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The Trucking Classification Structure and the Effect of Deregulation, Essential Regulations and Regulatory Enforceent on the Trucking Industry

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Abstract: From the consultations with Malaysia's hauliers, freight forwarders and government authorities there are only three commercial trucking licence classes being issued in the country, i.e. for-hire, private and for-hire container licences in contrast to a more comprehensive license structure being practised in developed countries. In the U.S.A. for example, the license types being issued are intercity-private ; intercity-for hire; for-hire-common; for-hire contract; for-hire-exempt; interstate-common-general freight; interstate-common-specialised; interstate-contract-general freight; and interstate-common-specialised. The results of a survey involving managers of carriers indicated that it was possible to classify freight-specific licenses into specialised licence (for moving heavy, bulky, hazardous materials and security freight) and exempt licence. Trucking services could be categorised into three classes, namely, interstate-exempt, private and general freight/specialised freight. There were trucking regulations in Malaysia that were believed to be stifling carriers' operations. Examples were regulations that demanded a low minimum driver's age, the enforcement of road bans on trucks on certain highways, the prohibition of backhauling and the use of high-tech vehicles. A factor analysis on the "constraining" regulation items had extracted five distinct deregulation factors (those regulations that needed to be unregulated), namely, route, regulatory control (operations), regulatory control (restrictions), policy and vehicle specification. There was a significant relationship between deregulation and carriers' overall performance. There was no significant relationship between carrier performance and revenue, carrier size and performance and carrier size and revenue. On average, the number of licences issued to carriers and the number of prime-movers in the market was more than sufficient to meet the demand for trucking services in the country. Finally, the 1958 cargo delivery rate of 16.6 *sen*/tonne/km (*sen* is Malaysia's coin name) was believed to be unsuitable by many carriers, considering the existing cost levels.

Key words: Trucking classification structure · Deregulation · Essential regulations · Enforcement

INTRODUCTION

This paper discusses the results of a survey involving trucking operators to obtain their feedback on several important variables such as the trucking class, trucking service, deregulation, essential regulations, regulatory enforcement and carriers' overall performance.

In Malaysia, the existing classification structure is too simplified to be able to achieve the Public Land Transport Commission's (SPAD's) objectives. The classification structures used in developed countries such as the U.S.A and the UK are well defined and goal oriented. Hence, it was considered in the research to benchmark them. The objectives of the research were: (1) To develop carrier classes based on the type of freight; (2) To develop carrier classes based on trucking services; (3) To identify deregulation areas; (4) To determine the relationship between deregulation, essential regulations and carrier performance; (5) To test the moderating effect of enforcement on the relationship between deregulation, essential regulations and carrier performance, if any; (6) To evaluate the adequacy of the number of licences

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issued by the SPAD; (7) To examine the inter-correlation between company performance, revenue and size, if any; and (8) To enumerate the distribution of cargo carriers' perceptions on the relevance of the government's issued tariff.

The research objectives were translated into several research questions as follows:

- Could trucking licence classes be developed based on the type of freight?
- Could licence classes be developed on the basis of trucking services?
- Did certain regulations constrained carriers' trucking operations and hence were candidates for deregulation?
- Were there deregulation items that belonged to coherent themes or factors?
- Was there a relationship between deregulation factors, if any and carriers' performance?
- Was there a relationship between essential (government-issued) regulations and carriers' performance?
- Did enforcement moderate the relationship between deregulation, essential regulations and carriers' performance, if any?
- Was the industry issued with an adequate number of trucking licences?
- Was there a correlation between carrier performance and revenue, carrier size and performance and carrier size and revenue?
- What were the perceptions of cargo carriers on the relevance of the government issued tariff and how were they distributed?

Trucking Classification Structure: The SPAD issues two types of licences, namely, "A" for for-hire vehicle license and "C" for private-good licence. These general-cargo classed vehicles can carry a variety of goods. For example, a prime mover of an oil tanker can be used to carry an automobile loader. An "A" license can have a prefix "K" (for container). It is dedicated to container-carrying vehicles that handle goods for export and import.

In comparison, amongst the U.S.A., UK and Canada, many trucking classes had been introduced, including local, intercity-private, intercity-for hire, for-hire-common, for-hire-contract, for-hire-exempt, interstate-common-general freight, interstate-common-specialised, interstate-contract-general freight and interstate-contract-specialised; standard national and international; general; local (intercity); long distance; regular route; and irregular route [1-21].

Industry Regulation: There are many regulations that affect the trucking operators' operations. The government have stopped issuing new "KA" licences, which totals 350 licences because it was thought that there was already an adequate supply of "KA" trucks that could meet the demand for container transportation in the country. The Association of Hauliers, Malaysia (AHM) believed that the supply of prime movers exceeded demand. Many carriers had resorted to price cutting to beat the competition.

The "A" operators persistently requested from the government the licence to carry containers as well (an "A" to "KA" issue) because their vehicles became idle when the goods they transported were off seasoned and hence they could be used to carry containers. The freight that an "A" vehicle could handle depended on the vehicle type. The former Commercial Vehicle Licensing Board (CVLB) had prepared the illustrations of various vehicle types that indicate the goods that they could carry. Carriers should refer to the illustrations so that they adhere to the authorised vehicle-goods prescriptions.

The Road Transport Department (RTD) are responsible for determining and enforcing vehicle and load weight restrictions on national roads. Trucking companies had been requesting for the truck weight limit to be raised from eight metric tonnes to twelve metric tonnes. No decision had been made on the matter yet. The Public Works Department's ruled that the country's highways could accommodate a maximum of twelve metric-tonne vehicles but not the state roads. Carriers also sought the approval of the SPAD to operate very heavy carriers such as multi-trailers and multi-axle trailers. The RTD could not approve the request because a more suitable infrastructure (e.g. stronger curbs and gentler corners) is required to accommodate very heavy vehicles. The government had introduced a road ban on heavy vehicles at two major highways----NKVE and Federal Highway from 6:30 A.M. to 9:30 A.M. to reduce traffic congestion. The road ban had caused hardships to carriers because it delays the delivery of their goods. The tariff for the "KA" service has been fully liberalised but the archaic tariff for the "A" service (introduced by the government in 1958) remains valid. However, operators do not apply the impractically low "A" tariff but allow market forces to take its course and settles at equilibrium.

A thorny issue that badly affected Malaysia's trucking industry was the shortage of drivers. The reasons for that were: (1) There was a short supply of new drivers and (2) Many drivers left for a higher-income job. The short supply of new drivers was believed by some to be partly contributed by the high minimum eligible driver's age, i.e. 21 years old that is specified by the RTD.

Deregulation: The government had been very accommodating to the trucking industry by way of providing assistance in various kinds and forms. A 30% tax exemption was given to operators for the purchase of every new prime mover. Despite the substantial incentive given to carriers, the prime movers that cost some RM300,000 per unit was, however, still costly to own. Prime movers were being imported either from Europe or Japan. Many operators imported reconditioned prime movers from Japan. Some of the prime movers were very old, ranging from ten to twenty years. The use of very old prime movers increased operations cost in the long run stemming from costly vehicle maintenance, low vehicle efficiency and reliability, downtimes and the significantly limited eligibility to warrantee claims.

SPAD maintain a one prime mover-one trailer rule. However, carriers are given an exception where every prime mover can be assigned to seven trailers. This could ease the pressure off operators from running out of trailers when stacked trailers have to be left at the customers' premise for loading, which could take several days or weeks. While boxes are being loaded, prime movers can be assigned to other trailers and assume other movements such as retrieving empty boxes and sending loaded boxes to seaports.

Thailand and Malaysia have already sealed a bilateral agreement that covers a wide area of cooperative arrangements, including, cross-border trucking. Thailand's carriers are allowed to apply Malaysian trucking licenses subject to certain procedures and requirements and vice versa. If their application is successful, they will be issued licences to transport goods to and from Malaysia. In the year 2015, the ASEAN Framework Agreement on the Facilitation of Goods in Transit (AFAFGIT) will come into force where trucks from bordering countries would have an unrestricted two-way entry. The competition is postulated to be more intense especially from trucking companies in Thailand, where the fixed and operating costs (e.g. cost of capital items, labour and spare parts, including tyres) are much lower and hence their service rates are more competitive. In addition, the longer work hours in Thailand increase their supply capacity.

Regulatory Enforcement: The regulatory enforcement is concerned with the safety and quality of service provisions, which actually tightened and raised the barrier of entry as opposed to deregulating it [22]. Such enforcement could result in the exclusion of unsuitable operators for the purpose of maintaining the trucking service quality. The primary concern about deregulation was the adherence to safety standards that could be undermined by carriers facing financial stress due to the competitive trucking environment. [23] pointed out that enforcement is a set of standards (technical and behavioural) and imposed penalties and sanction to those who break imposed regulations.

MATERIALS AND METHODS

The classification of licences on the basis of freight types depended on the freight (e.g. agricultural produce, metal, cement, woods, oil and gas, etc.) that recorded the highest frequency based on the feedback received from carriers. The service classes were based on carriers' level of agreement or disagreement on whether trucking services such as private or for hire, exempt, owner-operator, regular or irregular and specialised or general were perceived to have or would have a positive contribution toward the carriers' performance.

A list of regulations that had been exercised in Malaysia was prepared. The carriers' perceptions on the possible constraining effects of the regulations were analysed. The regulations that the carriers believed were restricting their operations were considered candidates for deregulation. Examples of potential deregulation were the freedom to load any types of goods, backhaul exemption, route freedom, exemption on vehicles used in agricultural operations, the liberalisation of entry, government's imposed pricing, political interference, maximum axle load, minimum driver's age and road ban.

Carriers' were asked to gauge the adequacy of essential regulations that affected them in terms of the areas they served, protection against liabilities, freight types, their vehicles' age, exhaust emission, travel speed and load capacity. Their perception on the adequacy of regulatory enforcements on items such as vehicle quality and safety standards, environmental conservation, driver's skill, driving hours, maintenance of equipments and insurance cover were also solicited.

The research data were gathered on the basis of a questionnaire survey of carriers. They were each represented by one of their managers who was knowledgeable about his or her carrier's functions. The survey instrument (questionnaire) was made up of

several types of items (open and close-ended questions, multiple-choice questions and Likert scales) that solicited respondents' feedbacks concerning the research variables.

The Malaysia Logistics Directory 2010 was used as the sampling frame. The directory contained 552 carrier establishments throughout the country. The convenience sampling was used with samples taken from the state of Johor, Negeri Sembilan, Selangor, Kuala Lumpur, Pulau Pinang and Kedah. The states were chosen because of their close proximity or the presence of high levels of trucking activity. Samples were taken for each type of licence class. An equal sample size of 80 operators was conveniently decided for each type of carrier. The sample size chosen was consistent with Roscoe's recommendation [24], i.e. 30-500 for similar types of research. The sample selection did not follow any particular sequence. Data were collected from sample elements until 80 sets of data had been collected for each license class. Personal and mail surveys were carried out throughout December 2011. In total, the researchers had distributed 600 questionnaires that included other carriers that were not listed in the directory.

Frequency analyses were used on variable counts; regressions analyses were performed to test for any asymmetrical relationships among variables; correlation analyses were used to determine the relationship between carriers' size, revenue and overall performance; and the Monte Carlo simulation technique was used to determine the adequacy of prime movers that were available in the market and the number of licences that the government had already issued.

RESULTS

Two hundred and fifty seven trucking entities took part in the questionnaire survey. That was equivalent to a 42.8% response rate, which was considered sizable. The distribution of "KA," "A," and "C" licences was almost equal, i.e. 89, 82 and 86, respectively. There were many types of freight that carriers handled, namely, livestock; fish; agricultural produce; metals; petroleum; food, hazardous materials; earth, rock and sand; ores; vehicles; timber; building materials; money; animal nutrition, medicine, equipments; and chemicals. Overall, it was possible to classify trucking licenses according to the materials that were most widely delivered. The possible licence classes were specialised licence (for moving heavy, bulky and hazardous materials and secure freight) and exempt license (for moving agricultural produce; earth, rocks and sand; among others).

Table 1: Rotated Factor Matrix of Trucking Services

	Factor Loading			
Factor	1	2	3	4
Factor 1				
Full container load	.713			
Drayage	.685			
Postal	.593			.390
Long-distance trucking	.563			
For-hire	.484	.447		
Truck class	.484		.415	
Irregular route	.478	.445		
Local trucking	.435		.354	
Exempt		.710		
Factor 2				
Owner operator		.573		
Common and contract	.503	.563		
Private carrier		.392	.302	
Regular route		.382		.337
Factor 3				
Class revenue			.737	
Courier			.659	
Loose container load	.338		.424	.314
Truckload			.362	
Factor 4				
General freight				.667
Specialised freight	.436			.611
Less-than-truckload		.374		.486

A factor analysis of trucking services had extracted four factors with an eigenvalue exceeding 1.0 (Table 1). Their Cronbach's alpha value exceeded the minimum value of 0.6 that was recommended by Sekaran [25]. Hence, the measurement scales used were reliable.

On examining the items in each factor, it was found that similar services were found to be jumbled up between factors. For example, the full container load service had been assigned to Factor 1 but the loose container load service was found in Factor 3. It was, however, possible to assign a licence class each to three valid factors based on the characteristics of their items, namely, interstate-exempt (Factor 1), private (Factor 2) and general freight/specialised freight (Factor 4). Overall and based on best practices, it was possible to develop four trucking service licence classes, namely, private/for-hire, general freight/specialised freight, exempt and interstate.

A factor analysis on the constraining effects of trucking regulations on carriers' operations had derived five factors with an eigenvalue of 1.0 or higher. The rotated factor matrix is given in Table 2.

The Cronbach's alpha value of each factor was high, ranging from 0.714 to 0.813 (exceeding 0.6). Hence, the measurement scales used were reliable. On the basis of the item groupings, the five distinct regulation factors that

Table 2: Rotated Factor Matrix of Regulation Items

	Factor Loading				
Factor	1	2	3	4	5
Factor 1					
No mergers	.818		.311		
Route limitation	.685				
Insurance limitation	.589				
No self weighing	.575			.345	.331
Factor 2					
Bureaucracy		.638	.409		
Inspection at specified points		.618	.590		
Declaration of goods and price	.315	.588			
Low minimum driving age		.553			
Loading/unloading at approved points		.518			
Restriction on the passing on of consignments	.438	.442			
Factor 3					
Partial liberalisation	.316	.364	.361		
Weight restriction on trunk roads			.661		
Backhaul restriction			.614		
Commodity restriction on highways			.586		
Strict license definition			.340		
Factor 4					
Political intervention				.822	
Road ban			.349	.402	
Archaic imposed tariff			.393	.397	
Non-exempt agricultural commodities		.361		.386	
Factor 5					
Restriction on high-tech vehicles	.324				.897
Restriction on vehicle's number of axles on highways	.370		.317		.380

restricted carriers' operations (or deregulation factors) were route, regulatory control (operations), regulatory control (restrictions), policy and vehicle specification that corresponded to factors 1 to 5, respectively. Respondents had assigned a moderate rating to all items. Hence, they had moderately agreed that the regulations were restrictive to their operations and, therefore, should be deregulated.

The following are the government's essential regulation items that the carriers perceived as being moderately effective in controlling the operations of the trucking industry:

- A licence is issued to a carrier when it could show that it is fit, willing and able to provide a service that fulfils public purposes.
- A licence is issued to a carrier when it could serve small communities or areas that otherwise are not considered attractive from an economic perspective.
- Carriers must possess a sufficient liability insurance cover to protect the public from accidents.
- There is a mechanism for evaluating the service of carriers at the state level.
- The liability for any loss or damage of goods in transit is included in the price-quality package that is agreed upon by the carrier and the shipper.
- Carriers do not operate trucks that have been used for more than 30 years.
- There are existing laws that emphasise on lowering greenhouse gas emissions and increasing fuel efficiency standards for medium and heavy-duty trucks.
- There are existing rules requiring truck speed to be electronically controlled (by way of installing a special device that could track and control truck speed).
- Trucks are weighed at major roads, points of entry and exit, loading and unloading bays at ports, factories, warehouses, etc.
- An industry association is chartered by the government to assess its members' standard of service.
- Various licence types are issued based on the types of goods handled and vehicle forms.
- There are existing regulations on load quantity that corresponds with vehicle capacity.

The following items were perceived to be moderately exercised by the enforcement bodies-the enforcement of:

- Vehicle quality and safety standards;
- Environmental conservation measures;
- Driving skill and competency requirement;
- Driving hours standard;
- Minimum capital requirement.
- Standard maintenance of equipment;
- Insurance coverage; and
- Appropriate trucking procedures.

The result of a multiple regression analysis for testing the relationship between deregulation factors and carrier performance was significant, $F(5, 209) = 6.721$, $p < 0.05$. The coefficient of determination, R^2, equalled 0.139. On analysing the significance of each factor, it was found that only two factors were significant, i.e. regulatory control (restrictions) and vehicle specification, $t(215) = 2.211$, $p < 0.05$ and $t(215) = 2.218$, $p < 0.05$, respectively. The regression coefficients were 0.162 and 0.111, respectively. Hence, it was concluded that the two deregulation factors contributed to carrier performance. The enforcement variable was found to moderate the deregulation-carrier performance and essential regulations-carrier performance relationships. On the basis of Pearson correlation analysis it was found that there was no significant relationship between carriers' revenue, size and performance.

The average number of prime movers owned by a "KA" carrier was 50. The quantity was used in a one-month Monte Carlo simulation of the request for orders of container delivery. Job arrivals were labelled as single, whole-day trips or multiple, partial-day trips. The range of the daily single and multiple trips was the same, i.e. 0 to15 trips and the mode was 32 and 27 trips per day, respectively. It was assumed that single trips took precedence over multiple trips. On the basis of the number of prime mover trips that was generated using random numbers, the carriers' service characteristics are as follows:

- Average daily single trips = 3
- Average daily multiple trips = 3.5
- Average number of trips per day = 6.5
- Average number prime movers idle per day = 43.5

The number of licences (and prime movers) already issued was more than sufficient. However, the average prime mover idleness was very high. Given the existing cost structure, many respondents believed that it was inappropriate to apply the 1958 cargo delivery rate.

CONCLUSIONS

Overall, it was possible to classify trucking licences according to freight type. The possible license classes were specialised licence (for moving heavy, bulky and hazardous materials and secure materials) and exempt license (for moving agricultural produce, earth, rocks and sand, among others). On the basis of trucking services, it was possible to derive three licence classes, namely, interstate-exempt, private and general freight/specialised freight. It was possible to extract five distinct regulation factors that restricted carriers' operations (or deregulation factors), namely route, regulatory control (operations), regulatory control (restrictions), policy and vehicle specification. Both deregulation and essential regulations had a significant relationship with carrier performance. The enforcement variable moderated the deregulation-carrier performance and essential regulations-carrier performance relationships. There was no significant relationship between carrier revenue, size and performance. The number of haulier licenses that was issued by the government was more than sufficient to cater for the country's demand for haulage services. Given the existing cost structure, many respondents believed that it was inappropriate to apply the 1958 cargo delivery rate.

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REFERENCES

1. Congressional Digest, 1979. Structure of the Trucking Industry. Congressional Digest, 58(10): 226.
2. Federal Motor Carrier Safety Administration, 2012. Interstate operating authority and financial responsibility. http://www. fmcsa. dot. gov/ registration-licensing/registration-OP.htm (Accessed Mior-2012).
3. Joseph, T., 2007. What Is ICC Authority? http://eziнearticles. com/?What-Is-ICC-Authority? and id=670332 (Accessed: Mior-2012).

4. Business Link, 2012. Operator's Licenses for Goods Vehicles: The Basics. http://www. businesslink. gov. uk/bdotg/action/detail?itemId=1082096329andr.i=1082096477andr.l1=1081597476andr.l2=1082103262andr.l3=1084755973andr.l4=1082095357andr.s=scandr.t=RESOURCESandtype=RESOURCES (Accessed: MIor-2012).
5. Vehicle and Operator Service Agency, 2009. Goods Vehicle Operator Licensing: Guide for Operators. http://www.dft.gov.uk/vosa/repository/10%20157a.pdf (Accessed: Mior-2012).
6. Roger, B., 2010. Why are We Waiting? Commercial Motor, 213(5408): 18-19.
7. Christabel, H., 2008. Behave Yourself. Commercial Motor, 207(5273): 26-27.
8. Lambert, D.M., J.R. Stock and L.M. Ellram, 1998. Fundamentals of Logistics Management. Singapore: The McGraw-Hill Book Co.
9. Muller, G., 2005. Logistics 101: Motor Carriers. Logistics Today, 46(3): 16-18.
10. Coyle, J.J., E.J. Bardi and R.A. Novack, 2000. Transportation. Boston: South-Western College Publishing.
11. Bloomberg, J.D., S. LeMay and B.J. Hanna, 2002. Logistics. New Jersey: Prentice-Hall, Inc.
12. Cohen, M.A. and M. Lieberman, 1949. Collective Bargaining in the Motor Freight Industry. Industrial and Labor Relations Review, 3(1): 17-32.
13. Agar, M.H., 1983. Political Talk: Thematic Analysis of a Policy Argument. Policy Studies Review, 2(4): 601-614.
14. Peoples, J. and M. Peteraf, 1997. Deregulation and the Competitive Fringe: Owner-Operators in the Trucking Industry. Journal of Regulatory Economics, 7(1): 27-42.
15. Federal Motor Carrier Safety Administration, 2004. Overview of Federal and State Regulations Concerning Interstate Motor Operations. http://www. fmcsa.dot. gov/registration-licensing/licensing/overview. htm (Accessed: Mior-2012).
16. North American Industry Classification, 2007. Truck Transportation. http://stds.statcan.gc.ca/naics-scian/2007/ts-rt-eng.asp?criteria=48-49 (Accessed: Mior 2012).
17. Utah Department of Transportation, 2007. Obtaining US Department of Transportation Numbers, Operating Authority and MCS-150 Updates. http://www. utahmc.com/trucking_guide/6-obtaining-usdot-numbers-operating-authority-and-mcs-150-updates (Accessed: Mior-2012).
18. Taff, C.A., 1961. Commercial Motor Transportation. New York: Liberty of Congress Catalogue.
19. Han, C., T.M. Corsi and C.M. Grimm, 2008. Why Do Carriers Use Owner Operators in the U.S. For-Hire Trucking Industry? Transportation Journal, 47(3): 22-35.
20. Moritz, E.P., 1978. Cost/Benefit Analysis: Effective Measurement of Motor Carrier Operations--The Impact of Institutional and Market Structures. Transportation Journal, 17(4): 40-55.
21. Hirsch, B.T., 1988. Trucking Regulation, Unionization and Labour Earnings: 1973-1985. Journal of Human Resources, 23(3): 296-319.
22. Boyer, K.D., 1997. Principles of Transportation Economics. Boston: Addison Wesley Longman, Inc.
23. Gubbins, E.J., 1988. Managing Transport Operation. London: Kogan Page Limited.
24. Sekaran, U., 1984. Research Method for Managers: A Skill-Building Approach. New York: John Wiley and Sons Ltd.
25. Sekaran, U. and R. Bougie, 2009. Research Method for Business: A Skill-Building Approach (5th ed.). West Sussex: John Wiley and Sons Ltd.