

# An Empirical Study on the Logistics Barriers of Three Countries in Northeast Asia

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## Abstract

**Purpose** – This research focuses on the analysis of logistics barriers in Korea, China and Japan facing the barriers of overseas-expanded manufacturers with other countries. With the three countries are emerging as the biggest trade partners in Northeast Asia, their logistics barriers are applied with similar verification methods of preceding researches such as Carter(1997).

**Research design, data and methodology** – Collecting the statistics data from the three countries' overseas-expanded manufacturers, t-verification was performed in order to analyze average value and verify any significance. Additionally, multiple regression analysis was used to analyze any influence on the relationship in Korean logistics barrier and Chinese and Japanese expansion to Korean market.

**Results** – Statistics suggested that three countries' logistics barriers are significantly differentiated by each verification categories, and Korean barrier negatively affected Chinese and Japanese manufacturers coming into Korean market.

**Conclusions** – As a result of multiple regression analysis of the influencing relationship between Korea's logistics barrier and Chinese and Japanese companies coming into Korean market, all of the Korean barriers are affecting the companies as an obstructive factor, and it is proved to be statistically meaningful. Therefore, in order to reduce Chinese and Japanese companies' cost burden, it is necessary that not only reasonable charge system and taxation support but also comprehensive measure establishment reduce Korea's logistics barriers.

However, since this research has a limitation in samples and shows a period of 5 years in the three nations' trade barriers, continuous and complementary researches are necessary in order to develop certain objectivity.

**Keywords:** Logistics, Logistics Barriers, China, Japan, Korea.

**JEL classifications:** L24, M38.

## 1. Introduction

Countries around the world are making an effort to remove barriers that block free trade, and they are trying to enhance economic welfare. These kinds of efforts are made by multi-national agreements or regional, bilateral cooperations. In order to formulate a free-trade environment, it is an important factor to remove non-tariff as well as tariff. Because GATT and WTO agreements allow certain amount of reasonable regulations, they supplies the reason of the barriers in logistics distribution and other types of non-tariff among the countries that joined World Trade Organization. In this paper, the logistics barrier means an element that hinders the free state between the logistic activities and inhibitory by the several factors, such as government policy, legal and economic systems. In other words, regulations with proper policy objectives are classified as reasonable regulations; regulations protecting the country from national health, security, environment, deceptive acts, and collapse of industry. These agreements set rules on these reasonable regulations to be 'less trade-restrictive' and enforces to adapt international standard or to avoid calculative operations with the purpose of protecting the industry, when these measures are in action. However, the term 'less trade restrictive' opens the room for controversy, and even if it is sued to WTO, proofing procedure may be difficult. Considering the reality, the existence of unfair non-tariff barriers among WTO member nations is undeniable, and the situation in Northeast Asia, especially Korea, China, and Japan, is no exception. These three countries' trade and investment scale is continuously increasing; however, it is undeniable that logistics barriers in three countries come around as a significant threat to the countries trying to expand overseas.

Even though Japan's tariff on industrial products is close to zero percent, logistic distribution barrier in respect of Japanese market's unique structure and distinctive business customs not only blocks Korean products to enter into the market but also weakens export competitiveness, eventually deepening the trade deficit. In China's case, with complex logistics barrier, factors such as high logistics cost, difficulties in finding related specialists causes too much uncertainties, and restricts market approach of the investment companies. Also, Korea's logistics barrier is named to be number one factor that blocks Chinese and Japanese companies coming into Korean market.

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However, all these three countries lack specific, empirical researches on logistic distribution barriers, and cannot adduce effective strategies to both Korean companies trying to expand to China and Japan, and Chinese and Japanese companies trying to expand to Korean market.

Hereupon, this research applies suggested verification fields and categories of preceding researches such as Carter(1997) with necessary modifications. The logistics barriers that three countries' overseas-expanded companies acknowledges is measured via average analysis(Likert 5-points index), and t-verification was used to verify statistical significance. By comparing analysis result and by investigating three countries' logistics barrier conditions, the research focuses on betterment of logistics result and effective counter-strategy for the companies trying to expand to other countries in Northeast Asia. In order to find out how Korean logistics barrier affects Chinese and Japanese companies, the research utilizes multiple regression analysis to provide better investment and logistics result for those companies seeking the opportunities in Korean market.

## 2. Literature

Mainstream researches on logistics barrier perform empirical analysis on businesses, which entered into the market. This research adapts the preceding researches by Carter(1997) and Yoo(2010)'s research on Korean manufacturers in Chinese market, and Yoo(2012)'s another research on Chinese manufacturers in Korean market. As a follow-up, this research comparatively analyzes three countries' logistics barrier, by looking into Korean manufacturers in Japanese market's and Chinese and Japanese manufacturers in Korean market's awareness of logistics barrier.

### 2.1. Research of Carter(1997)

According to Carter(1997)'s research, it is analyzed that most of the American companies in China are facing tremendous difficulties in business activities due to the excess regulation of Chinese government. The logistics barriers in China, which are pointed out by American companies, are highly complicated and occurring in various fields.

The logistics barriers that are recognized by the American companies, which invested in China, exist over a total of 37 contents as follows: the purchase field(7 contents), the transportation field(10 contents), the documentation/order processing field(6 contents), the warehousing field(4 contents), the inventory control field(5 contents) and the logistics services field(5 contents). According to the result of the survey, in the purchase field, 'Unavailability of local suppliers'(#1) and 'Local suppliers' lack of responsiveness to your needs'(#7) contents are in extremely severity level, 'Poor quality of locally sourced products'(#2), 'Local suppliers' lack of delivery dependability'(#3), 'Local suppliers' lack of order filling dependability'(#4) contents are in very severity level and 'High prices from local suppli-

ers'(#5), 'Lack of purchasing management skills'(#6) contents are in average severity level. In transportation field, only 'Local carriers' lack of delivery dependability'(#15) is in extremely severity level, 'Inadequate transportation infrastructure'(#8), 'Lack of mode/carrier selection'(#10), 'Excessive loading and unloading time at terminals'(#11), 'Lack of cargo tracing service'(#12), 'Unavailability of transportation services'(#16) contents are in average severity level, and contents of 'Lack of necessary transportation equipment'(#9), 'Lack of inter-modal carriers'(#13), 'High tariffs from local carriers'(#14), 'Lack of transportation management skills'(#17) are in average severity level.

In documentation/order processing field, there is no extremely severity logistics barriers. 'Lack of communication infrastructure'(#18), 'Hard to access required information'(#20) contents are in extremely severity level, and 'Lack of EDI systems'(#19), 'Slow order processing'(#21), 'Manual documentation operations'(#22), 'Lack of documentation/order processing skills'(#23) contents are in average severity level. In warehousing field, all 'Incompatible inventory control management methods'(#28), 'Unavailability of computer technology in inventory control'(#29), 'Inventory level uncontrollable due to mandatory raw materials allocation plan'(#30), 'Lack of skilled inventory controls staff'(#31), 'High inventory tax'(#32) contents are in average severity level, which shows that this field is comparatively better than the other fields. Lastly, for the logistics service field, all of 'Unavailability of freight forwarders/brokers'(#33), 'Unavailability of shipping agency services'(#34), 'Excessive customs clearing time'(#35), 'Complicated customs procedures'(#36), 'Unavailability of logistics consulting services'(#37) contents are in extremely severity level, which indicates the comparative difference from the storage field and the inventory control field.

To conclude, American companies recognize that the logistics barriers in China are extremely severity or ultra severity in the fields of purchase, transportation and logistics services. For the fields of the documentation/order processing, the warehousing and the inventory control and the logistics services barriers in China are recognized to be better, compared to the fields of the purchase and the transportation. However, it is important to notice that the logistics barriers in China, which are recognized by the American companies, are higher than being severity in all 37 contents.

### 2.2. Research of Tak(2004)

Tak(2004) organized logistics barriers in detail, based on Japanese companies expanded in Chinese market. Chinese barriers that these companies depicted were mainly concentrated in transportation area. Chinese barriers that they pointed out, in detail, were different license system in each province unit or 'sung' for transportation on road, and lack of railroad infrastructure for transportation by rail. At the end, they point out room shortage for normal freights for transportation by aircraft.

### 2.3. Research of KITA(2006)

The KITA(2006) pointed out the seriousness of Chinese logistics barriers with the analysis on environmental change of China's business. Among many obstructive factors on business expansion to China, backward logistics system and barrier in respect of shortage in logistics infrastructure causes high burden of cost, and it is depicted as the main reason of weakening of competitive power and decline in investment not only for Chinese companies but also foreign ones that perform manufacture and production activities in China.

### 2.4. Research of Yoo(2010)

Yoo(2010)'s research analyzed China's logistics barrier with the survey of 118 Korean manufacturers in Chinese market by adopting the preceding survey of Carter(1997).

According to the analysis of the average value, most of the Korean manufacture companies in China are facing significant difficulties in their business activities due to the logistics barriers in China.

Specifically comparing to the Carter(1997)'s research, it is known that there is a significant change in the degrees of recognition in the Chinese logistics barriers. Especially for 'Unavailability of local suppliers'(#1) and 'Local suppliers' lack of responsiveness to your needs'(#7) of the purchase field and 'Local carriers' lack of delivery dependability'(#15) of the transportation field, American companies have answered that they are in extremely severity level. On the other hand, Korean companies have answered that they are in average severity level. It clearly indicates the moderation in these fields among Korean companies. On the contrary, for 'Unavailability of freight forwarders/brokers'(#33), 'Unavailability of shipping agency services'(#34), 'Unavailability of logistics consulting services'(#37) of the logistics services field, American companies have answered that they are in ultra severity level while Korean companies ranked them to be of average severity level. Therefore, for this field, on the contrary, the logistics barriers in China are strengthened.

After aggregating these analysis results, China's logistics barriers somewhat eased off in the field of purchasing and transportation compared to the 1990s, stayed almost the same in the field of documentation and ordering, warehousing, inventory control; however, logistics service barrier reached a extremely severity level. Empirical research performed and suggests that the barriers in China were still above-average, and they were in a severity level in almost all of the verification categories.

### 2.5. Research of Yoo(2012)

In order to empirically evaluate the barriers in Korea and China, Yoo(2012) performed a research based on manufacturers expanded to each countries. Especially, for objective verification process, he applied verification categories of Carter (1997) and calculated each country's logistics barriers by average analysis,

and performed t-verification on independent samples to evaluate two countries' difference in average values is statistically relevant.

Noticeable implications of analysis result are suggested as follows.

First, in each investigation objects, there was a definite distinctions between the two countries's perception degrees of logistics barrier. Matter of fact, Korea and China's barrier was similar in warehousing field, and China's barrier was lower than that of Korea in inventory control field. Additionally, Korea's barrier was generally lower than that of China in purchasing field, transportation field, and documentation/order processing field, and China's barrier was significantly higher in logistics services field.

Second, Among purchasing field(7 contents), Korea had higher logistics barrier than that of China in 'high price from local suppliers'(#5). Similar result was found in 'Manual documentation operations'(#22) in documentation and order processing field(6 contents), and 'High inventory tax'(#32) in purchasing field(5 contents). This result indicates that Chinese manufacturers in Korean market find the high barrier in logistics cost, such as fee and tax.

Third, Korean manufacturers in China face significantly high barrier in logistics services field, among six categories of investigation.

This kind of result indicates China's barrier is moving from traditional transportation and warehousing field to logistics services field.

## 3. Research Methodology

### 3.1. Research Model

This research applied verification categories and verification contents of preceding research such as Carter(1997), and measured the logistics barriers that three countries' overseas-expanded companies acknowledges via average analysis(Likert 5-points index). t-verification was used afterwards to verify statistic significance. Especially, the research utilized multiple regression analysis to understand how Korea's logistics barrier affects in expansion of Chinese and Japanese companies into Korean market.

### 3.2. Research Samples

This study limited the subject of study to three nations; Korea, China and Japan. First of all, the reason of limiting the subject is because these three countries' trade quantity is significantly increasing, and they are making a sudden rise as one of the three world's largest markets, ranking with EZ and NAFTA economic blocs. Additionally, manufacturing industry is the only factor in this research because it is the most investing type of industry in all three nations.

The survey was done with 1,516 Korean businesses in

Chinese market and 113 Korean businesses in Japanese market, all listed under the Korea Trade-Investment Promotion Agency's category of overseas trade, and 239 Chinese and Japanese companies that the author extracted from the list of foreign companies investing in Korea. Survey period was December 15, 2009 to January 30, 2010, September 16, 2011 to October 30, 2011, and October 1, 2015 to December 30 2015, respectively. Survey was performed by direct phone calls and mail/electronic mail with chief executive officers and distribution managers of each firm, and the number of collected questionnaires was 118 Korean manufacturers expanded to China, 68 Korean manufacturers expanded to Japan, and 128 Chinese and Japanese manufacturers in Korea.

### 3.3. Contents of Survey

Details of questionnaires to research three nation's logistics barriers include purchasing field(7 questions), transportation services field(10 questions), documentation/order processing field(6 questions), warehousing services field(4 questions), inventory control field(5 questions), logistics services field(5 questions) with the total of 37 questions in 6 fields. This type of design is same as the preceding researches of Carter(1997), Yoo(2010), and Yoo(2012).

## 4. Empirical results

### 4.1. Average Analysis

#### 4.1.1. China's logistics barriers

The logistics barriers that 118 Korean companies in China market acknowledges are comparatively more severe than those of Korea and Japan.

Specifically, it is surveyed that 'Unavailability of local suppliers'(#1), 'Poor quality of locally sources products'(#2), 'Local suppliers' lack of delivery dependability'(#3), 'Local suppliers' lack of order filling dependability'(#4), 'Local suppliers' lack of responsiveness to your needs'(#7) contents in the purchase field are graded as extremely severity, 'High prices from local suppliers'(#5), 'Chinese managers' lack of purchasing management skills'(#6) as average severity. For the transportation field, 'Inadequate transportation infrastructure'(#8), 'Lack of mode/carrier selection'(#10), 'Excessive loading and unloading time at terminals'(#11), 'Lack of cargo tracing service'(#12), 'Local carriers' lack of delivery dependability'(#15), 'Unavailability of transportation services'(#16) contents are graded as extremely severity, and 'Lack of necessary transportation equipment'(#9), 'Lack of inter-modal carriers'(#13), 'High tariffs from local carriers'(#14), 'Lack of transportation management skills'(#17) contents as average severity.

For the documentation/order processing field, there are no extremely severity logistics barriers. It is appeared that 'Lack of communication infrastructure'(#18), 'Hard to access required in-

formation'(#20) contents are graded as extremely severity and 'Lack of EDI systems'(#19), 'Slow order processing'(#21), 'Manual documentation operations'(#22), 'Lack of documentation/order processing skills'(#23) contents as average severity. For the warehousing field, it is appeared that 'Hard to find appropriate warehouse locations'(#24), 'Lack of warehousing facilities'(#25), 'Lack of warehousing services except storage'(#26), 'Lack of warehouse computer system'(#27) contents are graded as average severity.

In addition, the inventory control field is analyzed to be comparatively better than the other fields since it is graded as an average severity on the contents of 'Incompatible inventory control management methods'(#28), 'Unavailability of computer technology in inventory control'(#29), 'Inventory level uncontrollable due to mandatory raw materials allocation plan'(#30), 'Lack of skilled inventory controls staff'(#31), 'High inventory tax'(#32). Lastly, for the logistics services field, it is surveyed that 'Unavailability of freight forwarders/brokers'(#33), 'Unavailability of shipping agency services'(#34), 'Unavailability of logistics consulting services'(#37) contents are ultra severity and 'Excessive customs clearing time'(#35), 'Complicated customs procedures'(#36) contents are graded as extremely severity.

Such a result indicates that the logistics barriers in the fields of the warehousing and the inventory control are comparatively lower while the logistics barriers in the fields of the purchase, the transportation and the documentation/order processing are significantly higher. Especially, as the logistics barriers in the logistics services field is indicated to be extremely severity, it is analyzed as a notable obstacle for Korean companies in China.

#### 4.1.2. Japan's logistics barriers

The study surveyed that the logistics barriers in Japan are comparatively lower than those of Korea and China.

Specifically, in the purchase field, 'Unavailability of local suppliers'(#1), 'Poor quality of locally sourced products'(#2), 'Local suppliers' lack of delivery dependability'(#3), 'Local suppliers' lack of order filling dependability'(#4), 'Lack of purchasing management skills'(#6), 'Local suppliers' lack of responsiveness to your needs'(#7) contents are graded as not severity and 'High prices from local suppliers'(#5) content is solely graded as average severity.

In the case of the transportation field, 'Inadequate transportation infrastructure'(#8), 'Lack of necessary transportation equipment'(#9), 'Lack of mode/carrier selection'(#10), 'Excessive loading and unloading time at terminals'(#11), 'Lack of cargo tracing service'(#12), 'Lack of inter-modal carriers'(#13), 'Local carriers' lack of delivery dependability'(#15), 'Unavailability of transportation services'(#16), 'Lack of transportation management skills'(#17) contents are graded as not severity while 'High tariffs from local carriers'(#14) are only graded as extremely severity.

In the documentation/order processing field, 'Lack of communication infrastructure'(#18), 'Lack of EDI systems'(#19), 'Slow order processing'(#21), 'Lack of documentation/order processing skills'(#23) contents are graded as not severity while 'Hard to

access required information'(#20) and 'Manual documentation operations'(#22) are graded as extremely severity.

In the warehousing field, 'Hard to find appropriate warehouse locations'(#24), 'Lack of warehousing facilities'(#25), 'Lack of warehousing services except storage'(#26) contents are appeared to be severity and only #27 is known to be not severity.

In the inventory control field, 'Incompatible inventory control management methods'(#28), 'Unavailability of computer technology in inventory control'(#29), 'Inventory level uncontrollable due to mandatory raw materials allocation plan'(#30), 'Lack of skilled inventory controls staff'(#31) contents are graded as not severity while 'High inventory tax'(#32) content is graded as average severity. Lastly, in the case of the logistics service section, 'Unavailability of freight forwarders/brokers'(#33), 'Unavailability of shipping agency services'(#34), 'Unavailability of logistics consulting services'(#37) contents are graded as not severity and 'Excessive customs clearing time'(#35), 'Complicated customs procedures'(#36) contents are graded as average severity.

Such a result indicates that Japanese logistics barriers are comparatively in lower level than those of Korea and China since, except for 7 contents, rest of the contents are graded as not severity. However, 'High prices from local suppliers'(#5) content of the purchase field, 'High tariffs from local carriers'(#14) content of the transportation field, 'High inventory tax'(#32) content of the inventory control field as well as 'Excessive customs clearing time'(#35), 'Complicated customs procedures'(#36) contents of the logistics services field are graded as average severity. In addition, 'Hard to access required information'(#20), 'Manual documentation operations'(#22) contents of the documentation/order processing field are graded as extremely severity. Hence, Japanese logistics barriers are analyzed to be dependable on the custom causes such as administration manual, accessibility of the information as well as the cost factors such as taxes and transportation fees.

#### 4.1.3. Korea's logistics barriers

As a result of average value analysis, 128 Chinese and Japanese manufacturers in Korean market were facing difficulties in management due to certain logistics barriers in Korea. Considerable deviation was displayed among logistics barriers, in which these companies pointed out.

Specifically, 'Unavailability of local suppliers'(#1), 'Poor quality of locally sourced products'(#2), 'Local suppliers' lack of delivery dependability'(#3) contents are graded as not severity, and 'Local suppliers' lack of order filling dependability'(#4), 'Lack of purchasing management skills'(#6), 'Local suppliers' lack of re-

sponsiveness to your needs'(#7) contents are graded as average severity. However, 'High prices from local suppliers'(#5) content are surveyed to be extremely severity. In the case of the transportation field, 'Lack of transportation management skills'(#17) content is only graded as not severity while 8 contents, that is, 'Inadequate transportation infrastructure'(#8), 'Lack of necessary transportation equipment'(#9), 'Lack of mode/carrier selection'(#10), 'Excessive loading and unloading time at terminals'(#11), 'Lack of cargo tracing service'(#12), 'Lack of inter-modal carriers'(#13), 'Local carriers' lack of delivery dependability'(#15), 'Unavailability of transportation services'(#16) are graded as average severity. This indicates that the most contents in transportation field are higher or equal grade as average severity. Especially, 'High tariffs from local carriers'(#14) content are surveyed as extremely severity.

In the documentation/order processing field, 'Lack of communication infrastructure'(#18), 'Lack of EDI systems'(#19), 'Slow order processing'(#21), 'Lack of documentation/order processing skills'(#23) contents are graded as not severity while 'Hard to access required information'(#20) and 'Manual documentation operations'(#22) are graded as extremely severity.

In the warehousing field, 'Hard to find appropriate warehouse locations'(#24), 'Lack of warehousing facilities'(#25), 'Lack of warehousing services except storage'(#26) contents are appeared to be average severity and only 'Lack of warehouse computer system'(#27) is known to be not severity.

Also showed average severity 'Incompatible inventory control management methods'(#28), 'Unavailability of computer technology in inventory control'(#29), 'Inventory level uncontrollable due to mandatory raw materials allocation plan'(#30), 'Lack of skilled inventory controls staff'(#31) in inventory control field and 'High inventory tax'(#32) is showed extremely severity. Finally showed average severity 'Unavailability of freight forwarders/brokers'(#33), 'Unavailability of shipping agency services'(#34), 'Complicated customs procedures'(#36), 'Unavailability of logistics consulting services'(#37) in logistics services field and 'Excessive customs clearing time'(#35) is showed extremely severity.

Such a result implies that the subject of investigation, that is, 9 contents out of 6 fields are not that severity while 28 contents are more severity than the mean value. 'High prices from local suppliers'(#5), 'High tariffs from local carriers'(#14), 'Hard to access required information'(#20), 'Manual documentation operations'(#22), 'High inventory tax'(#32), 'Excessive customs clearing time'(#35). Especially the six contents are extremely severity, which is a barrier to the Japanese and Chinese manufacturers operating in Korea.

<Table 1> Result of the average analysis and T-test

verification field and verification contents	Japan(2015)	Korea(2012-2015)	China(2010)
<b>● PURCHASING field(7 contents)</b> 1. Unavailability of local suppliers 2. Poor quality of locally sourced products 3. Local suppliers' lack of delivery dependability 4. Local suppliers' lack of order filling dependability 5. High prices from local suppliers 6. Chinese managers' lack of purchasing management skills 7. Local suppliers' lack of responsiveness to your needs	Not severity(0.012) Not severity(0.001) Not severity(0.021) Not severity(0.011) Not severity(0.021) Average severity(0.013) Not severity(0.031)	Not severity(0.012) Not severity(0.001) Not severity(0.022) Average severity(0.001) Extremely severity(0.020) Average severity(0.030) Average severity(0.011)	Extremely severity(0.033) Extremely severity(0.001) Extremely severity(0.031) Extremely severity(0.003) Average severity(0.021) Average severity(0.022) Extremely severity(0.001)
<b>● TRANSPORTATION field(10 contents)</b> 8. Inadequate transportation infrastructure 9. Lack of necessary transportation equipment 10. Lack of mode/carrier selection 11. Excessive loading and unloading time at terminals 12. Lack of cargo tracing service 13. Lack of inter-modal carriers 14. High tariffs from local carriers 15. Local carriers' lack of delivery dependability 16. Unavailability of transportation services 17. Lack of transportation management skills	Not severity(0.033) Not severity(0.011) Not severity(0.010) Not severity(0.011) Not severity(0.022) Not severity(0.013) Extremely severity(0.033) Not severity(0.031) Not severity(0.011) Not severity(0.024)	Average severity(0.011) Average severity(0.033) Average severity(0.010) Average severity(0.023) Average severity(0.012) Average severity(0.030) Extremely severity(0.001) Average severity(0.030) Average severity(0.021) Not severity(0.020)	Extremely severity(0.033) Average severity(0.041) Extremely severity(0.030) Extremely severity(0.021) Extremely severity(0.001) Average severity(0.031) Average severity(0.038) Extremely severity(0.013) Extremely severity(0.011) Average severity(0.002)
<b>● DOCUMENTATION/ORDER PROCESSING field(6 contents)</b> 18. Lack of communication infrastructure 19. Lack of EDI systems 20. Hard to access required information 21. Slow order processing 22. Manual documentation operations 23. Lack of documentation/order processing skills	Not severity(0.011) Not severity(0.031) Extremely severity(0.022) Not severity(0.013) Extremely severity(0.001) Not severity(0.021)	Not severity(0.021) Not severity(0.011) Extremely severity(0.031) Not severity(0.012) Extremely severity(0.021) Not severity(0.023)	Extremely severity(0.014) Average severity(0.033) Extremely severity(0.041) Average severity(0.033) Average severity(0.033) Average severity(0.030)
<b>● WAREHOUSING field(4 contents)</b> 24. Hard to find appropriate warehouse locations 25. Lack of warehousing facilities 26. Lack of warehousing services except storage 27. Lack of warehouse computer system	Not severity(0.002) Not severity(0.012) Not severity(0.022) Not severity(0.032)	Average severity(0.013) Average severity(0.013) Average severity(0.021) Not severity(0.011)	Average severity(0.011) Average severity(0.021) Average severity(0.023) Average severity(0.018)
<b>● INVENTORY CONTROL field(5 contents)</b> 28. Incompatible inventory control management methods 29. Unavailability of computer technology in inventory control 30. Inventory level uncontrollable due to mandatory raw materials allocation plan 31. Lack of skilled inventory controls staff 32. High inventory tax	Not severity(0.031) Not severity(0.021) Average severity(0.031) Average severity(0.022) Not severity(0.033)	Average severity(0.030) Average severity(0.031) Average severity(0.012) Average severity(0.021) Extremely severity(0.0352)	Average severity(0.001) Average severity(0.018) Average severity(0.013) Average severity(0.008) Average severity(0.013)
<b>● LOGISTICS SERVICES field(5 contents)</b> 33. Unavailability of freight forwarder 34. Unavailability of shipping agent services 35. Excessive customs time 36. Complicated practice 37. Unavailability of logistics consulting services	Not severity(0.024) Not severity(0.001) Not severity(0.011) Average severity(0.020) Not severity(0.003)	Average severity(0.033) Average severity(0.002) Extremely severity(0.034) Average severity(0.021) Average severity(0.021)	Extremely severity(0.034) Extremely severity(0.033) Average severity(0.013) Extremely severity(0.012) Extremely severity(0.011)

( ) is the result of t-t between independent samples, significance level(0.05)

4.2. T-test

In order to verify the statistical significance of differences in acknowledgement of 37 logistics barriers by verification contents that are suggested in average analysis, t-verification between independent samples was performed.

Looking into the result, all 37 contents in 6 fields—purchasing field(7 contents), transportation field(10 contents), documentation/order processing field(6 contents), warehousing field(4 contents), inventory control field(5 contents), logistics services field(5 contents)—displayed significance level of 0.05 and low-

er(95% confidence interval). This result suggests that the logistics barrier acknowledgment of manufacturers of three countries are statistically relevant.

4.3. Multiple Regression Analysis

In order to analyze the effect of Korea's logistics barrier to Chinese and Japanese businesses entering into Korean market, the author has set up a regression model with satisfaction level of Korean market as dependent variables and Korea's logistics barrier as independent variables(purchasing field, transportation

services field, documentation/order processing field, warehousing services field, inventory control field, logistics services field). In terms of measuring variables, dependent variables were set up with Chinese and Japanese manufacturers'(128 companies) acknowledgement of Korean market's satisfaction level, and independent variables or Korea's logistics barrier(6 fields) was set up with average value of the survey result.

As a result of multiple regression analysis, overall suitability of regression equation displayed significant level in respect of the value of F, and it was considerably high. In classifying each independent variable's influence in respect of dependent variables, dependent variable of satisfaction level of Korean market(KOR), and independent variables such as purchasing field(PUR), Transportation field(TRA), Documentation/order processing field(DOC), Warehousing field(WAR), Inventory control field(INV), logistics services field(SER) all displayed 'negative(-)' in influencing relationship.

Additionally, since these results have statistical significance with significance level of 0.01, it is proven that satisfaction level of Korean markets to Chinese and Japanese companies decreases as they acknowledges more about Korea's logistics barriers.

<Table 2> Result of multiple regression analysis

independent variable	$\beta$	SE B	T	Sig T
PUR	.346862	.133730	3.234	-.0023**
TRA	.304671	.128323	4.624	-.0013**
DOC	.301304	.142934	4.108	-.0073**
WAR	.303321	.147323	3.990	-.0028**
INV	.382323	.163211	3.923	-.0034**
SER	.372738	.154368	4.883	-.0038**
R Square = .68331    Adjusted R Square = .66327 F = 32.88689    Sig F = 0.0001				

\*\* significance level  $p < 0.01$

## 5. Conclusions

This research was performed for the purpose of enhancement in logistics result and effective counter-strategies for the companies trying to expand to Northeast Asian countries which are emerging as the biggest trade partners through the analysis of the logistics barriers in three countries—Korea, China, and Japan.

In this research, with the adaptation of verification field and verification contents that preceding researches such as Carter(1997) suggested, the author calculated logistics barriers of expanded manufacturers acknowledge by average analysis(Likert 5-point measure), and performed t-verification of independent samples in order to verify statistical significance. Especially, to understand how much Korea's trade barriers affect Chinese and Japanese companies coming into Korean market, the author performed multiple regression analysis. Additionally,

the author focused on enhancing logistics result and setting up effective counter-strategies for companies trying to expand to neighboring countries in Northeast Asia by comparing the analysis result with investigating three nation's barrier aspects.

The study result in 2010 with 118 companies was adopted as the investigation for Korean manufacturers in Chinese market's acknowledgements of logistics barriers. In this research, additional 68 Korean manufacturers in Japanese market were surveyed to analyze Japan's barriers, and follow-up research was done with 128 Chinese and Japanese manufacturers in Korean market to look into their acknowledgement.

As a result of comprehensive analysis of three nation's logistics barriers, China's barriers were comparatively high, but in certain verification field, Korea's barriers were higher than those of China. In Japan's case, its barriers were comparatively lower than those of Korea and China. Especially, Chinese and Japanese businesses in Korean market pointed out the cost-related field such as rate and tax as severity logistics barrier, and Korean businesses in Chinese and Japanese market acknowledged severity level of logistics barrier in the field of logistics services. In details, it is shown that Korea's barriers were slightly lower or similar level to those of China in six out of six contents—excluding 'High prices from local suppliers'(#5). Additionally, in all contents of transportation services field, Korea's barriers were slightly lower or similar level to those of China, but among Korea's logistics barriers, 'High tariffs from local carriers'(#14) turned out to be the barrier with extremely severity level.

Among six contents in documentation/order processing field, five contents excluding 'Manual documentation operations'(#22) suggested lower or similar level of China's barriers. On the other hand, All four contents of warehousing field suggested similarity in level of barriers, but every contents in the field were significantly high above average.

Every contents in inventory control field for both Korea and China displayed significantly high level above average, and the content of 'High inventory tax'(#32) was higher in Korea's barrier. This result suggests that inventory control field is the only barrier that is higher than China.

Last, in five contents of logistics services area, China's logistics barriers were comparatively higher than those of Korea, and they displayed the most distinctive gap between two nations.

In Japan's case, its logistics barrier was significantly lower than that of China and Korea. In details, 'High price from local suppliers'(#5) in purchasing field, 'High tariffs from local carriers'(#14) in transportation field, 'High inventory taxation'(#32) in warehousing field, 'Excessive customs procedures'(#35), 'Complicated customs procedures'(#36) in logistics services field were average severity level.

'Hard to access required information'(#20) and 'Manual documentation operations'(#22) in documentation/order processing field was in extremely severe level. Therefore, Japan's logistics barrier mainly comes from coastal factors such as taxation and transportation fee, and customary factors such as difficulties in achieving necessary information and manual.

Especially, as a result of multiple regression analysis to ana-

lyze the influence relationship between Korea's logistics barrier and Chinese and Japanese companies coming into Korean market, all of Korea's barriers are affecting the companies as an obstructive factor, and it is proved to be statistically meaningful. Therefore, in order to reduce Chinese and Japanese companies' cost burden, not only reasonable charge system and taxation support but also comprehensive measure establishment is necessary to reduce Korea's logistics barriers.

However, since this research has a limitation in samples and shows just 5 years of research period of three nations' trade barriers, continuous and complementary researches are necessary in order to develop certain objectivity.

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