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Planning for a Logistics Village

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Abstract: This paper provides a review of the characteristics of a comprehensive logistics village and an evaluation of Malaysia's logistics infrastructure. Currently, the country lacks a full-fledged logistics village but its function is provided for by freight transport terminals such as ports, inland ports and distriparks (for district parks). The locations of Malaysia's logistics terminals were less than desirable, traffic congestion was a commonplace at the terminals and intermodal transportations were lacking. A questionnaire survey on the perception of freight forwarders on the core elements of freight transport terminals, i.e., ports, inland ports and warehouses were conducted. The research had examined three core elements, namely, physical elements, activities and services as well as the respondents' level of satisfaction with the transport terminals. It was found that the respondents' perceived the terminal's core elements as being moderately important. They were moderately satisfied with the goods distribution process at the freight transport terminals.

Key words: Logistics village · Planning standard · Distribution system

INTRODUCTION

In the broadest sense, a logistics village is a centre for all companies to participate in activities related to transport and logistics [1]. A logistics village is a complex facility with multiple entities, including transshipment yards, warehouses, wholesale markets, information centers, exhibition halls and meeting rooms, among others [2].

A logistics village is not a new concept, but it has been around since 30 years ago [3]. [4] stated that a logistics village should encourage intermodal transportation. It is one of the key elements that functions as transferring points for freight to be passed from one mode to another [5]. It may offer very convenient transportation and synergic solutions (rail/road/short-sea shipping) that involves the use of block shuttle trains on long-range journeys through an intermodal transportation system [6]. One of the main differences between a conventional logistics industry site and a logistics village is that the access of transportation provided in a logistics village covers more than one transportation mode. It also contains a neutral management unit that assists logistics village tenants with the required services to optimize their operational performance [7].

In Malaysia, studies on logistics village are still new. Various organizations in Malaysia such as the Malaysian Logistics Council, Ministry of International Trade and Industry and institutions of higher learning were trying to implement the idea of a logistics village in the country [8]. The federal government believed that logistics villages are very essential in facilitating its efforts for ensuring that the logistics sector continues to contribute to the improvement of the country's economy [9]. A functioning logistics village could reduce problems such as traffic congestion [10], vehicle travel distance, transportation costs, journey time [2, 6, 11], accidents involving goods vehicles [12] and various pollutions emitted by goods vehicle [13].

Logistics Issues and Problems in Malaysia: Currently, comprehensive logistics villages have not been developed in Malaysia. There exist intermodal freight transport terminals such as ports, inland ports and also distriparks (district parks) that served its functions. With high demands and expectations in relation to the logistics and transport sectors, a good transportation and

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distribution system seemed very necessary to ensure that the intermodal freight transport terminals continue to support logistics activities. They function to reduce the problems pertaining to the transportation and distribution of goods in the country concerning the location of transport terminals, traffic congestion at terminals and the availability of intermodal transportation.

Traffic congestion had worsened in urban areas, partly due to the increase in truck volume and has the effect of increasing transportation costs [2]. [14] pointed out that many major cities in Malaysia such as Kuala Lumpur, Penang, Johor Bahru were facing serious traffic congestion. The situation was also experienced in large cities in other parts of the world. Traffic congestion was one of the most prevalent freight transport problems in large urban agglomerations. The globalization and the materialization of the economy had resulted in growing quantities of freight moving within cities. As freight traffic commonly shared infrastructures with the passenger traffic, the mobility of freight in urban areas had become increasingly problematic [2].

The total weight of cargo imports and exports throughout Malaysia were 252.6 million tons in 2005. The tonnage increased was projected to be substantial, i.e., 751 million tons by 2020 [15]. The increase in international trade volume using containers led to the rapid growth of container traffic at various ports in the country. That had resulted in congestion at the ports and delays in the delivery of containers. The problem reached a level at which manufacturers and exporters had to bear excessive costs of storage and delays at the ports [9].

According to the Department of Environment (2011), air pollution, especially in city areas came from three main sources, namely, mobile sources (vehicles), stationary sources (power stations and industry) and waste incinerators [13]. The mobile sources, i.e., motor vehicles, were a major contributor to air contamination. The pollution from stationery sources and waste incinerators were lower than the mobile source. Moreover, the increase in vehicle numbers and goods transportation activities contributed to the intensity of the transportation problems and created a variety of adverse effects on the operations of traffic systems. The total number of registered motor vehicles in Malaysia had reached 19.6 million in 2010 compared to 19.0 million in 2009. There were 17.9 million vehicles in 2008, 16.8 million in 2007, 19.4 million in 2006 and 14.8 million in 2005 [16]. The trend had contributed to severe traffic congestions because it was not compensated with improvements in road infrastructure.

The overall increase in the number of motor vehicles registered, coupled with many goods vehicles that were involved in road accidents, indicated that it was imperative that the conditions affecting the transportation of goods in Malaysia were improved [15]. The number of road accidents involving goods vehicles was very large, i.e., 44,859 in 2004, 61,147 in 2005, 44.815 in 2006, 47,795 in 2007, 48,250 in 2008 and 34,047 in 2009.

Goods vehicles that travel on a longer period of time may contribute to accidents more than goods vehicles that make shorter trips [12]. Besides that, higher costs are associated with longer travel distances and time for deliveries. A good logistics village planning provides a potential means of avoiding unnecessary vehicle travel miles.

Logistics Villages in the Malaysian Context: The persistent growth of freight traffic congestion, the worsening of air pollution in urban areas and the increase of imbalanced and inefficient land use and development drove the logistics practitioners and users to find alternative logistics solutions to ease freight transport problems. The logistics villages would serve an important role in the effort to establish a system of distribution of goods more effectively and systematically to support the tremendous pace of logistics development in Malaysia. According to the Ministry of International Trade and Industry (2006), logistics in Malaysia had been assumed to perform a very prominent role as the backbone for facilitating international trade [17]. Moreover, according to the Third Industrial Master Plan (2006-2020, logistics sector has also been recognized by the Malaysian government as a major source of revenue and a catalyst for the country's economic renaissance [9].

Malaysia need a more comprehensive and systematic system to ensure that the logistics sector become the key player in driving its economic development. According to the Third Industrial Master Plan (2006-2020), the country's total merchandise trade with the U.S.A. and Europe is expected to reach RM 2.8 trillion by 2020 [9]. The plan has a target growth rate of 8.6 % for the industry during its 2006-2020 planning horizon that would contribute 12.1% to the country's gross domestic product by 2020. In addition, the volume of total cargo handled by seaports is expected to increase by more than three folds, from 252.6 million tons in 2005 to 751 million tons in 2020. The volume of air cargo trade is projected to increase by more than two folds, from 1 million tons in 2005 to 2.4 million tons in 2020. Rail cargo volume is expected to increase almost five folds, from 4 million tons in 2005. A practical system was required to facilitate the great progress of the country's commercial sector.

According to the Third Outline Perspective Plan of Malaysia (OPP3, 2001-2010), shippers, including exporters, importers and freight forwarders were encouraged to utilize a multimodal transport system that was provided by logistics villages to reduce the need for long distance road haulages and avoid other common problems and, hence, increasing the efficiency of cargo movement [18]. [6, 19] recognized the significance of the good planning for logistics villages in creating a more effective mechanism for moving goods. Its impact could not be ignored when taking into consideration the importance of the logistics industry to the overall development of the country's economy [17].

[2, 11, 20] had suggested several approaches to help minimize the problems associated with goods transportation, e.g. traffic congestion, time consuming processes, industrial accidents and environmental pollution. They included the adoption of an effective intermodal transportation system, the practice of an uncomplicated documentation process, the running of an efficient warehousing system and the creation a safe and environment friendly infrastructure.

[8] had compiled a group of logistics village elements based on the opinions of various experts on logistics management as shown in Table 1.

Table 1: Experts' opinion on various logistics village elements

		Authors															
	Logistics Village Characteristics	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1	Intermodal Transport	v	v	v	v	v	v	v		v			v	v	v	v	12
2	Smart Warehouses	v	v	v		v	v	v		v		v	v		v	v	11
3	Meeting Room/Conference Centre			v				v									2
4	Office for Logistics Operators	v	v	v	v		v	v					v	v			8
5	Customs Operation	v		v										v		v	4
6	Truck Services and Repair	v		v									v	v		v	5
7	Transshipment Yard	v				v		v						v			4
8	Value Added production			v													1
9	Free Trade Zone			v							v						2
10	Cafe/Restaurant	v		v													2
11	Information Technology	v				v				v				v		v	5
12	Cargo Consolidation and Distribution	v				v											2
13	Design			v							v	v					3
14	Packaging					v								v		v	3
15	Telematic					v								v			2
16	Location		v	v							v	v			v		5
17	Access	v		v									v				3
18	Proximity			v									v		v		3
19	Business Services (Banking, Mail, Overnight Delivery)	v												v		v	3
20	Hotel/Motel/Truckstop for Drivers			v													1
21	Public Transportation and Internal Transit	v		v													2
22	Wholesale Market		v					v									2
23	Information Center							v									1
24	Management		v	v	v			v	v								5
25	Future Expansion										v						1
26	Hazardous Goods Store													v			1
27	Filling Station	v												v	v	v	4
28	Research Centre															v	1
29	Loading and Unloading	v															1
30	Area for Parking	v															1

The priority list contains twenty-five elements that could be grouped into seven areas: infrastructure (items 3, 5, 7, 12, 18, 22), system (1), operations (6, 9, 10, 13, 14, 15, 16, 23, 24, 25), procedures (2), services (4, 21), efficiency (8, 17) and quality (11, 19, 20). The majority were operations items (8 items). Intermodal requirements were related with four items, namely, items 3, 10, 12 and 14. There were ten items that were relevant to the government, i.e., items 1, 2, 6, 8, 10, 12, 14, 15, 18 and 22. As expected, a number of the items were concerned with infrastructure development, while others were related to system, operations, procedures and efficiency areas. Three of the items were concerned with customs operations, including Item 8, i.e., the speeding up of customs clearance process for goods transfer.

The listed items were prepared based on feedbacks from foreign respondents who were from European countries, where logistics villages were introduced about 30 to 50 years ago. Hence, many of their views reflected their regional logistics needs and the resources that they owned, which may differ from the situation in Malaysia. The differences are: Malaysia's geographical area is relatively smaller; it only has two terrestrial borders; the demand for logistics is smaller and its financial resources are limited. Hence, the country must be selective when considering the logistics village elements in its logistics capacity planning.

MATERIALS AND METHOD

Freight Transport Terminal Core Elements at Ports, Inland Ports and District Parks: A freight terminal's core elements consist of its physical elements (facilities), activity elements and service elements. They are the main thrusts in planning a good intermodal freight transport terminal. A terminal's characteristics were manifested by a number of goods distribution elements. A survey was conducted to determine freight forwarders' perception on the importance of freight terminal core elements as well as their level of satisfaction with the goods distribution process that took place at the terminals. The elemental importance was similarly rated and the level of satisfaction with the goods distribution process at the terminals were measured using a five-point Likert scale (1 for very dissatisfied to 5 for very satisfied). By examining the mean scores of the terminals' process elements, the researchers could evaluate the system performance of goods distribution at ports, inland ports and distriparks.

RESULTS

Table 2 shows the result of the survey for physical elements.

Table 3 shows the result of the survey for service elements. The scores were also in the midrange, i.e., the respondents perceived the elements as being moderately important.

Table 4 shows the result of the survey for activity elements. The scores were also in the midrange, i.e., the respondents thought that the activity elements were moderately important.

Table 5 shows the result of the survey for the goods distribution system performance. The scores were also in the midrange, i.e., the performance of the system was thought to be average.

Table 2: Mean and standard deviation of physical elements at ports, inland ports and distriparks in peninsular Malaysia

		Freight Forwarder					
		Por ts		Inland Port		Distripark	
#	Physical Elements	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1	Warehousing Infrastructure	3.56	.629	3.52	.610	3.54	.607
2	Loading and Unloading Areas	3.44	.629	3.53	.688	3.43	.630
3	Location, Direct Access or Proximity to Intermodal Facilities, Ports and Waterfront, and/or Airport Operations	3.47	.673	3.48	.654	3.44	.606
4	Delivery Bays and Design of Terminal	3.50	.626	3.50	.593	3.55	.639
	Cronbach's Alpha Value	.806		.744		.700	
	Sample Size	n= 257					

Table 3: Mean and standard deviation for service elements at ports, inland ports and distriparks

		Freight Forwarder					
		Ports		Inland Port		Distripark	
#	Core-On Site Services	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1	Safety of Cargo Delivery	3.51	.656	3.57	.656	3.50	.616
2	Loading Services	3.46	.678	3.51	.653	3.48	.640
3	Unloading services	3.45	.660	3.54	.633	3.50	.669
4	Offices for Logistics Operators	3.53	.625	3.56	.624	3.54	.662
Cronbach's Alpha Value		.750		.713		.774	
Sample Size		n= 257					

Table 4: Mean and standard deviation core-on site activities at ports, inland ports and distriparks

		Freight Forwarder					
		Ports		Inland Port		Distripark	
#	Core-On Site Activities	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1	Trade Documentation Processing	3.61	.616	3.54	.640	3.62	.634
2	Warehousing Services	3.47	.580	3.56	.665	3.46	.555
3	Clearance Process for Goods Transferred	3.38	.669	3.53	.667	3.58	2.10
4	Custom Operation	3.49	.685	3.45	.675	3.46	.622
5	Quality of Goods Transported	3.58	.709	3.68	.668	3.63	.672
6	The Availability of Intermodal Operation (Shift from Road to Rail)	3.53	.690	3.62	.729	3.53	.616
	Cronbach's Alpha Value	.810		.786		.452	
	Sample Size	n= 257					

Table 5: Mean and standard deviation for goods distribution system performance based on ports, inland ports and distriparks in peninsular Malaysia

		Freight Forwarder					
		Ports		Inland Port		Distripark	
#	Intermodal Freight Transport Terminal Performance	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
1	Value Added Production Infrastructures and Services	3.58	.633	3.56	.623	3.56	.688
2	Cost of Goods Transported	3.57	.715	3.60	.652	3.61	6.81
3	Time of Goods Transported	3.53	.690	3.64	.715	3.50	.661
4	Processing for Transportation and distribution of Goods	3.54	.624	3.56	.652	3.63	.621
5	Loading Infrastructure	3.41	.606	3.52	.646	3.47	.648
6	Unloading Infrastructure	3.41	.662	3.45	.617	3.49	.670
	Cronbach's Alpha Value	.817		.769		.763	
	Sample Size	n= 257					

CONCLUSIONS

The research concluded that the core elements of a logistics village can be divided into three elements, namely physical, service and activity elements. The core elements can be manifested by their respective sub-elements. The goods distribution system performance can be measured using several related process elements. Overall, the respondents perceived that all the logistics village and freight terminal core elements were moderately important. They were moderately satisfied with the goods distribution system performance at the ports, inland ports and warehouses.

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