



## Freight Transport by Road: Challenges Towards the Freight Transport Efficiency

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### ABSTRACT

Freight transport by road is the transportation of the raw material and finishing product from one location to another location and it is essential for the development of the country as it support the daily life of the residents and operation of industry. However, the challenges in freight transport by road has becomes the limitation to its efficiency. Therefore, identification of the challenges in freight transport by road is a need. The aim of this research is to identify the factors behind the challenges in freight transport by road. To achieve the aim, two objectives have been formulated which are identification of the challenges in freight transport by road and examination of the factors behind the challenges in freight transport by road. To achieve all the objectives, questionnaire survey and the development of partial least square (PLS) have been conducted. Questionnaire survey is conducted to the haulage companies. 12 challenges regarding the freight transport by road have being survey and the results indicates that the major challenges in freight transport by road are poor road condition access to port, congestion and poor loading/unloading activity at ports. The model for the challenges factor in freight transport by road then developed by using PLS. Six hypotheses are establishing and three were accepted. Therefore, it is hope that the government can address these factors in increasing the efficiency in freight transport by road.

**Key words:** freight transport, road, challenges, efficiency, target.

### 1. INTRODUCTION

Freight transport is the activity of goods movements from one destination to another destination by request of demand. The importance of freight transport does not only focus on satisfying the consumers on demand, but also can be viewed as an economic generator [1]. The history of freight transport was first introduced during the military operation where trucks were used to transport people, guns and food [2]. Then, the principle is adopted by the manufacturing sector, in the function of production, distribution and consumption. In Malaysia, the most common mode is by road. The demands in freight transport by road can be classified under three categories; domestic, import and export activity.

In recent years, the study of freight transport by road has caught the attention of many researchers due to the important of this sector to others sector. The development in increase the efficiency in freight transport by road has been targeted by the government in order to ensure the efficiency target in freight transport by road can be achieved. However, synchronized with the time, the efficiency that the government try to achieve is inevitable by the challenges in freight transport by road. According to [3], the challenges in freight transport by road starts when the national policy of Malaysia makes the load centering of freight at Port Klang. This has resulted to poor road condition and influence the effectiveness of commercial traffic in general as 95% of the freight is carried by trucks [4]. The criteria of road design such as width of lane, load bearing standards and junctions that are not

standardized, make the problems worse [5]. As mention by [6], the lane width of road that connecting the port, Federal Route 2, is 11.0 meter and from federal Route 2 to North Port is 7.0 meter. The narrow width of lane in from Federal Route 2 to North Port has slow down the trucks and cause delays which hence lead to the increasing of monetary costs and reduces time. In addition to the problems, the trend of industrial zone establishes near the urban area, increase the delay due to the combination between the private vehicles and commercial vehicles [3].

## 2. LITERATURE REVIEW

When the freight transport by road expands, the challenges associated with freight transport by road also increased. The objectives of freight transport by road are to provide access to the goods that people want when they want without causing avoidable damage to the physical environment and without consuming excessive resources. [7] stated that the challenges in freight transport by road are different with the challenges faced by passenger transport because freight transport often moves in a long distance to supply on demand and passenger transport meanwhile only travels for a short a distance. Hence, freight transport tends to create problems without benefit due to the distance and the size of freight vehicles that have many possibilities like accidents, deterioration, congestion etc.

[8] states that the challenges in freight transport involve seven key factors, which are commuting and peak hours, congestion, parking, cargo load contradiction, land use, green logistics and e-commerce. However, many researchers such as [9] believed the major challenges in freight transport by road are congestion, poor road, restricted access and accidents problem.

## 3. RESEARCH METHODOLOGY

This study uses the quantitative method, which is questionnaire. In this study, 12 major challenges have been developed and sent to the 150-haulage company to gain their feedback. A total of 70 answered received and being analyze by using Mean and Correlation analysis. The result then being further tested by using Exploratory Factor Analysis (EFA). Based on the results, a model was developed using PLS to test the hypothesis formulated in identifying the factors behind the challenges in freight transport by road.

## 4. FINDINGS

### 4.1 Challenges in Freight Transport By Road

In the questionnaire survey, respondents were given 12 challenges from which they think the most problems to them in order to meet the efficiency in freight transport by road. The result of the survey is analysing by using Mean to rank

the challenges according to seriousness and priority. Table 1 shows the result of Mean. From the Table 1, the poor road condition accesses to the ports is the highest rank followed by the poor coordination of loading/unloading activities at ports, congestion and so forth where the mean for these three highest risks are 3.53, 3.44 and 3.43 respectively. The competitive with rail transport is regarded as “Low” with the mean value of 2.67. From this result, it can be concluded that from 12 challenges asked, only one that being regarded as “High” to haulage which is poor road condition accesses to the ports. The others challenges are considered as “Moderate” except for competitive with rail transport that being considered as “Low”.

The poor road condition accesses to the ports exist when the road is frequently used by heavy vehicles and no regular maintenance is conducted to maintain the smoothness of the road [10]. As mention by [11], a road connecting to port has the poor road condition for over a decade and the authority seems unaware about that because it has left in that way without proper maintenance. Therefore, the government is urging to take an action on this matter as the road access to port transporting the goods that value thousand to millions Ringgit every day. [12] stated even the road in Malaysia is increasing, but the budget approved for maintenance is reducing. As a result, maintenance companies cannot perform road maintenance even though many complaints about road damage are received.

**Table 1:** Result of Mean Analysis

Items	Challenges	Total Mean	Rank	Interpretations
CH1	Excessive dwell times for freight vehicles at ports	3.31	5	Moderate
CH2	Congestion	3.43	3	Moderate
CH3	Poor road condition accesses to the ports	3.53	1	High
CH4	Poor coordination of loading/unloading activities at ports	3.44	2	Moderate
CH5	Blockages to the free flow of transit vehicles in the hinterland (i.e. between borders)	3.26	6	Moderate
CH6	Incompatible customs and immigration procedures	3.01	10	Moderate
CH7	Lack of a single transport authority for door-to-door consignments	3.00	11	Moderate
CH8	Inconsistency of fuel price	3.39	4	Moderate
CH9	Shortage of truck driver	3.26	7	Moderate
CH10	Competitive with rail transport	2.67	12	Low
CH11	Axle loads Problems	3.16	8	Moderate
CH12	Hijacking	3.13	9	Moderate

In order to determine the relationship between the challenges, correlation analysis test has been conducted. From the analysis, the challenges that give the large significant between each other are:

- a) Poor road condition accesses to the Ports and Poor coordination of road loading/unloading activities in ports (0.522).
- b) Congestion and Blockages to the free flow of transit vehicles and freight in the hinterland (0.533).
- c) Incompatible customs and immigration procedures and Lack of a single transport authority for door-to-door consignments (0.721)
- d) Poor road condition accesses to the ports and Poor coordination of road loading/unloading activities in ports

Poor road condition at the port is caused by the frequency of heavy truck trips. Due to the poor coordination of loading/unloading activity at the port, many freight vehicles have to wait in the longest time and cause the delay which resulting in poor road condition. This result thus, consistent with the finding by [13] that state poor coordination of loading/unloading activity at port is one of the factors to the poor road condition because inefficiency during the cargo handling has cause to congestion in port.

- e) Congestion and Blockages to the free flow of transit vehicles and freight in the hinterland

According to [14], among the challenges faced by the port in Asia are blockages to the free flow transit which resulting from slow customs inspection or slow document procedure. This blockage tends to cause congestion and increase the cost of transportation. Though the customs procedure in Malaysia has used electronic data interchange (EDI) in improving the system, but because of no standardization in systems in the neighbouring country, blockages to the free flow transit between borders occur.

- f) Incompatible customs and immigration procedures and Lack of a single transport authority for door-to-door consignments

[15] state delay in transportation that resulted from the slow inspection of customs clearance is because there is no single authority to observe the development in freight

**4.2 Identification of Challenges Factors from Exploratory Factor Analysis (EFA)**

EFA is a reduction technique that grouped the challenges into optimum number of challenges factors that best represent the coherent subscales. The data were examined in a 3-step procedure: a) checking the suitability of the data, b) determine the optimum number of factor extraction and c) identification of the challenges that “clumped” into each factor. Table 2 below show the results from EFA.

The result in Table 2 indicate that, all the challenges are clumped into four components and appropriate name are given according to the challenges that clump together with it.

For example, in component 1, the challenges of Poor road condition accesses to the ports, and Congestion are clump together. Therefore, this component are name as “Distribution”, as it reflect the challenges that loaded to it. The second component consists of three challenges which are Axle load problems, Incompatible customs and immigration procedures and Lack of single transport authority. These three challenges reflects to the Authority as axle load problems are caused by the regulation that being set by the Ministry of Transport (MOT), incompatible customs and immigration procedures is the problems under the Royal Malaysia Custom Department and lack of single transport authority is the problem regarding to no explicit authority to deal with the problems in freight industry. Thus, component 2 is re-named as “Authority”. The third component consist of three challenges which are Poor coordination of loading/unloading activities at ports, Excessive dwell times for freight vehicles at ports and Blockages to the free flow of transit vehicles and freight at the hinterland. From these three challenges, it can be concluding that it is reflects to the management in freight activity at port. Thus, component 3 is re-named as “Management”. The last component which is component four, consist of three challenges which are Inconsistency of fuel price, Shortage of truck driver and Hijacking. All of these challenges are not being influence by any factors that related to it. Because these challenges are stands alone to affect the freight transport by road, this component four has been renamed as “Others”.

**Table 2:** Result From EFA Analysis

Item	Challenges	Component			
		1	2	3	4
CH2	Congestion	0.747			
CH3	Poor road condition access to the ports	0.740			
CH6	Incompatible customs and immigration procedures		0.637		
CH7	Lack of a single transport authority for door-to-door consignments		0.665		
CH11	Axle loads Problems		0.640		
CH1	Excessive dwell times for freight vehicles at port			0.750	
CH4	Poor coordination of loading/unloading activities at ports			0.742	
CH5	Blockages to the free flow of transit vehicles and freight in the hinterland			0.861	
CH8	Inconsistency of fuel price				0.795
CH9	Shortage of truck driver				0.800
CH12	Hijacking				0.555

These four components are the key factors to the challenges that being summarized from 11 challenges variables in the questionnaire. It serves as the basis for partial least square (PLS) analysis. For the ease of further analysis, the challenges variables are coded according to its groups loaded. For

example, the variable of CH1 is coded into F1CH1 to show it is loaded to factor 1 and by the challenges number 1. The summary of the challenges variable and its new coded name is shown in Table 3.

**Table 3:** The Challenges Variables and Its New Coded Name

New Groups			
Distribution	Authority	Management	Others
F1CH2 F1CH3			
	F2CH6 F2CH7 F2CH11		
		F3CH1 F3CH4 F3CH5	
			F4CH8 F4CH9 F4CH12

Based on Table 3 also, six hypotheses develop and the model is illustrated as Figure 1. The develop hypothesis are as follow:

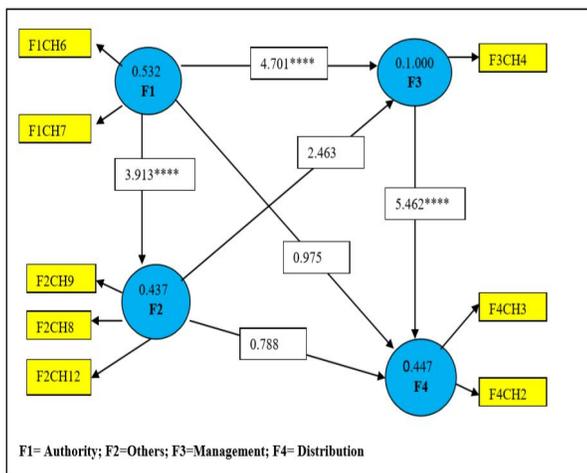
- g) H1 Authority has a positive significance influence to the Distribution
- h) H2 Others has a positive significance influence to the Distribution
- i) H3 Management has a positive significance influence to the Distribution
- j) H4 Authority has a positive significance influence to the Management
- k) H5 Authority has a positive significance influence to the Others
- l) H6 Others has a positive significance influence to the Management

The conclusion that can be made based on the developed model, when the significance level of 0.01 is used, the Management (Poor Coordination of Loading/Unloading Activity at Port) was identified to be the factors contributing to the Distribution (Poor road condition accesses to the ports and Congestion). This factor was highly influenced by Authority (Lack of Single Transport Authority and Incompatible customs and immigration procedures). However, Authority factor is found not directly affects the Distribution as it has low t-value. Other than that, it also found that Authority also influence the others factor (inconsistency of fuel price, shortage of freight drivers and hijacking) but others factor is found not contributing to the challenges in freight transport by road as it also has low t-value.

Based on the hypothesis results, it is recommended that the government focus to the Management factor as it give high impact to the Distribution. Management that consists of the challenges of poor loading/unloading activity at port, not only cause delay to freight traffic at entry gate, but also cause the poor road condition due to the frequency and overloading of heavy good vehicles. As the challenges of poor loading/unloading activity at the port is being influenced by the lack of single transport authority and incompatible customs and immigration procedures, it is hoped that the Port Authority and Ministry of Transport can improve the present system. As stated by [16], in recent time haulage companies found the productivity and efficiency has suffered due to various problems and bottlenecks in the industry, which are beyond their control while at the same time the customers demand for better services. Thus, by knowing the factors behind the challenges in freight transport by road, the government is hope can review the factors to address the challenges in freight transport by road.

**5. CONCLUSION**

This paper analyses the challenges that freight transport by road face in meeting the efficiency target. The result from the study indicates that poor road condition access to port is the most serious problem to the haulage operator, follow by poor coordination of loading/unloading activity at port and congestion. A deeper analysis on the relationship indicates that poor road condition access to port has strong relationship with the poor coordination of loading/unloading activities at ports while Congestion has strong relationship with blockages to the free flow of transit vehicles and freight in the hinterland. Another challenge that has strong relationship is incompatible customs and immigration procedures and lack of a single transport authority. From the analysis of EFA, it can be stated that the root cause behind the challenges were Authority, Distribution, Management and Others. This paper overall give an aerial view of the research on freight transport by road and will provide useful information’s for decisions supports and planning, and stimulating further research work in the area.



**Figure 1:** The Path Coefficient In The Pls Model

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