

# Location Selection Factors for International Distribution Center in Port Hinterland

- A Review of Busan New Port Hinterland from User's  
Perspective -

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Location Selection Factor, Busan New Port

## I. Introduction

As consequence of the changed port functions as a central point in industries engaged in international trade, the role of port hinterland has

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transformed to a significant component in international shipping logistics and economic cooperation with its surrounding area.<sup>1)</sup> Academic literature on port hinterland development highlighted the importance of multi-functional business center which can produce added-value and the growth with their host city.<sup>2)</sup> Moreover with the changes in business environment such as globalisation of economy and expansion of SCM to global market, prior studies on port development highlighted the importance of international distribution center that allow integrating the overall production and distribution systems in international business. The role of port hinterland has been transformed to a strategic and critical base for creating value-added in international shipping<sup>3)</sup>. Seeking to secure competitive capacities in international shipping logistics, the major ports in NEA (Northeast Asia) strive to construct international distribution center in their hinterland.

The success of port hinterland as international distribution center would critically depend on location selection factors. Although prior studies on location selection factor for logistics distribution center and port hinterland development provide broad implications for strategies and policy for port hinterland development, they do not indicate or identify the significant factors that influence location selection factors for international distribution center in port hinterland. Prior work distinguished studies on location selection factor for distribution center from work relating to port

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1) Kim, S. H., Chiang, B. G., "Sustainability practices to achieve sustainability in international port operations", *Journal of the Korean Port Economic Association*, Vol. 30, no. 3, 2014, p. 15.

2) van den Berg, R., de Langen, P. W., "Hinterland strategies of port authorities: a case study of the port of Barcelona", *Research in Transport Economics*, Vol. 33, no. 1, 2011, pp. 6~14.

3) Chen, L., Notteboom, T. E., "Determinants for assessing value-added logistics services to logistics centers within a supply chain configuration", *Journal of International Logistics and Trade*, Vol. 10, no. 1, 2012, pp. 3~41.

hinterland development, namely, existing studies in location selection factors for logistics distribution center typically failed to consider differences in the context of port hinterland operations. Further study is required to provide useful insights for logistics distribution center in port hinterland. Moreover, to accommodate the changing customer's expectations, it would be required to evaluate port hinterland from the user's perspective, by focusing on strategies and policy for port hinterland development. Therefore, to provide useful insights for future improvement of Busan new port hinterland, this paper aims to analyze location selection factors from the user's perspective. To explore the location selection factors for logistics distribution center in port hinterland, this study analyzes location selection factors for international distribution center in port hinterland, using an empirically-based instrument. In addition, in order to provide useful insights for future improvement, this study investigated and evaluated the degree of users'satisfaction of Busan new port hinterland. After introducing the research background, the paper elaborates on the role of logistics distribution center in port hinterland operations, and reviews the locations selection factors for international logistics distribution center. The overall research design, data collection processes, and the results of the assessments of the potential biases that can be arisen from using a questionnaire are discussed in the following section. Particularly, by targeting logistics companies located in port hinterland in Busan new port, external validity of the findings was enhanced in this study. Data analysis and the results are discussed in section four before considering their implications. After considering both conceptual and substantive perspectives of the findings, limitations and suggestions for future research are discussed and recommended.

## II. Literature Review

### 1. Port hinterland as a strategic base of supply chain management

The concept of port hinterland<sup>4)</sup> has been widely discussed over time. With the dynamic surrounding of maritime shipping (e.g. containerization), the role and mechanism of port hinterland has transformed from a gateway for shipping elsewhere to a critical component for linking more efficiently elements of the supply chain<sup>5)</sup>. A particularly relevant concept is a combination of logistics and industrial activities, discussed Notteboom and Rodrigue (2005), and more recently by van den Berg and de Lange (2011). In a case of manufacturing companies, they are having a greater interest in a combination of logistics and industrial activities in terms of the total supply chain management<sup>6)</sup>. It is because they can manage whole process from the multiple sourcing of raw material to the production and the final distribution of the finished product. Manufacturing companies are, therefore, also taking steps to establish regional logistics and distribution centers in port hinterland, to improve their competitive power by reducing raw material procurement and inventory costs, and by providing swift, customer-oriented JIT services and value added logistics services. Consequently, port hinterland is required to be defined as a place where can provide an economic activities pertaining to logistics and commodity chain.

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4) van den Berg, R., de Langen, P. W. "Hinterland strategies of port authorities: a case study of the port of Barcelona", *Research in Transport Economics*, Vol. 33, no. 1, 2011, p. 7.

5) Hesse, M., Rodrigue, J. P., "The transport geography of logistics and freight distribution", *Journal of Transport Geography*, Vol. 12, no. 3, 2004, pp. 171~184.

6) Notteboom, T. E., Rodrigue, J. P., "Port regionalization: Towards a new phase in port development", *Maritime Policy and Management*, Vol. 32, no. 3, 2005, pp. 297~313.

## 2. Concept of international distribution center in port hinterland

According to Cheng and Tsai, a general distribution center<sup>7)</sup> defined "as a place that integrates the operations of manufacturing with land, sea, air transportation, storage, and port and customer operations in order to achieve efficient distribution of commodities". On the other hand, Notteboom (2008) argued that the increasing vertical integration in the supply chain is a key issue of port hinterland development. Based on a supply chain perspective, van der Horst and de Langen, (2011; 2008) suggested that port authorities need to enlarge the scope of port hinterland and contribute to the connection between the port and its hinterland. It is because hinterland costs including inventory costs and shipping costs and others are the largest part of total door-to-door costs. By seeking to enhance customer satisfaction and improvement organizational profitability, prior studies on logistics distribution center in port hinterland suggested that the term distribution center is virtually synonymous with the warehouse. Moreover, in distribution channels, the function of port hinterland has varied from a warehouse for inventory to a significant component of international shipping and economic cooperation with its surrounding area. Therefore, to tackle this issue, this study defines logistics distribution center in port hinterland as an international logistics center for linking more efficiently elements of the global supply chain between supplier and the manufacturer, and the manufacturer and industrial customers in international business.

## 3. Location selection factors for international distribution center

As the international distribution center has become a critical component

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7) Cheng, Y. H. and Tsai, Y. L., "Factors influencing shippers to use multiple country consolidation services in international distribution center", *International Journal of Production Economics*, Vol. 122, no. 1, 2009, p. 79.

for linking more efficiently elements in SCM, to tackle the issues, prior studies investigated analyzed the location selection factors for international distribution center. For example, in early work to identify key attributes of a world-class logistics system<sup>8)</sup>, Wood (1995) examined the four general attributes. Bookbinder and Tan (2003) added two others<sup>9)</sup> (business and political environment) to the general attributes identified by Wood (1995). Literature from 2010s<sup>10)</sup> reveals a gradual change in the relative importance of the determinants of location selection for international distribution center, and featured more evaluation criteria such as geo-location, labor conditions, logistics costs, traffic conditions, financial incentives, quality and reliability of modes of transportation, and proximity to customers, suppliers or producers. In the case of NEA, Hong (2007) suggested that the location of foreign logistics firms depended on transport condition, market size, labor quality, agglomeration economics and government incentives.

Although prior studies on international distribution center provide broad implications for practice and policy for location selection factors for logistics companies, they do not indicate or identify the difference in location selection factors in port hinterland operations. Existing studies on international distribution center typically failed to consider differences in

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8) Four key attributes of a world-class logistics system: infrastructure, performance, information systems and human resources(Wood, D. F., *International Logistics*. Springer Science & Business Media, 1995, pp. 223~227).

9) Six key attributes of a world-class logistics system: infrastructure, performance, information systems, human resources, business and political environment (Bookbinder, H. J., Tan, C. S., "Comparison of Asian and European logistics systems", *International Journal of Physical Distribution & Logistics Management*, Vol. 33, no. 1, 2003, pp. 36~58).

10) e.g. Guo, X., Zhao, X., "Study on logistics center site selection of Jilin province", *Journal of Software*, vol. 7, no. 8, 2012 pp. 1799~1806 and Demirel, T., Demirel, N. C., Kahraman, C., "Multi-criteria warehouse location selection using Choquet integral", *Expert Systems with Applications*, Vol. 37, no. 5, 2010, pp. 3943~3952.

port hinterland operations and meaning. Further research is required on international distribution center in port hinterland operations. Therefore, to investigate the location selection factors for international distribution center in port hinterland, prior studies on both general location selection factors for international distribution center, and location selection factors for port hinterland were reviewed. Literature reviews identified that location selection factors for international distribution center in port hinterland is determined by considering diverse factors including geo-location, availability, market size and growth (potential), cost factors (e.g. logistics costs, labor costs, and low rental fee for land), soft factors such as reliability, service differentiation, quality of business environment and professional and workforce development, and supportive factors including market niche, incentives and IT application. After eliminating overlapping and interrelated elements, this study carefully selected the items to analyze the location selection factors. Finally, twenty one measurement items were extracted as shown in Table 1.

〈Table 1〉 Selected item for international distribution center

Codes*	Items identified	Reference
IDC 1	Effective land Transport system and Logistics costs	Guo and Zhao, 2012; Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002;
IDC2	Labor costs in distribution center	Guo and Zhao, 2012; Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002;
IDC 3	Low rental fee for land	Guo and Zhao, 2012; ESCAP, 2002;
IDC 4	Low traffic congestion	Guo and Zhao, 2012; ESCAP, 2002;
IDC 5	Incentive programs offered by host country	Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002; Chen, 2001;
IDC 6	Free trade system and related law	Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002;

Codes*	Items identified	Reference
IDC 7	Simplicity and ease of administrative procedures	Guo and Zhao, 2012; Demirel, et al., 2010; ESCAP, 2002;
IDC 8	Political stability	Guo and Zhao, 2012; Oum and Park, 2004;
IDC 9	Port, airport and intermodal transport facilities	Guo and Zhao, 2012; Demirel, et al., 2010; Oum and Park, 2004;
IDC 10	Market size and growth (potential)	Demirel, et al., 2010; Oum and Park, 2004; Notteboom and Rodrigue, 2005; ESCAP, 2002;
IDC 11	Availability of trained technical labors	Guo and Zhao, 2012; Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002; Chen, 2001;
IDC 12	Availability of English speaking port workers	Guo and Zhao, 2012; Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002; Chen, 2001;
IDC 13	Availability of land	Oum and Park, 2004; ESCAP, 2002
IDC 14	Quality and reliability of modes of transportation	Guo and Zhao, 2012; Demirel, et al., 2010; Notteboom and Rodrigue, 2005
IDC 15	Level of information service	Guo and Zhao, 2012; Demirel, et al., 2010; ESCAP, 2002; Wood, 1995
IDC 16	Quality of workers	Guo and Zhao, 2012; Demirel, et al., 2010; Oum and Park, 2004; ESCAP, 2002; Chen, 2001;
IDC 17	Quality of life (ex. public facilities)	Oum and Park, 2004; Alberto, 2000
IDC 18	Accessibility to the relevant business infrastructure	Demirel, et al., 2010; Oum and Park, 2004; Bookbinder and Tan, 2003; Chen, 2001;
IDC 19	Distance between port and hinterlands	Guo and Zhao, 2012; Demirel, et al., 2010; Notteboom and Rodrigue, 2005; ESCAP, 2002;
IDC 20	Distance between port and industrial complex	Guo and Zhao, 2012; Demirel, et al., 2010; ESCAP, 2002;
IDC 21	Establishment of feeder service (hub and spoke system)	Notteboom and Rodrigue, 2005; ESCAP, 2002; Wood, 1995

\*IDC: International distribution center



### III. Method

#### 1. Overview of research design

This paper aims to review Busan new port hinterland, based on location selection factors for international distribution center. Given that studies linking central and regional distribution center in port hinterland are recently highlighted, as well as prior studies were undertaken for strategic development of port hinterland to as a strategic base of logistic activities which can produce added-value and the growth with their host city. Relatively, location selection factors for multi-functional distribution center are supported by literature, not directly discovered and verified in the context of port hinterland operations. Therefore, whether the identified factors are applicable to the context of port hinterland operations is critical for empirical work in this paper. Accordingly, a two-phase empirical investigation was conducted to achieve research aims, adopting a questionnaire survey. First, to analyze location selection factors for international distribution center in the port hinterland operational context, the respondents are asked to tick one box to show their degree of importance by checking one of five response categories in each statement (ranging from 1 - not very important to 5 - very important). Employing exploratory factor analysis (EFA) in SPSS 21, responses were analyzed to cluster the relevant items and eliminate potentially superfluous items. Thereafter, the degree of satisfaction to the measurement items was investigated to evaluate Busan new port hinterland from user's perspective, employing a five-point likert scale (1- very poor to 5- very good). In addition, to enhance the external validity of the findings, questionnaires were distributed to actual users located in Busan port hinterland.

## 2. Data collection

Prior to collecting the data in 2014, a pilot survey by email was conducted based on thirty respondents including a group of researchers and experts working in international shipping logistics area. Based on the pre-tests, the final questionnaire was upgraded and revised. Questionnaires were distributed to all organizations located in Busan port hinterland (<http://www.busannewport.or.kr>). A total of 150 questionnaires were distributed to all thirty organizations located in Busan port hinterland. The organizations were multi functional logistics company. Two weeks after the initial mailing a cover letter highlighted the various means to respond, and reminder emails were sent to all potential respondents. The last wave of mailing was sent two weeks later. A total response of 56 gave an effective response rate of 40.6% (56/138), with 12 returned as non-deliverable. Nine companies were with three responses each, eight companies with two, and thirteen with one. Regarding to respondents, over 66% of the respondents had worked for their organization for over 10 years and most of the respondents (71.4%) were in senior and middle groups entitled vice president or above, board member, director, manager of department, section chief, operational supervisor, although more junior levels representing operational staff (28.6%) were also represented.

## 3. Assessing non-response bias and common method bias

Two common types of non-response<sup>11)</sup> exist in questionnaire survey; item non-response and unit non-response. To avoid item non-response caused when one or more items are missing, a web-based questionnaire loaded

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11) Wagner, S. M. and Kemmerling, R. "Handling non-response in logistics research", *Journal of Business Logistics*, Vol. 31, no. 2, 2010, p. 357.

with a system that notices an error such as an omission and double checks the respondents was devised. With respect to unit non-response arising from a failure to gather information such as incorrect contact information, delivery errors, or the respondent's temporary absence or ineligibility, a widely-used extrapolation method was employed to statistically estimate non-response bias whereby late respondents are hypothesized to behave similarly to non-respondents.<sup>12)</sup> The sequential data was sorted in chronological order according to its arrival time. Comparison between the first and fourth quartiles of respondents for key constructs revealed a no significant difference at the .05 level on t-test, which indicates that non-response bias is not expected to inhibit our analysis. In addition, to assess common method bias at the level of measurement item, we employed Harman's single factor test<sup>13)</sup> in SPSS. The results revealed that no single factor accounted for the majority of the covariance in EFA (see Table 2). Based on these results, non-response bias and common method bias is not expected to inhibit our analysis.

## IV. Data Analysis and Results

### 1. Results of factor analysis

This study has been designed to evaluate Busan new port hinterland based on location selection factors for international distribution center. Prior to evaluating Busan new port hinterland, we analyzed location

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12) Armstrong, J. S., Overton, T. S., "Estimating non-response bias in mail surveys", *Journal of Marketing Research*, Vol. 14, 1997, pp. 396~402.

13) Podsakoff, P. M., MacKenzie, S. B., Lee, J. Y., Podsakoff, N. P. "Common method biases in behavioral research: A critical review of the literature and recommended remedies", *Journal of Applied Psychology*, Vol. 88, 2003, pp. 879~903.

selection factors for international distribution center, employing exploratory factor analysis (EFA) in SPSS 21 to determine how clearly and to what extent an observed variable is linked to the underlying factors, and to eliminate potentially superfluous items. This section presents the results of EFA. To extract the minimum number of factors which account for the co-variation amongst observed variables, principle components analysis with varimax rotation was adopted because it assumes independence between factors and maximizes the sum of the variances of the squared loadings. The criteria<sup>14)</sup> used for selecting measurement items were eigen-value ( $>1.0$ ) and factor loading ( $>0.50$ ). Twenty one items for location selection factors were assessed and grouped into the five dimensions (Table 3). In terms of the measurement items, although all 21 items presented factor loadings  $>0.5$ , we eliminated one item RLDC 3 (Low traffic congestion) due to low communality  $<0.5$ , as recommended by Hair et al. (2010), which enhances the reliability and validity of measurement items. Finally, the factor loading values of the twenty purified items were between 0.530 and 0.873 and their communality was all above 0.5, exceeding acceptable standards. The results indicate that the variables are well represented by the extracted factors, and hence that the factor analysis is reliable. Table 3 presents the results of EFA. Kaiser-Meyer-Olkin's measure of sampling adequacy was 81.7% indicating the extent to which the observed variables are linked to their underlying facts. Based on the five factors underlying the twenty items, total variance explained is approximately 73.46%, which indicates that the extracted five location selection factors explain 73.46% of the inherent variation in their items. Lastly, Cronbach's  $\alpha$  for all four extracted factors was  $>0.70$ , indicating the construct's internal consistency and validity.

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14) Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., *Multivariate Data Analysis*, 7<sup>th</sup> ed., New Jersey: Prentice Hall, 2010. pp. 112~141.

〈Table 2〉 Results of Exploratory Factor Analysis

Codes*	Factor Analysis					Cronbach's $\alpha$
	GA	AV	PS	CF	QB	
IDC 19	.873					
IDC20	.823					
IDC 18	.732					.841
IDC 21	.675					
IDC 9		.849				
IDC 10		.834				
IDC 11		.770				.798
IDC 12		.686				
IDC 13		.530				
IDC 5			.850			
IDC 6			.770			.836
IDC 7			.736			
IDC 8			.679			
IDC 3				.860		
IDC 2				.849		.858
IDC 1				.846		
IDC 16					.872	
IDC 15					.783	
IDC 17					.656	.789
IDC 14					.583	
Eigen-value	6.237	2.587	2.312	1.901	1.657	
% of Variance	31.186	12.934	11.559	9.503	8.287	Total: 73.468

Kaiser-Meyer-Olkin Measure of Sampling Adequacy: 0.817 \*IDC: International distribution center; GA: Geo-location and accessibility; AV: Availability; PS: Political supports; CF: Cost factors; QB: Quality of business environment.

Based on the results of EFA, the structure conceptualizing location selection factors for international distribution center in port hinterland was developed, using labels of '*geo-location and accessibility*', '*availability*', '*political supports*', '*cost factors*', and '*business environment*'. Further details of sub-dimensions are as follows:

***Geo-location and accessibility:*** Distance between port and hinterlands, accessibility to the relevant business infrastructure, distance between port and industrial complex, and establishment of feeder service (hub and spoke system).

***Availability:*** Port, airport and intermodal transport facilities, Market size and growth (potential), availability of trained or non-trained technical labors, availability of English speaking port workers, and availability of land.

***Political supports:*** Incentive programs offered by host country, free trade system and related law, simplicity and ease of administrative procedures, and political stability.

***Cost factors:*** Effective land transport system and logistics costs, labor costs in distribution center, and low rental fee for land.

***Quality of business environment:*** Quality and reliability of modes of transportation, level of information service, quality of workers, and quality of life (ex. public facilities).

## 2. Evaluation of Busan new port hinterland

This section presents the results of the evaluation of Busan new port hinterland. To evaluate Busan new port hinterland from user's perspective, we investigated the degree of users'satisfaction. The respondents are asked to tick (V) one box to show their degree of satisfaction by checking one of five response categories in each statement (ranging from 1 - very poor to 5 - very good). Table 3 presents the results of the evaluation of Busan new port hinterland, based on the five factors underpinning twenty measurement items identified in EFA. According to the mean value of

each factors, availability showed the highest degree of satisfaction, indicating 4.205. Geo-location and accessibility, business environment, cost factors recorded 3.91, 3.628, and 3.369 whilst political supports (3.249) presented the lowest mean value. The findings imply that Busan new port hinterland is an attractive location for international distribution center in terms of availability while political support are required to be improved. After identifying the degree of satisfaction to each factors, this study compared the mean values of measurement items (see Table 3).

〈Table 3〉 Evaluation of Busan new port hinterland

Factors	Mean	Measurement items	Mean
Geo-location and accessibility	3.910	Distance between port and industrial complex	3.750
		Distance between port and hinterlands	4.464
		Accessibility to the relevant business infrastructure	3.535
		Establishment of feeder service	3.892
Availability	4.205	Port, airport and intermodal transport facilities	3.285
		Market size and potential growth	3.464
		Availability of trained technical labors	2.928
		Availability of English speaking port workers	3.107
		Availability of land	4.035
Political supports	3.249	Incentive programs offered by host country	3.035
		Free trade system and related law	3.142
		Simplicity and ease of administrative procedures	3.392
		Political stability	3.428
Cost factors	3.369	Effective land Transport system and Logistics costs	3.500
		Labor costs in distribution center	2.964
		Low rental fee for land	3.642
Quality of business environment	3.628	Quality and reliability of modes of transportation	4.142
		Level of information service	3.714
		Quality of workers	3.642
		Quality of life (ex. public facilities)	3.012

With respect to geo-location and accessibility, the findings revealed that

the users of Busan new port hinterland presented high degree of satisfaction in distance between port and hinterlands (4.464) while indicating the lowest value in accessibility to the relevant business infrastructure (3.535), which implies that Busan new port hinterland is required for future improvement in accessibility to the relevant business infrastructure. This would be demonstrated by inviting the relevant business to port hinterland as discussed by Demirel, et al. (2010). Strategic development of the port area into a multi-functional business center, which can enhance a centrality as a central position for industries related to international business. For example, financial complex and an international arbitration center will improve a port's availability as a central position for industries related to international trade. In terms of availability, the respondents showed higher degree of satisfaction to availability of land whilst availability of trained technical labors recorded the lowest value (2.928) in the mean comparison. In Political supports, incentive programs offered by host country and free trade system and related law presented the relatively lower values, indicating 3.035 and 3.142, respectively. On the other hand, regarding to cost factors, the respondents showed the lowest value in labor costs in distribution center (2.964). This result might be caused by lower availability of trained and/or non-trained labors in Busan new port hinterland. Lastly, in terms of quality of business environment, quality and reliability of modes of transportation (4.412) presented the higher satisfaction of the users while the quality of life (ex. public facilities) indicated the lowest value (3.012), featuring the requirements for future improvement in the quality of life.

## V. Conclusion

Examining multi-measurement items, this paper examined location selection factors for international distribution center applicable to port



hinterland development. Namely, by targeting the companies located in Busan port hinterland, this study proposed a new model to analyze location selection factors for international distribution center in port hinterland. The research findings provide implications from both conceptual and substantive perspectives, differing from the extant works on location selection factors for a general distribution center.<sup>15)</sup> The findings offer important steps in building knowledge about 'global SCM in port hinterland' dealing with location selection factors for international distribution center in general and how it can be evaluated.

## 1. Implications

In terms of conceptual issues, the proposed five factor model has advanced our understanding of the location selection factors for international distribution center within the context of port hinterland operations. Although the location selection factors for international distribution center have been identified separately in prior studies, to the best of our knowledge, these five factors have never been tested in the context of port hinterland operations. The five factors identified include geo-location and accessibility, availability, political supports, cost factors, and business environment. Moreover, the findings revealed the difference in the relative importance of the location selection factors, which requires different strategies to improve. For example, geo-location and accessibility showed the highest values in the percentage of variance explained. This implies that geo-location and accessibility most significantly influence location selection for international distribution center in port hinterland. Besides, by targeting the companies located in port hinterland, the findings

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15) i.e. Guo, X., Zhao, X., "Study on logistics center site selection of Jilin province", *Journal of Software*, Vol. 7, no. 8, 2012, pp. 1799~1806 and Hong, J., "Transport and the location of foreign logistics firms: The Chinese experience", *Transport Research Part A*, vol. 41, no. 6, 2007, pp. 597~609.

could assist understanding of user's expectations for future improvement. Moreover, although the determinants are not fully exhaustive, they are meaningful in that they have been assessed by the companies located in port hinterland. The findings can assist future studies on location selection factors for international distribution center, and as the first study of the examination in the context of port hinterland operations, it will provide guidance for future strategic management in port hinterland development and operations.

The study findings have implications for port hinterland operators with an interest in reviewing and establishing their strategies to enhance their competitive position. The empirically-based factors for international distribution center revealed significant differences from prior studies on general distribution.<sup>16)</sup> For example, as presented in prior studies, operational aspects such as political support, cost factors, and quality and reliability were also identified as the key factors in port hinterland operations which help decision making for location selection. However, research findings reported that the most influential factor determining location selection for international distribution center are physical and functional aspects including geo-location and accessibility, and availability. Therefore, the results imply that the success of port hinterland as international distribution center critically depends on strategic development of port hinterland to multi-functional business center, by securing appropriate physical capacities. Based on the evaluation of Busan port hinterland, we suggest that Busan port hinterland must secure and/or improve: 1) appropriate physical capacities to be a central point of regional

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16) i.e. Demire, T., Demire, N. C., and Kahraman, C., "Multi-criteria warehouse location selection using Choquet integral", *Expert Systems with Applications*, vol. 37, no. 5, 2010, p. 3943-3952; Hong, J., "Transport and the location of foreign logistics firms: The Chinese experience", *Transport Research Part A*, vol. 41, no. 6, 2007, pp. 597-609.

trade; 2) intermediacy and/or connectivity to the import/export area, market, the host city; 3) diversification of infrastructure; and 4) centrality based on attractive business environment in international shipping, which improves a hinterland's functional availability as international distribution center, as well as the relevant industries. For example, services and facilities related to international business such as an international arbitration center, an international convention center and financial complex will improve a port hinterland's availability as a central position of industries related to international trade.

## **2. Limitations and suggestions for future research**

Some limitations of this work present interesting directions for future research. Firstly the listed location selection factors for international distribution center are necessarily not exhaustive: perhaps variables such as strategies could be investigated? In a port hinterland operational context, strategies for operations and development may influence potential growth. Given the importance identified in the strategic operation/management literature, future studies could consider strategic issues such as many opportunities for sustainable and potential growth. Although the findings presented are supported by literature, future research to enhance the validity of this research includes testing the structure of the model of location selection factor for international distribution center in other regions to verify the findings. Additionally, it would be interesting to focus on the impacts of the determinants of location selection on a firm's operational performance in port hinterland operations.

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## ABSTRACT

### Location Selection Factors for International Distribution Center in Port Hinterland:

—A Review of Busan New Port Hinterland from User's Perspective —

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As port functions change to act as an economic catalyst and take on a central position in industries engaged in international trade, port hinterland has become a significant component in international shipping. The success of port hinterland as a strategic base of logistic activities critically depends on location selection factor for international distribution center that links elements of global supply chain management. By examining multi-measurement items empirically, this paper analyzed location selection factor for international logistics distribution center in port hinterland, and evaluated Busan new port hinterland from the user's perspective. Employing exploratory factor analysis, the results revealed that the model structured around five factors incorporating geo-location and accessibility, availability, political supports, cost factors, and quality of business environment is valid and reliable in the context of the location selection factors for logistics distribution center in the context of port hinterland operations. The evaluation of Busan new port hinterland provides useful insights for strategic improvement to accommodate the users' expectation. Further, the model offers both a descriptive and diagnostic strategic management tool for port hinterland development and operations, to guide future improvement.

Key Words : International Distribution Center, Port Hinterland,  
Location Selection Factor, Busan New Port