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Abstract

Evaluating the development and investment direction of complex transportation system for Kaohsiung international logistics is very important to Taiwan. According to the effect of internal and external variables factors, it is necessary to inspect the Kaohsiung metropolitan area epistemic development plan and trend of domestic industry develop international logistics. In order to achieve the benefits of developing logistics integration; we set the Kaohsiung harbour and airport as the core of this study. Exploring that how to strengthen the international logistics function and develop the strategy to improve the economic environment of Kaohsiung area. Consequently, this study is to extract critical expert knowledge and to build strategic decision to improve the economic environment of Kaohsiung area and international logistics.

Keywords: Extracting Expert Knowledge, Building Strategic Decision, International Logistics, Kaohsiung Harbor

Introduction

Intermodal transport has received an increased attention in freight transport policy making due to problems of road congestion, environmental concerns and traffic safety [1]. A growing recognition of the strategic importance of speed and agility in the supply chain is forcing firms to reconsider traditional logistic services [1]. As a consequence, research interesting intermodal transportation problems is growing.

Kaohsiung is the most important metropolitan area in south of Taiwan. Currently, the Civil Aeronautics Administration has proposed the "Kaohsiung Airport overall planning and the future 5-year development plan" and the port of Kaohsiung has also provided "Kaohsiung overall planning and future development plans" in the light of new situation and varied investment environment for cross-strait transport and Taiwanese business industry. Which the international economic, cross-strait economic interaction and investment will effect the future of Kaohsiung airport and harbor. According to the effect of internal and external variables factors, it is necessary to inspect the Kaohsiung metropolitan area epistemic development plan and trend of domestic industry develop international logistics. Evaluating the development and investment direction of complex transportation system for Kaohsiung international logistics is also important. In order to achieve the benefits of the develop logistics integration; we set the Kaohsiung harbor and airport as the core of this study. Focus on the intermode between land (highway, railway), ocean and air transportation. Exploring that how to strengthen and develop the international logistics function and advantage by complex transportation from the level of international, inter-city and urban logistics. This study evaluates the effect of developing Kaohsiung harbor and airport by overall industry and economic environment per current international situation, development of domestic industries and cross-strait interaction. And analysis the conditions for Taiwan become international logistics center. In addition, after the airport regulation passed the feasibility of Kaohsiung maritime city also explored.

This objective of this study will be achieved by exploring the following three research questions:

1. To explore the critical variables and to extract the expert knowledge in developing international logistics in Kaohsiung area.
2. To explore the impact of critical variables constructs on developing international logistics of Kaohsiung area.
3. To build strategic decision of developing international logistics in Kaohsiung area.

The remainder of the paper is structured as follows. In Section 2, we discussed the intermodal transport and regional economy in Kaohsiung Harbor. Section 3 we described our methodology and Empirical study including interview survey, interview and extracting expert knowledge, survey

instruments, pre-test and pilot test, data collection, and sample characteristics. Next, we discussed the analysis results. Finally, section 5 presented our final conclusions and suggestions.

Intermodal Transport and Regional Economy in Kaohsiung Harbor

There is growing recognition that sustainable mobility implies inter-connecting transport systems that must provide a door-to-door service [2]. In this respect, planning intermodality offers a means of increasing the sustainability of the transport system: the better that different resources are co-ordinated so that they combine in an integrated manner, the greater the sustainability of the whole transportation system [3].

Macharis and Bontekoning [4] define intermodal transport as the combination of at least two modes of transport in a single transport chain, without a change of container for the goods, with most of the route traveled by rail, inland waterway or oceangoing vessel and with the shortest possible initial and final journeys by road. Road transport and constitutes a relatively large share of intermodal transport costs. This is mainly due to empty vehicle movements [1]. Morlok and Spasovic [5] assert that a central planning could lead to considerable cost reductions in the pre-and end-haulage of intermodal containers. The attractiveness of intermodal transport may thus be increased by organizing the road segment in the intermodal transport chain more efficiently.

In regions with an extensive ocean and air network, such as Hong Hong, Singapore, Osaka-Kobe area, to integrate the ocean and air transportation to build intermodal transport. Pre-and-end haulage by integrating various transportation systems constitutes an operational planning problem in intermodal transport in Kaohsiung airport and harbor.

Methodology and Empirical Study

The objective of this study is to build the strategic decision to improve the international logistics in Kaohsiung area. According to the objective of this study, we explore the critical variables and to extract the expert knowledge in developing international logistics in Kaohsiung area. And, based on the extracting expert knowledge, we design the instrument to investigate industry's opinions and to extract the critical constructs.

Interview and Extracting Expert Knowledge

In this study, the core methodology philosophy is interpretivism. The core methodology philosophy belonging to epistemology, as is one of the areas of research philosophy. Some suggest that the interpretivist perspective is appropriate in qualitative method [6]. In this study, we interview eleven industry's experts. Based on the expert's opinions, we extract thirty-one variables (strategies) to improve the international logistics in Kaohsiung area. All of the thirty-one variables are listed below:

S1: Collecting acquired resources in developing a single free trading zone.

S2: Integrating the free trading zone, logistic center, Asia Pacific operation center, science parks, and export processing zone into single customs territory outside the free trade area.

S3: Corporatizing Kaohsiung port operation for improving operational efficiency and inviting private investment.

S4: Making port land to public access.

S5: Amending laws for streamlining customs clearance.

S6: Defining deep processing of free trade zone by referring to the international trading decrees of major trading countries.

S7: Implementing autonomous management mechanism in free trading zone for 24hr goods clearance.

S8. Incorporating clearance examine system for facilitating customs clearance.

S9. Formulating expedient measures targeted on the policy of cross-straight direct or expedient shipment.

S10: Revising the policy of Cross-Straight direct or expedient shipment.

S11: Building safety management mechanism of customs supply chain.

S12. Forming inter-ministerial collaborative mechanism in public sector (e.g. Ministry of Economics, Communications, Finance)

S13: Forming the single-window unit for systematically managing affairs like port service, customs service, free trading zone, etc.

S14: Legalizing the corporation platform worked collaboratively by Kaohsiung Port and coastal second-line ports of China; besides, signing cooperation agreement.

S15: Permitting Kaohsiung port's investment in foreign ports and building operational nodes for providing goods transportation function.

S16: Incorporating the licenses and resources of cargo and freight transportation for lowering operation limits and costs.

S17: Taking initiatives in facilitating the international reciprocity agreements (e.g. dealing with the customs of trading countries, creating mutually-recognizing clearance mechanisms for facilitating customs procedures, the mechanisms are like the AEO of WCO, C-TPAT of the States).

Green economic strategy

S18: Assisting industries in forming standard

multiple transportation procedures.

S19. Developing technology applied into clearance and fulfilling the trading facilitation & cyberization.

S20: Helping multiple transportation procedures pass ISO/PAS 28000, ISO9001, and ISO 14001.

S21: Developing intelligent transportation system through technology in intellectualizing shipment & transportation.

S22: Improving interconnecting roads, e.g. building 2nd tunnel and high way leading directly into the port.

S23: Improving the roads within the port for bridging the linkage between ports and container terminal.

S24: Expanding the port hinterland, e.g. land reclamation, or adjacent land acquisition.

S25: Expanding the Kaohsiung container terminal of Kaohsiung port for boosting container capacity so as to reach the international standard.

S26: Negotiating the agreements that the number of flights be increased for complementing the freight capacity in Kaohsiung International Airport.

S27: Negotiating the deal that curfew of Kaohsiung International Airport be cancelled.

S28: Lengthening the runways of Kaohsiung International Airport to facilitate the landing of large 747 cargo freighter.

S29: Reviewing the establishment of southern international airport and reassessing its requirement.

S30: Reviewing the legal restrictions on multiply transportation, relaxing or amending the outmoded regulations.

S31: Relaxing the escort management measures and limitations on different ports of a terminal.

Survey Instruments

Our overall survey instrument was based on interview survey of extracting expert knowledge

The items were to be measured on a five-point Likert scale, ranging from 'Strongly unimportant' (1) to 'Strongly important' (5).

Pre-test and Pilot Test

A pre-test was performed with three industry's experts and two Ph.D. students using a questionnaire consisting of thirty-one items to improve the content and appearance of the survey instrument. Several large firms were then contacted for assistance with the pilot-test of the instrument.

The respondents were asked to complete the questionnaire and provide comments on the wording, understandability and clarity of the items, as well as the overall appearance and content of the instrument. Based on these initial responses, all statements were retained and only minor cosmetic changes were made. After a further review by two other academic researchers, the instrument was deemed ready to be sent to a larger sample to gather data.

Data Collection

Questionnaires were distributed to the department of government and to the direct and indirect related firms with intermode transportation in Kaohsiung area. Total of 82 responses were received. However, 5 more responses were eliminated because they were incomplete. Therefore, the results of this survey are based on an analysis of 77 effective responses (effective responses rate 7.7%).

Sample Characteristics

Table 1 provides a profile of the respondents. Most responses were from private companies at 36 responses (53.62%). In terms of sales revenue, the most responses occurred in the range below 1 hundred million (New Taiwan Dollars), at 27 responses (42.86%). In the item of position of respondent, the most responses was the higher than general manager, at 28 responses (37.84%). Finally, 16 respondents (21.33%) had the intermode industry experience in the range of 26-30 years.

Table1: Sample Characteristic

Demographic profile	Counts	%
Industry type	*(N=68)*	
Department of government	32	46.38
Freight and container transport	1	1.45
Airfreight Forwarders	5	7.25
Ocean Freight Forwarders	5	7.25
Shipping agents	10	14.49
Airlines	1	1.45
Customs agents	3	4.35
Warehousing logistics	7	10.14
Storage industry	1	1.45
Tally Industry	2	2.90
Shipping companies	1	1.45
Sales revenue (New Taiwan $)	*(N=63)*	
Below 1 hundred million	27	42.86
1.1~5 hundred million	9	14.29
5.1~10 hundred million	4	6.35
10.1~50 hundred million	14	22.22
50.1~100 hundred million	2	3.17
100.1~200 hundred million	7	11.11
Above 200.1 hundred million		
Years of establishment	*(N=74)*	
Less than 5 years	3	4.05
6-10 years	9	12.16
11-15 years	10	13.51
16-20 years	5	6.76
21-25 years	4	5.41
26-30 years	5	6.76
Over 31 years	38	51.35
Position of respondent	*(N=74)*	
Higher than general manager	28	37.84

General manager	21	28.38
Lower than general manager	17	22.79
Others	8	10.81
Person Experiences	*(N=75)*	
Less than 5 years	7	9.33
6-10 years	9	12.00
11-15 years	13	17.33
16-20 years	8	10.67
21-25 years	9	12.00
26-30 years	16	21.33
Over 31 years	13	17.33

Results

The research model in this study is based on a sample of 77 effective responses collected from the department of government and private firms in Kaohsiung area. We calculated the mean and standard deviation of strategic items. Based on the mean value, we rank the priority of the strategies to build strategic decision. The results are shown in table 2.

Table 2: Analysis Result and Rank

Item	Mean	Std.	Rank	Item	Mean	Std.	Rank
S1	4.63	0.80	**1**	S17	4.33	0.71	6
S2	4.34	0.68	**5**	S18	4.01	0.80	25
S3	4.25	0.71	13	S19	4.41	0.62	**4**
S4	3.97	0.89	29	S20	4.10	0.71	18
S5	4.62	0.59	**2**	S21	4.00	0.68	27
S6	4.25	0.63	12	S22	4.29	0.79	10
S7	3.99	0.84	28	S23	4.30	0.70	9
S8	4.55	0.66	**3**	S24	4.10	0.88	19
S9	4.15	0.59	16	S25	4.03	0.83	21
S10	4.05	0.97	20	S26	4.03	0.90	22
S11	4.22	0.76	14	S27	3.78	1.00	31
S12	4.32	0.83	7	S28	4.01	0.87	26
S13	4.31	0.78	8	S29	3.91	0.87	30
S14	4.11	0.85	17	S30	4.21	0.85	15
S15	4.01	0.93	24	S31	4.28	0.86	11
S16	4.03	0.80	23				

The top five ranks are as 1. S1: Concentrate the resources on the development of a single free trade area; 2. S5: Amend the laws to adopt a customs clearance and simplify customs clearance procedures; 3. S8: Integration of customs clearance to sign the trial system in order to speed up customs clearance; 4. S19: The development of technology, the establishment of customs clearance of technology, the implementation of trade facilitation and networking; and 5. S2: The integration of free trade ports, logistics centers, regional operations centers, science parks, export processing zones as a single customs territory outside the free trade area.

These top five strategies that can be separated into three main dimensions, as (1) customs service, and (2) develop a single free trade area. We discuss the result as below:

(1) Customs service: according to our interview with the industry's experts, some experts stressed that the clearance is too restrictive in comparing with Hong Kong and Singapore. It needs to amend the relevant laws in order to improve the customs clearance process. In addition, it uses the technology to build convenient customs clearance procedures and to improve trade facilitation. The goal is to speed up customs clearance through integrating customs clearance to sign the trial system.

(2) Develop a single free trade area: in Taiwan's economy issued process, the government has set up export processing zones, science parks, the Asia-Pacific operations center, logistics centers, and free trade ports in Kaohsiung area. The purpose is to improve industry environment and to accelerate economic development at that time. Government has given manufactures a different preferential terms in each park. The operation of each park has its own corresponding decree. The different preferential terms can assist industrial development, but also limit manufactures to select the manufactory' location. More importantly, some parks have been unable to meet the practical needs of manufactures, and even affect their development. Therefore, some experts suggest building a single free trade area in Kaohsiung through integrating the export processing zones, science parks, the Asia-Pacific operations center, logistics centers, and free trade ports.

Conclusions

Building international logistics of intermodal transport enhances the competitive advantage of Kaohsiung area as a whole. In this paper, we have extracted thirty-one strategies to improve the international logistics of intermodal transport influencing competitive advantage of Kaohsiung. With the study of Kaohsiung's international logistics and of intermode, we have found some key strategies and rank the top five strategies. We summarize the five strategies to two dimensions. The first dimension is that customs service is the influencing factor to improve the efficiency of cargo clearance. The strategy of customs service contributes more to speed up the clearance, to simplify customs clearance procedures, and to integrated system of customs clearance to sign trial. The second dimension is to developing a single free trade area which would create a business environment to invest. This strategy focuses on attractive manufactures to return Kaohsiung. To be incentive investment and to create the volume of transportation when this strategy is selected, relevant parties should be integrated, such as the free trade ports, logistics centers, regional

operations centers, science parks, and export processing zones.

With building the strategic decisions, this study makes a practical contribution in linking government policy with industry developed and its extracting strategies for helping government to create a good economic environment and to improve intermodal transport system. The extracting strategies of this study can be applied to other forms of across various industries involving expert knowledge. The results of the study provide practical insights in building how enhanced business environment can help enhance international logistic and intermodal transport system for achieving the competitive advantage to Kaohsiung harbor.

As a pioneer research in addressing the building international logistics of intermodal transport enhances the competitive advantage of Kaohsiung area. The study uses expert knowledge as a mediation to reflect the request of industry. The results of the study may serve as a starting point for develop a better intermodal transport system in Kaohsiung area.

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