff et al., 2003). In general, if errors of the common method are severe, only one factor with an eigenvalue of one or more is derived from factor analysis performed on all variables. Even if several factors are derived, the explanatory power is concentrated on a certain factor (Harman, 1976). To examine the possibility of the same method bias in this viewpoint, we conducted a factor analysis of all factors. We found four factors to have eigenvalues of one or more, and only the explanatory power accounts for 40.342% of the total variance. Therefore, we can safely conclude that all the measured variables do not converge to one factor, indicating no issues of the same method bias (Harman, 1976; Podsakoff et al., 2003; Sharma et al., 2018).

#### 4.4. Analysis Tools

We used the SPSS 21.0 statistical package for basic data and reliability analysis, and a structural equation model for confirmatory factor analysis and hypothesis testing in two stages. First, we evaluated the measurement model, and then the structural model (Anderson and Gerbing, 1988).

While the control effect analysis includes numerous methods, we used the Process Macro (Hayes, 2013), which is popular for the moderating effect analysis. In the Process Macro, it is possible to complement the disadvantages of the existing Sobel test for verification of the moderating effect; it provides a stricter statistical value and verifies various types of mediated effects. This method has been increasingly used by scholars in recent years.

## 5. Results

### 5.1. Sample Characteristics

To verify the proposed theoretical model, we collected questionnaires from import-export companies with AEO-MRA certification. The type of company with the largest number was exporters, and respondents had highest annual sales of less than 5–50 billion won. The number of countries that have entered the foreign market was highest among 3–10 countries, and the highest rate of overseas experience (period of overseas market entry) was less than 3–10 years. See Table 1 for specific details.

**Table 1.** Sample Characteristics

Criteria	Frequency ( $n=172$ )	Percentage
<i>Type of firms</i>		
Exporter	57	25.4
Importer	31	13.8
Certified customs broker	35	15.6
Freight forwarder	43	19.2
Etc.	53	24.2
<i>Annual sales (₩)</i>		
Less than 5 billion	46	26.7
5 billion to 50 billion	50	29.1
50 billion to 100 billion	39	22.7
More than 100 billion	32	14.6



**Table 1.** (Continued)

Criteria	Frequency ( <i>n</i> =172)	Percentage
<i>Number of foreign markets</i>		
Fewer than 3	46	26.7
3 to 10	66	38.4
More than 10	33	15.1
<i>Overseas experience</i>		
Less than 3 years	36	20.9
3 to 10 years	45	26.2
10 to 15 years	27	15.7
More than 15 years	35	16.0

## 5.2. Assessment of the Measurement Model

We verified the validity of the measurement model using confirmatory factor analysis. First, we removed the variables that significantly reduced the suitability of the model by evaluating the measurement model. Two items of the AEO-MRA effect, Cuet 6 and Cuet 7, were removed, and Lperf 4 was removed from the logistic performance. Then, the fitness of the estimated model,  $\chi^2$  was found to be 224.317 (d.f. = 108,  $p = .000$ ), CFI = .968, TLI = .959, and RMSEA = .079. The model is acceptable because it can accommodate the fitness of the model.

To assess convergent validity, we first calculated the factor loadings of each measurement variable to evaluate whether or not these values exceeded the general reference value of 0.5 and if they were significant (Hair et al., 2006). In other words, if the value exceeded 0.5, the significance becomes the basis of establishing the central validity. To confirm convergence validity, we calculated the composite reliability (C.R: Construct Reliability  $\geq 0.7$ ) and the AVE (Average Variance Extracted  $\geq 0.5$ ). These values were found to be above the reference value (Fornell and Larcker, 1981).

As shown in Table 2, we confirmed that the standardization load of all variables was 0.518–0.997, and statistically significant. These results suggest that the intuitive validity of these measures is well established, but complementarily, we also examined the value of C.R and AVE.

The C.R value was in the range of 0.795–0.980, while the AVE value was in the range of 0.502–0.854. These results suggest that the intensive validity of this study scale is well established.

We then obtained the Cronbach's alpha value to verify the internal consistency of each construct. There is no clear criterion for the Cronbach's alpha coefficient to test the internal consistency of an item, but Nunnally (1978) generally suggested 0.7 as the empirical standard. The Cronbach's alpha coefficients of these study unit measures are all within the range of 0.795–0.980, indicating high internal consistency of the scale.

After confirming the reliability of the scale and the establishment of intensified validity, we proceeded to verify the validity of discrimination using Fornell and Lacker's (1981) method ( $\sqrt{AVE} > \phi$ ), which is considered to be the most rigorous. Since the annual sales, number of foreign markets, and overseas experience were measured as a single item, the AVE value was not obtained, but the correlation with other variables was estimated.

As shown in the correlation matrix in Table 3, annual sales are highly significant in terms of positive (+) direction, and can be considered important variables. Thus, annual turnover is also positively affected as the number of overseas markets increases and the overseas experience becomes greater. On the other hand, the number of countries that have entered

overseas markets and the period of overseas experience are not correlated with other variables. The relationship between AEO-MRA effect, logistics cooperation, logistics performance, and operational performance, which can calculate the AVE value,  $\sqrt{AVE} > 0$  is well established. For example, logistics cooperation  $\sqrt{AVE}$  operational performance have the largest correlation coefficient at 0.548. On the other hand, logistics cooperation  $\sqrt{AVE}$  is 0.863 and operational performance  $\sqrt{AVE}$  is 0.708, and these values are larger than the correlation value of the two factors, 0.548.

Thus, the validity of discrimination of this study unit is strictly established. The results of this study are as follows. First, the reliability of the scale is high, and intensive and discriminant validities are well established. Therefore, we proceeded to the hypothesis testing procedure.

**Table 2.** Confirmatory Factor Analysis

Construct	Attributes	Standardized value	T-value	Cronbach's $\alpha$	C.R.	AVE
AEO-MRA Effect	Cuet 1	.991***	-	.980	.979	.854
	Cuet 2	.997***	82.900			
	Cuet 3	.962***	41.269			
	Cuet 4	.905***	27.201			
	Cuet 5	.873***	22.696			
	Cuet 8	.892***	24.847			
	Cuet 9	.902***	26.639			
Logistic Cooperation	Lcn 1	.934***	-	.910	.897	.745
	Lcn 2	.799***	18.492			
	Lcn 3	.851***	14.316			
Logistic Performance	Lperf 1	.921***	-	.933	.936	.829
	Lperf 2	.957**	22.857			
	Lperf 3	.851***	17.157			
Operational Performance	Operf 1	.518***	-	.795	.797	.502
	Operf 2	.733***	6.532			
	Operf 3	.732***	6.483			
	Operf 4	.817***	6.816			

Note: \*\*\*  $p < .001$ .

**Table 3.** Correlation Matrix

Constructs	Mean	S.D.	1	2	3	4	5	6	7
1. Annual sales	2.76	1.85	1						
2. Number of foreign markets	2.35	1.37	.269**	1					
3. Overseas experience	2.72	1.43	.503**	.632**	1				
4. AEO-MRA effect	3.54	1.58	.298**	.045	.170*	.924			
5. Logistic cooperation	5.22	1.12	.218**	.097	.117	.172*	.863		
6. Logistic performance	4.69	1.59	.308**	.095	.040	.728**	.189*	.910	
7. Operational performance	5.09	1.09	.203**	.009	.122	.420**	.548**	.546**	.708

Notes: 1. The values in diagonal line represents the square root values of average variance extracted (AVE) for each construct.

2. \*  $p < .05$ , \*\*  $p < .01$ .

### 5.3. Assessment of the Structural Model

The fit of the model for path analysis was acceptable, except that the RMSEA is slightly larger than the reference value of 0.08.  $\chi^2 = 187.229$  (d.f. = 74,  $p = .000$ ), CFI = .964, TLI = .955, and RMSEA = .095. We performed hypothesis testing accordingly.

H1 assumes that annual sales (H1.1), number of foreign markets (H1.2), and overseas experience (H1.3) have a positive effect on the AEO-MRA effect. In the analysis, the AEO-MRA effect increased with an annual sales increase ( $\beta = .230$ ,  $t = 2.838$ ,  $p < .01$ ). On the other hand, the number of foreign markets did not affect the AEO-MRA effect significantly ( $\beta = -.114$ ,  $t = .939$ ,  $p > .05$ ), and the effect of overseas experience on AEO-MRA effect was not statistically significant ( $\beta = .109$ ,  $t = .841$ ,  $p > .05$ ). According to these results, H1.1 is supported, but H1.2 and H1.3 are not (indicated by a dotted line in the figure below).

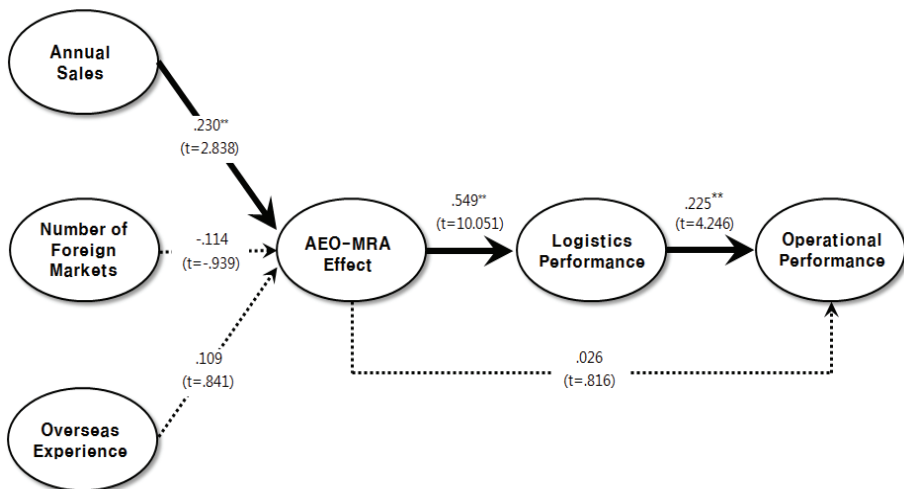
H2 assumes that the AEO-MRA effect directly affects firm logistics performance. In the analysis, the logistic performance of the firm increases as the AEO-MRA effect increases ( $t = 10.051$ ,  $p < .01$ ). Thus, H2 is supported, which shows that the AEO-MRA effect has a direct effect on logistics performance.

H3 assumes that as the logistics performance of an enterprise increases, its operational performance also increases. In the analysis, the performance of the organization increased as the logistics performance increased ( $\beta = .225$ ,  $t = 4.246$ ,  $p < .01$ ). These results support H3, which shows that firms operating the AEO-MRA are positively affected by logistics performance.

H4 assumes that the AEO-MRA effect directly affects the performance of a company. In the analysis, the AEO-MRA effect did not directly affect the performance of the firm ( $\beta = .026$ ,  $t = .816$ ,  $p > .05$ ). H4 is therefore not supported (indicated by the dotted line in the figure).

H5 assumes that logistics cooperation plays a moderating role in the relationship of influence between the AEO-MRA effect and logistics performance. We performed a regression analysis to analyze the results, which Table 4 shows.

Fig. 2. Result of Path Analysis



Note: \*\*  $p < .01$ .

The AEO-MRA effect in Phase 1 and the logistic cooperation in Phase 2 have a positive effect on logistics performance. The AEO-MRA effect in Phase 3 and the mutual relation coefficient of logistics cooperation are significantly positive (+). In other words, the reciprocal term is significant at the 1% significance level, and increased the explanatory power of logistics performance and dispersion by an additional 2.2% ( $\beta=.154$ ,  $\Delta R^2=.022$ ). This adjustment effect means that, as the AEO-MRA effect increases, logistics performance also increases. That is to say, an increase in the degree of logistics cooperation enhances the positive effect.

**Table 4.** Result of Regulated Regression Analysis

Step	Variable	$\beta$			$R^2$	$\Delta R^2$	$\Delta F$
		Step 1	Step 2	Step 3			
Step 1	AEO-MRA effect (A)	.728**	.717**	.689**	.530		
Step 2	Logistics cooperation (B)		.065	.104*	.534	.004	.223
Step 3	A*B			.154**	.556	.022	.004

Note: \*  $p < .05$ , \*\*  $p < .01$ .

To investigate the region of significance, we used the SPSS Process Macro (Hayes, 2013).

**Table 5.** Region of Significance of Moderator Effect

Value of logistics cooperation	Effect	S.E.	t	p	LLCI	ULCI
-3.2267	.2772	.1629	1.7010	.0908	-.044	.598
<b>-3.0173</b>	<b>.3042</b>	<b>.1541</b>	<b>1.9742</b>	<b>.0500</b>	<b>.000</b>	<b>.608</b>
-2.9767	.3094	.1524	2.0307	.0439	.008	.610
-2.7267	.3417	.1419	2.4078	.0171	.061	.621
⋮						
1.0233	.8258	.0638	12.9515	.0000	.699	.951
1.2733	.8581	.0707	12.1337	.0000	.718	.997
1.5233	.8903	.0787	11.3189	.0000	.735	1.045
1.7733	.9226	.0873	10.5659	.0000	.750	1.095

Table 5 shows the significant and non-moderating effects of the whole interval. The effect of the AEO-MRA on logistic performance increases when the degree of logistic cooperation is high. In the region where the logistic cooperation value is lower than 3.0173, the effect of the AEO-MRA on logistic performance is no longer evident and it is not significant. These results imply that, if the logistics cooperation falls below a certain level, the effect of the AEO-MRA on logistics performance can be halved.

## 6. Discussion

The Korean economic structure, which has a high dependency on trade benefits and has to deal with a large part of its economic growth, is sensitive to changes in the world trade paradigm. As a trading paradigm with significant influence on the current trade environment, the AEO-MRA in the logistics sector, along with the multilateral FTA in the trade sector, is a system that requires greater attention, especially in the context of Korea.

We thus constructed a structural model for the AEO–MRA effect by introducing RBT and a relational viewpoint, and draw both theoretical and policy implications through an empirical analysis that implements a structural equation model. We thus summarize as follows.

First, the yearly turnover shows a positive (+) relationship between the AEO–MRA effect and year-to-date sales, overseas expansion, and overseas market penetration. These results indicate that the larger the company represented by annual sales, the greater the AEO–MRA effect. In other words, when customs clearance is delayed owing to various reasons, such as inspections and document insufficiency in the overseas market, the bigger the deal, the greater the loss will be. Conversely, if you consider the benefits of the AEO–MRA, it is likely that the larger the size of the transaction, the bigger the benefit.

On the other hand, the number of market expatriates who have international experience and the period of advancement to overseas markets do not have a significant impact on the AEO–MRA effect. Ascertaining the fundamental cause of these results requires rigorous investigation. However, since many countries have entered overseas markets, it is possible that not all countries are AEO–MRA countries. There are many countries that have entered the overseas market, but if the volume of transactions is not large, the effect may not be significant. The AEO–MRA effect is expected to have a positive effect on the overseas experience as a whole, but the results of this study differ from our expectation. It is possible that these large companies' overseas partners are not all AEO–MRA certified.

Second, the AEO–MRA effect has been shown to enhance the logistics performance of companies. In countries that have adopted the AEO–MRA, customs clearance is characterized by exemption of inspection, reduction of inspection rate, fewer customs documents, and relaxed examination of requirements and FTA verification. As shown in this study, since the AEO–MRA effect generated by the customs clearance sector is linked to logistics performance, local partner companies can trust the AEO–MRA-certified company to ensure timeliness of transactions and greater predictability.

Third, logistics performance increases the operational performance of the enterprise. These results show that the speed and visibility of logistics increases, while the operating cost decreases, thereby satisfying the local partner company. This eventually leads to continuous transactions. Moreover, the AEO-accredited company would be recognized as excellent in terms of compliance with laws and safety management capabilities, thus positively affecting its external image (Korea AEO Association). As such, the AEO–MRA is considered to be a major consideration in the selection of overseas partner companies in recent research (Diop et al., 2007; Furia et al., 2011).

Nevertheless, the AEO–MRA effect did not directly affect the increase in operational performance. That is, the effects of the AEO–MRA in the customs sector are not directly attributable to operational performance since these effects are concentrated in the customs sector. In addition, from the viewpoint that logistics performance is enhanced through the AEO–MRA effect and operating performance increases. Thus, the AEO–MRA effect can be seen to indirectly improve operational performance through logistics performance. Finally, we investigated whether or not logistics cooperation with logistics companies played a moderating role in the relationship of influence between the AEO–MRA effect and logistics performance; that is whether it positively affects the performance of the company by improving the relationship quality (Cullen et al., 2000) owing to an enhanced cooperative relationship between firms, theoretically speaking. The analysis shows that the AEO–MRA effect and logistics cooperation exhibit positive interactions, and thus logistics performance is strengthened.

These results demonstrate the importance of logistics cooperation in the relationship of influence between the AEO–MRA effect and logistics performance. However, most previous research has examined only the occurrence of these regulatory effects, while we examined the

extent to which such positive effects occur in logistics cooperation. The AEO-MRA effect on logistics performance is as follows. When the degree of logistics cooperation is high, the AEO-MRA effect on logistics performance is positive (+) in a certain area. The effect of the AEO-MRA on logistics performance can be halved if the level of logistics cooperation falls below a certain level.

We obtain these results by emphasizing the importance of logistics cooperation in the relationship of influence between logistics performance and the AEO-MRA. In addition, companies that want to maximize the AEO-MRA effect based on these findings are more likely to need positive synergy by strengthening logistics cooperation with logistics companies.

The policy implications of this study are as follows. First, for AEO-MRA certification to spread, more conclusive research must indicate the positive effect of the AEO-MRA on firm performance. That is, its spread in Korea is dependent on consistent and conclusive evidence that the AEO-MRA is a necessary system for large, small, and medium-sized companies. Our study offers a persuasive argument for this claim by establishing a structural relationship between the AEO-MRA effect, logistics performance, and operational performance, and then strictly inferring their relationships of influence.

Further, our study is significant because it constructs a conceptual model by accepting the RBT and a relational viewpoint. We thus derived meaningful results. In other words, in our model for measuring AEO-MRA effects, international experience extracted from the RBT had no significant effect, but annual sales had a positive effect on the increase of the AEO-MRA effect. Logistical cooperation, proposed from the relational viewpoint, is a key variable for strengthening the causal relationship between the AEO-MRA effect and logistics performance; if the former increases, then the latter could decline if logistics cooperation falls to a certain level. Therefore, we expand the perspectives of these theories by our introduction of the RBT and relational viewpoints.

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