STREET TURN STRATEGY: AS A GREEN LOGISTICS TOOL IN MALAYSIA

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Introduction

In recent years, the logistics industry in Malaysia has expanded very quickly in response to the pressures of globalisation. As one of the biggest industries in Malaysia, the logistics and transportation sector has the sheer size of being large enough to have a significant impact on the environment. As such, reducing harm to nature can be done by implementing a logistics and transportation strategy that is friendlier to the environment. This is a point established in a study conducted by Rodrigue, J.P., (2011), the logistics and transport industry is a major contributor to environmental issues through its various modes and infrastructures. As a developing industry, logistics and transport was seen as a golden opportunity for the adoption of more environmentally friendly practices and present a more environmentally friendly face to the world at large.

At the forefront of this development in the logistics industry is the humble container. However, transporting a container is not an environmentally friendly process. For example, in Europe prime-movers contribute up to 10 percent (10%) of the carbon dioxide emissions (CESER, 2009). As similar vehicles are used here in Malaysia for the transportation of containers, emission figures should not be largely dissimilar. Hence, “green” practices such as minimizing the movement of empty containers should be practiced in Malaysia. The industry practice of container movement in Europe largely uses two strategys which called „Depot Direct" and „Street Turn", these strategys are looked upon as suitable tools for the management of containers that is hauled by the prime-movers. However in Malaysia, logistics practitioners still have not implemented similar strategys that will be the foundation of green logistics thus helping in reducing carbon emissions in Malaysia. If Malaysia truly desires to implement similar strategys like those found in European there is no need to implement a change in the logistics network structure-that may be costly. A mere change in management can generate efficiency and effectiveness gains over a longer period of time, (Association of Malaysia Haulier, 2011). Therefore, this study is a suggestion to the government and the logistic industry to clarify which is the best strategy for implementation in order to manage the movement of empty containers based on the cost measurement indicator.

Problem Statement

Normal operations involving the movement of empty containers, is usually identified with inefficiency, as there is a failure to maximise utilisation of both fuel and the vehicle. A study by Dam Hanh, P.I.L (2003), had found that for inbound and outbound cargo, loaded containers are picked up by haulier companies from the carrier"s terminal and are delivered to the consignee for unloading. The containers are then returned to the carrier"s terminal, usually by the same haulier company. The same practices are in place for outbound cargo. Haulier companies pick up empty containers required by an exporter from a carrier"s terminal and deliver these empty containers to the exporter for loading. After a container has been loaded, a haulier company will transport the loaded container to the carrier"s terminal where it will be stacked at the pier prior to loading on to a container ship. It is clear that, in the case of both export and import cargo, at least two thirds of the require container haulage trips involve empty container movements, either for empty pickup or empty return.

McKinnon, A. and Edwards, J., (2010), said that empty journeys are not only wasteful economically, but also carry an environmental problem. They also said that, nowadays this situation is not similar because over the last 30 years the proportion of empty running by haulage in the UK has steadily declined, yielding significant economic and environmental benefits. As a conclusion, in order to solve this empty container problem, most of marine terminal companies have come out with several strategys which have been put into practices. The main thrust of these management practices is not only to reduce the problem of empty containers but also to support principles of green logistics in managing global warming issues.

One of the most popular strategys that are implemented in the United Kingdom (UK) and marine terminals in the United States of America (USA) is a combination of the “Street Turn” strategy and “Depot Direct” strategy.

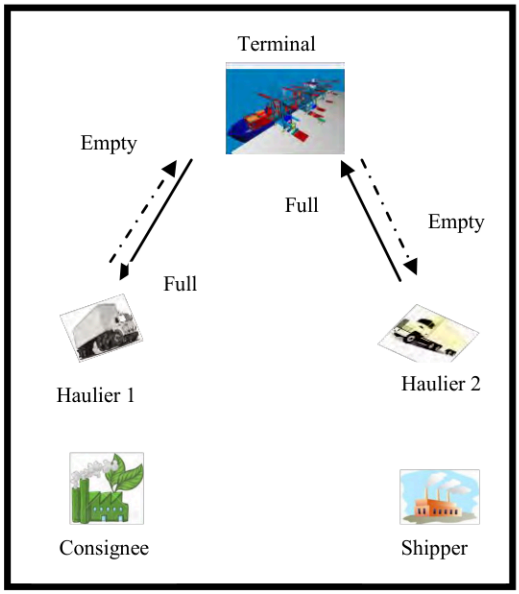

Figure 1: Depot Direct

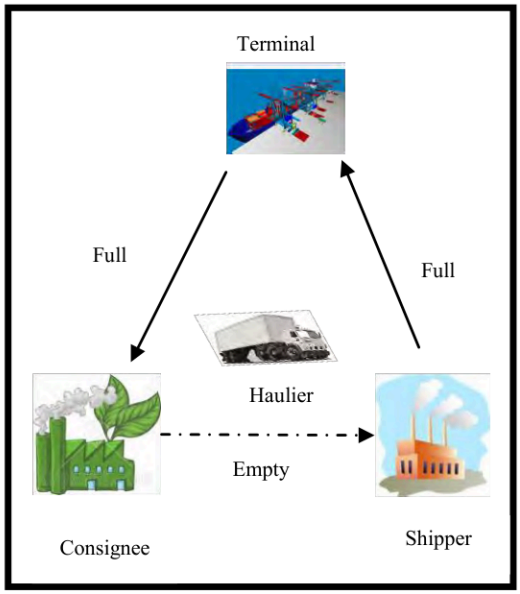

Figure 2: Street Turn

A study by Jula,H., et al., (2008), defined depot direct strategy as a normal operation of container haulage for import and export goods from terminal, port or depot to their consumer and this strategy is suitable for the short distance travel. The „Street turn strategy" defined as movement full load container haulage from the beginning and until the ending of operation and the rules for this strategy is consists of using empty import container for export loads without first returning them to marine terminals. According to International Asset Strategys (IAS), 2006, this “Street Turn” strategy can be more effective by running together with information system that automatically updates the information about the availability and location of empty containers. Based on the street turn strategy, researchers have found that by implementing the idea of reusing empty containers, substantial reduction in related haulage trips from and to the container ports, reduction in costs can be obtained. Moreover, as a result of the study conducted by Jula, H., et al., (2008) showed that by allowing substitution between different types of empty containers, we can further decrease the number of the haulage trips and also cost related to empty containers. In other that, by implementing the idea of reusing empty containers the traffic congestion around the container terminals can be improve and as a consequence emission can also be reduce significantly.

In Malaysia, the depot direct strategy is normally used by industry players and from the general observation this strategy is not environmental friendly strategy if we want to support the principles of green logistics, as it truly shows wastage in terms of cost and carbon emissions (Association of Malaysia Haulier, 2010). However, if there is implementation of a new straegy like „street turn" in Malaysia for container haulage operation, the question which arises is how effective this strategy in reducing cost operation in the haulier company? The effectiveness of this street turn strategy has been measured by looking at the cost operation (to measure the commercial impact) and also the perception toward this strategy implementation.

Literature Review

Normally, the “Depot Direct” strategy will be used by a haulier company when operating a prime mover for the carriage of a container from depot, port or terminal to a customer"s designated place of delivery. Detailed explanation of this strategy was given by Dam Hanh, P.I.L (2003), in his study. He has said that the potential benefits of depot-direct are establishing a neutral supply point for reusable empties,

facilitating empties drop-off and pickup when terminal gates are congested or closed and adding buffer capacity to the marine terminals. The concept of off-dock empty depot may be more attractive and promising in the long term than the short term. However, in the long term, congested marine terminals and the high capital cost of expanding on-dock containers would justify the higher operating cost of empty depots. When compared to “Street Turn” strategy, a new scenario for distribution can be observed. The rules of the „street turn" strategy are that, prime mover come back to terminal without empty carrying. The potential advantages of street turn including decreasing the operation cost.

Referring to a paper written by Chassiakos, A., (2008), one can see that a change in logistics network structure may be costly to implement but, on the other hand, generate effectiveness gains if seen over a longer period of time. The advantage of „street turn" is that the physical network structures remain largely unchanged, whilst its implementation will see almost immediate commercial benefits. It is one of the low hanging fruits that remain ripe for picking in green logistics. Chassiakos" study shows that a successfully implementation in Europe can make the „street turn" strategy as a green initiative which may quite easily be implemented into the organization and instantly reduce emissions as well as costs. Next, we refer to study conducted by Wang, R., (2008). In his study, he had developed a strategyatical description to the process of empty containers allocation, clarifing the subjective and objective reasons which causes the empty container allocation, the characteristic of empty container allocation and the question which exists in the practice and actual operation of container trasportation, as well as analysis of the major factors affecting empty containers allocation. He also established a liner programming model which not only deal with the characteristics of empty container allocation, but also very easily applicable to shipping practice. From this study it was shown that, there were several countermeasures to decrease the cost generated by empty container not being managed effectively.

A smilar study to that carried out by Wang, R. was proposed by Deidda, L., et al., (2008), where a new decision tool based on a mathematical programming approach was used. In this paper the proposal was for the use of a decision support tool to quickly determine truck routes and implement the street turn strategy. This tool is based on an optimisation model determining the allocation of empty containers between customers and defining truck routes in a post-optimisation phase. They compared routes resulting from the proposed model to the decisions of a real shipping company. Early results indicate that this approach represents a promising support for shipping companies in dealing with street turn. It can significantly reduce distances travelled by trucks and times requested to determine routes.

In addition, a clear benefit in term of cost and reducing carbon emissions a study by Hossein Jula, H., (2008: p. 211) also found that a small percentage in decreasing empty container traffic, meant that there was also a reduction in relocation traffic and this can be reflected in huge congestion reduction as well as improved operational cost. Hossein"s study encompassed the reusing of empty container and its role in the process of facilitating the interchange of empty containers at ports. In particular, the depot-direct and street turn methodologies are investigated, and variants of the empty container reuse problem are considered. His study focusses on traffic congestion and long queues at the gates of the terminals which are becoming the major source of driver inefficiency, wasted energy and increasing maintenance cost imposed by the volume of trucks on the roadway. Therefore, similar factor from this study will be use as a guide for conducting this study in Malaysia but there will several modifications to take into account the different environment and policy in Malaysia.

Theoretical Framework

Measurement of the effectiveness of using the „street turn strategy" in road haulage companies will be performed by focusing on cost effectiveness factor. The identification of these factors have been made in previous international studies and show that these are major factor contributing to its effectiveness as tool for green logistics.

The important of cost to measure the effectiveness of Street turn strategy have been prove in studies conducted by both Dam Hanh, P.I.L (2003) and Wang, R. et al., (2008). Both conclude that, the cost control and reduction in managing empty containers have become the key aspects which influence a road haulage company"s operation state. Under cost effectiveness dimension, there will be four (4) elements to support the measurement of the effectiveness of the Street turn strategy. These elements consist of

vehicle impact, fuel utilization, waiting time as well as toll and road traffic. This selection is made by referring to study conducted by Nash, C. et al.(2003), where the authors found that the marginal cost of freight transport by heavy goods vehicle (HGVs) depend on several factors: which varies with traffic volume, road damages, uncover accident and fuel. Therefore by managing these elements with a suitable strategy, there could be sizeable cost savings.

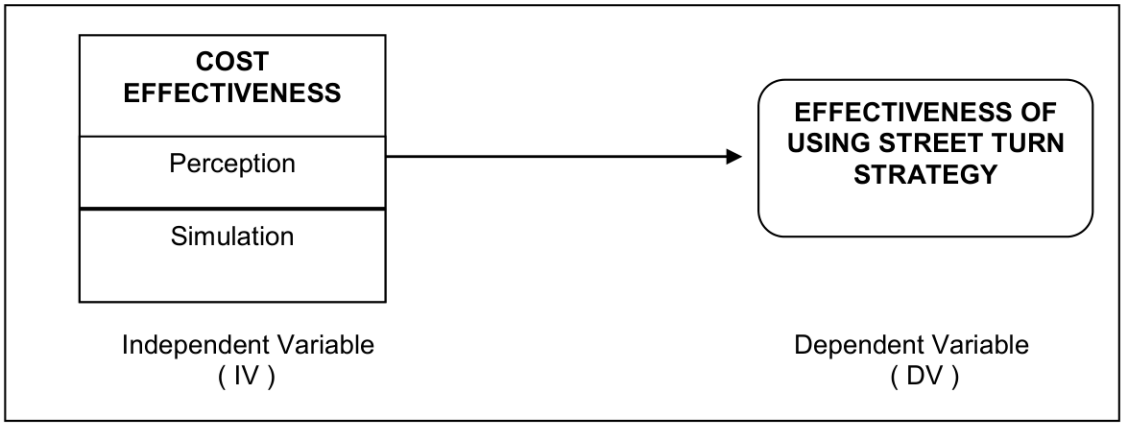

Figure 3: Theoretical Framework

Dimension	Element	Author & Year
Cost	• Vehicle Impact • Fuel Utilization • Waiting Time • Toll & Road Traffic Selection	▪ Larsson,F.E. & Bernal,D.V., (2010). ▪ Nash C. et al., (2007). ▪ International Transport Forum (2009)-Publish report. ▪ McKinnon, A., et al., (2010). ▪ Rodrigue, J.P. et al., (2001). ▪ Pandian et al., (2008). ▪ Uehara et al., (2000) cited in Pandian et al., (2008). ▪ Balke et al., (2005) cited in Pandian et al., (2008).

Table 1: Dimension & Element

Methodology

Sampling procedures

The target population would be 344 companies that carry on the business of road haulage in Malaysia as listed in the Malaysia Logistic Directory 2010/2011. The respective respondents in this study will be the manager and middle management in operation department because they are well known about the strategy in their company. All these companies will be separated into three categories which is “Small, Medium and Large” company as followed by several criteria (the annual sales turnover or full-time employees) that are approved by Companies Commission of Malaysia (CCM) for more details see table 2.

Types	Employement			Sales Turnover		
	Number of Employees	Number of SMEs	(per cent) %	Category of Sales Turnover (RM)	Number of SMEs	(per cent) %
Micro	<5	694	17.8	<199,999	773	19.7
Small	5 – 9	1,935	49.5	200,000 to 1 million	1,429	36.5
Medium	20 – 50	834	21.4	1 million to 5 million	1,271	32.5
Large	>50	445	11.3	> 5 million	445	11.3
Total		3,908	100		3,908	100

Table 2: Profile of SMEs in the Transport and Communication Service Sector

Therefore, the sample for this study consists of 162 companies that are involved with the haulage of containers in Shah Alam and Klang, Selangor. The reason for choosing this area, is because SMEs in Selangor are predominantly in the transport equipment and electrical sector (Saleh, A.L. & Ndubisi, N.O., 2006),and researcher had sorted from many sources (analysis from Malaysia Logistic Directory, 2010/2011). Regarding to the population, researcher will select a sample by using the simple random sampling method, Sekaran (2003) considers this the most efficient sampling design when differentiated information is needed from the various strata within the population; purpose of using this technique is to avoid members of population being significantly under or over represented (Hussey and Hussey, 1997). The optimum sample size is 85 to 92 determined based on the sampling table provided by Bartlett, Kotrlik and Higgins (2010).

Data collection and analysis procedures

A set of structured questionnaires is used for primary data collection as a survey instrument to serve as the basis for collecting data pertaining to cost effectiveness when using Street Turn strategy as a green logistic tool. This method is to enhance empirical evidence in find out the users" views and experiences in using the strategy. This questionnaire has been distribute to the road haulage company. Through the questionnaires, feedback on cost effectiveness was collected. To ensure standardization and ease of analysis, all constructs was measured on a 7-point Likert scales ranging from Very Strongly Disagree to Very Strongly Agree to examine how strongly subjects agree or disagree with statements. Researcher also use selective based questions only require respondents to tick in the appropriate box or boxes. Nevertheless, some modifications may be necessary to suit the specific context of the current study.

Quantitative

Quantitative study is more appropriate for this research because the main research problem of this thesis involves a lot of information from road Haulage Company that cannot be qualified such as measurement of their cost operation. Besides that, researcher had used estimation calculation to measure cost of fuel for one container haulage trips per day to compare with the profit gathering from the similar haulage on that day to identify fuel utilization result. Formula that has been used would be:

Estimation of Fuel Calculation:

$$\frac{\text{Distance Travel (km)}}{\text{2km}} \times \text{Fuel Price (RM)} = \text{Fuel Cost}$$

Figure 5: Fuel Cost Formula

Based on 2012 price
1 Liter Diesel = RM 1.75 (actual price)
1 Liter Diesel = RM 1.48 (subsidy price)
1 Liter Diesel = 2 km

Example calculation:
Distance travel (km)= 15km
Fuel price (RM) = RM 1.48/L

$$\frac{15\text{km}}{2\text{km}} \times \text{RM } 1.48 = \text{RM } 11.1 \text{ (fuel cost)}$$

Data analysis
The respondents perception has been analysis by using the Statistical Package for Social Science (SPSS) software. The researcher has used, correlation coefficient and linear regression as a statistical technique to measure the data gathered. To determine the association between variables, researcher had run correlation coefficient to determine strongly positive or negative significant relationship between each variable and finally, the researcher had used regression linear to determine how strongly the variable will influence the dependent variable. Based on result gathered in final stage analysis, the researcher can make an attempt to answer the research question and give a straight answer as to whether the objectives of this study have been met.

Conclusion
The findings indicate that the majority of road haulage companies in Malaysia perceive that the „Street Turn" strategy can reduce operating costs based on the number of trips empty movement is lower compared to the „Depot Direct" strategy. This also supported by the result of calculation gathered showed that the percentage of cost reduction is quite high for the „Street Turn" strategy implementation. This reduction is based on the total fuel that had been well utilise by the road haulage operator and the road selection that had been made to avoid tolls and crowded area. As a conclusion from this calculation, it was proved that by implementing the „Street Turn" strategy, the road haulage company will experience the cost saving based on the total amount of cost reduction is quite high when compared to the implementation of the „Depot Direct" strategy. From this result also, it was truly show that the perception of a road haulage company towards cost can be reduced by implement the „Street Turn" strategy is fully supported by this calculation result. Apart from this result, the level of acceptance and awareness the road haulage companies in Malaysia towards green logistics has been identified. On the other hand, this result cannot be compared with the previous study result because there is no perception analysis that had been done according to a review of literature.

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