

Awareness on Green Logistics among Transportation Companies in Johor towards Business Performance

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Abstract: *Rapid industrialization has detrimental effect on the environment due to the increase in the pollution, waste and rapid consumption of natural resources. Environmental issues are very important for the overall strategy of the firm. However, research in the field of green logistics identifies several ways for companies to reduce the environmental impact of transport and logistics activities, including modal changes and intermodal solutions. It is treated as a factor of the cost. Some companies have already taken external costs of logistics associated especially with the environmental issues such as climate change, pollution, and noise into account. The purpose of this study is to identify the relationship between green logistic awareness (GLA) and business performance. Research hypotheses were proposed and examined while considering three drivers of GLA such as transportation, warehouse, and packaging. The research was conducted in Pasir Gudang and Batu Pahat. The hypothesis of this research is that there is a positive relationship between green logistic awareness and business performance. The finding of the study shows that GLA such as transportation, warehouse and packaging exhibit significant relationship with business performance*

Keyword: *Green Logistic, Business Performance, Awareness*

I. INTRODUCTION

Logistics industry has become the most important industry that can link one country to another country. In this era of technology, logistics has an important role in the world economy. According to Ministry of Natural Resources and Environment (NRE), Malaysia, carbon dioxide emissions from energy use in logistics showed the highest percentage (Sitorus, 2017). In business terms, logistics is the physical movement of goods from the supplier point to the customer point. Logistics are directly or indirectly related to daily activities and not just activities within the company. As consumers, we also experience the impact of logistics management activities. (Sitorus, 2017).

According to Tirunavukkarasu et al, (2014), logistics management typically includes inbound and outbound activities such as warehousing, materials handling, order

fulfilment, and logistics network design. All attempts in order to reduce ecological impacts of logistic activities including all activities of forward and the reverse flows of products, information and services between the point of origin to the point of consumption is green logistics.

Environmental issue becomes a challenging issue for many organizations. In Malaysia, environmental issues have become very important issue of concern for the Malaysian government and the public. However, such rapid industrialisation has detrimental effect on the environment due to the increase in the pollution, waste and rapid consumption of natural resources (Eltayeb et al, 2010).

Air pollution can be caused by various sources, such as factories, power plants, dry cleaners, vehicles and even windblown dust and wildfires. It is reported that for the past five years, the three major sources of air pollution in Malaysia are mobile sources (c.a. 70-75% of total air pollution), stationary sources (c.a. 20-25%), and open burning sources (c.a. 3-5%). This was proven by the high emission of unburnt hydrocarbons from motor vehicles and other oil and gas related works, and the emission of SO₂ due to high sulphur fuel dependency for industrial production and electric power generation (Ahmad et al., 2012).

Therefore, the level of awareness and sensitivity among those involved in the industry must be measured first, which in turn leads to the use of technology that is more environmentally friendly and has less impact on the environment. Awareness of these issues and changes for practice green logistics not only impacts environment but also on the business performance and development phase itself.

From the previous studies, it can be assumed that most of the major pollutants come from manufacturing activities. It is important to note that the increase in the demand of vehicles and the many economic activities occur along with population growth. Humans, despite their awareness, have inflicted more complications by polluting the air via industrial activities, operating of motor vehicles, open burning and many more. It is projected that the environment will experience more severe impacts as this matter becomes more serious.

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II. LITERATURE REVIEW

Green Logistic Awareness The term “green logistics” is defined as supply chain management practices and strategies that reduce the environmental and energy footprint of freight distribution. Green logistics awareness focuses on material handling, waste management, packaging and transport (Rodrigue et al., 2012). As mentioned in the definitions of green logistics before, in the past, companies coordinated their logistics activities comprising freight transport, warehousing, packaging, materials handling and data collection and management to meet customer requirements at minimum cost. (Nowakowska-Grunt, 2008). In the present research, transportation, warehouse, and packaging has been targeted to study that what is their impact on business performance.

It is easier to understand, if an organization's awareness of green logistics were in place and were highlighted there is a possible that organization may require a proactive strategy of green logistics and green logistics practice will arise (Yongrok Choi, 2012). According to López-Gamero et al. (2010), came up with if environmental management is significantly positive, if environmental strategies are not impelled by legislation, but rather driven by green awareness job performance is also directly associated with the green logistic awareness.

Previous studies have shown that firms that implemented green awareness better environmental programs and strategies will have better performance. The other studies that have been conducted have determined that green awareness has a significant positive relationship with green strategy but has no relationship with green management whereby this suggests that green awareness needs to be systematically integrated into the green logistic practices of the enterprise (Yongrok Choi, 2012).

Denisa and Zdenka (2015) conducted quantitative approach of perception of implementation processes of green logistics in SMEs in Slovakia, and they found out that most of the SMEs in Slovakia agree with a statement of ‘green logistics is ecological way of transporting materials and goods, as well as using environmentally friendly packaging’. Besides, they are involved in recycling and separating waste, while at the same time trying to lessen the material demands of production.

The activity that they least engaged in is providing their employees a training in the field of green logistic. In order to implement the initiatives of green logistics, the next important step to enables the organizational support and suitable human resources are inevitable to plan the courses besides educate the employees in order to raise their awareness and knowledge in the field of environment (Denisa et al, 2015).

Finally, one of the main starters of implementation of initiatives of green logistics into organization is the customer pressure, and the decisions of the top management. For instance, the furniture manufacturer IKEA seeks a sustainable mode of transport that reduces the ecological effects. L’Oréal, HP, and Dell have all taken the term “green” as an important value for their business and adopted

of new energy saving technologies in order to improve good public image or “green image”.

Transportation is one of the items that can be used to measure the level of the awareness of green logistic in a company. To make it simple, transport means by which a shipment is moved from one point to another such as by air, rail, road or sea. As a function of green logistics, transportation or green transportation can be defined as transportation service which has minimal impact on human health and the natural environment compared with competing transportation services that serve the same purpose (Bjorklund, M, 2011).

Within a logistics system, transportation is one of the operations that contribute the most in terms of negative environmental impact (Wu and Dunn, 1995). On an aggregate, freight emissions account for roughly 8 per cent of worldwide energy-related CO₂ emissions, whereas warehousing accounts roughly 2 per cent (McKinnon, 2010).

In order to ensure there is no adding to the growing Green House Gas or GHG problem, logistics managers should take part and play their role by making good decisions about the mode of transportation they use to transport their products to the end user. Brooks (2009) suggested two important methods to focus on clean vehicle technology either by improving vehicle efficiency in daily operations or switching to hybrid fuel technology sources. In particular, intermodal road-rail solutions, where a combination of road and rail transport is utilized, has been suggested as a promising way to reduce the CO₂ emissions from the transport operations within a logistics system (Floden, 2007; Swedish Government, 2006; European Commission, 2001).

Efficient use of transport resources which aimed at the selection of vehicle types, consolidation of freight flows and selection of type of fuel can help to minimize negative effects on the environment such as pollution, noise and congestion. Therefore, firm need to choose the appropriate vehicle mode and route which has important effects on consumption. According to Ali (2012), green logistic ensure some advantages for organizations. One of the advantages is optimized external and internal transport, in other word outbound and inbound such as lower truck fleet costs due to better capacity utilization.

Pazirandeh A and Jafari H (2013) make a conclusion that most of the firms concentrating on greening their transportation have sustainability as part of their firm’s strategic plan. In addition, these firms were able to improve their logistics performance, both from an effectiveness perspective as well as an efficiency perspective, with greening their transportation purchasing procedures.

Warehouse According to Fritz Institute (2008) warehouse is a planned space for the storage and handling of goods and material. There are few types of warehouse such as commercial, government or state, transit, bonded warehouse, open storage, owned and managed by organization and pre-fabricated warehouse.



Warehouses are busy places. Goods are constantly on the move; inbound and outbound deliveries have to be dealt with as well as the movements of items from location to location. Many companies are looking to warehouse operations at an area where they can make environmentally sound decisions. Companies are concentrating on three areas to help them in this endeavor; reduce, reuse and recycle (Brădescu, 2014).

The United States Environmental Protection Agency (EPA), in a guide called "The Lean and Green Supply Chain: A Practical Guide for Materials Managers and Supply Chain Managers to Reduce Costs and Improve Environmental Performance", provides a systematic approach to implementing a Green Supply Chain. "It's a four step decision making process. The first step is to identify environmental costs within your process or facility. The next step is to determine opportunities which would yield significant cost savings and reduce environmental impact. The third step is to calculate the benefits of your proposed alternatives. The last step is to decide, implement and monitor your improvement solutions".

Logistics managers all over the world are finding numerous ways to reduce the energy that their logistics buildings are consuming. One unique way to reduce energy consumption is by harnessing natural light. Natural light not only saves on utility expenses, but employees working during normal business hours appreciate it as well. Many firms are building factories and warehouses with larger windows or skylights (Bellona, 2009). Keeping reasonable inventory quantities on hand will prompt the need for smaller facilities. This then will translate into less energy expended in heating and cooling the storage area for raw materials, finished goods, and employees (Franchetti et al., 2009).

Packaging is one of the activities in logistics system. It can be defined as the technology of enclosing or protecting products for distribution, sale, storage and use. Packaging also refers to the process of design, evaluation and production of packages. Industrial packaging focuses on protecting the product while it is being transported and stored. It conveys important information to inform the customer and provide protection during storage and transport.

Both products' loaded package and logistics' package were needed to consume a large amount of resources and produce large amounts of solid waste. Thus, the impact of packaging to environment is very large. For instance, solid waste pollution, liquid and gaseous pollution, the spread of bacteria and pests are kinds of pollution generated by packaging. Therefore, green packaging which can also called ecological package or environmentally friendly package has been offered in green logistics. Zhang and Zhao (2011) define green package as environmentally friendly package which totally made by natural plants and it can be recycled or degradation, reused and does not give harm for human and pollute the environment during the product life cycle.

Guirong and Zhongjian (2012) found that green packaging is not only a package of general performance, but

also with two main functions such as protecting the environment and renewable resources. Nevertheless, green packaging offered benefits and prevent negative impact not only towards environmental but help companies to reduce waste and costs through improved packaging designs and techniques (Nadine, Yasmina and Abederrahman, 2013).

Business Performance. is a combination of management and analytic processes that allows managers of an organization to achieve pre-determined goals. A business management approach which looks at the business as a whole instead of on a division level. Business performance management entails reviewing the overall business performance and determining how the business can better reach its goals.

Performance measurement can also have other purposes such as to determine the efficiency and effectiveness of an existing system or to compare competing alternative systems, as well as being an important "support" in the planning, design, implementation and monitoring of systems (Maria, Uni, and Mats 2012). Zhu et al. (2008) describe similar purposes with performance measurement as they state that practitioners can use different forms of scales to measure green supply chain management for continuous improvements, implementation of green supply chain management, and benchmarking.

The marketing literature provides evidence that increasing quality by satisfying customers more effectively can improve business performance by increasing revenues (Kamakura et al., 2002). Literatures in such fields as operations and engineering similarly show that increasing quality by improving efficiency can improve business performance by reducing costs (Breyfogle, 2003), although too much emphasis on cost reduction can have a harmful effect on customer satisfaction (Rust and Huang, 2012).

A. Conceptual Framework and Hypothesis

Thus, this is the framework design for this study:

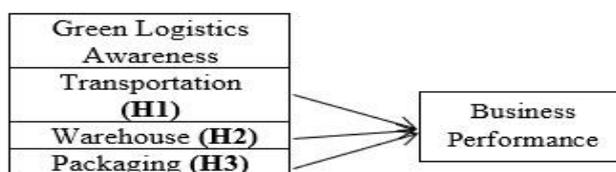


Fig 1: Green Logistic awareness and business performance

III. METHODOLOGY

Quantitative method and survey design were used in this study to explore the direct relationship between three Green Logistics dimensions, Transportation, Warehouse and Packaging and Business Performance. All the data collected in this study from the answered questionnaires were analyzed using Structural Equation Modelling SEM through Partial Least Square (PLS) software. In this study, Responses were on a 5-point Likert scale that ranged from 'strongly disagree' (1) to 'strongly agree' (5). the number of respondents that answered the questionnaire is 103 persons.



IV. RESULTS AND FINDINGS

In data analysis, validity and reliability of the measurement model was calculated which was followed by the validation of structural model. In measurement model results point out that all the items which were used to represent the construct were having internal consistency reliability, as shown in table 1, all CR and CA values are greater than 0.8 or 0.9.

Table 1: Reliability Test

	Cronbach's Alpha (CA)	Composite Reliability (CR)
Business Performance	0.918	0.934
Packaging	0.928	0.939
Transportation	0.893	0.912
Warehouse	0.895	0.915

Convergent validity is acceptable when Average Variance Extracted value of the construct is at least 0.5. Table 2 given below shows that all AVE values lie within the range from 0.527 to 0.732. This result shows that the measurement model has acceptable convergent validity.

Table 2. Convergent Validity Values

	Average Variance Extracted (AVE)
Business Performance	0.669
Packaging	0.606
Transportation	0.510
Warehouse	0.545

In SEM structural model shows the hypothesized relationship between the latent construct. The main criteria to check goodness of the structural model is Coefficient of determination (R²) in SEM (Hair et al., 2012). Higher R² value is desired as the main aim of PLS-SEM is to explain the variance in dependent variable by independent variable. As depicted in the table 3, R² value for AC is 0.636. It shows that 63.6% variance in business performance is significantly explained by the independent variable GLA dimensions.

Table 3. Coefficient of Determination value

	R ²	Result
Business Performance	0.636	Strong/Significant

Evaluation of path coefficient value helps in assessment of the structural model. Table 4 given below shows the path coefficients, t-value and p-value as well as significance level for all paths. Acceptance or rejections of the proposed hypotheses are determined from the results of path assessment. Hypotheses are supported at a significance level of 0.05.

Table 4. Path Coefficient Values

Path	Path Coefficient	S.E	t-value	p-value
Transportation → Business Performance	0.325	0.062	5.217	0.000
Warehouse → Business Performance	0.406	0.058	6.969	0.000

Packaging → Business Performance	0.238	0.031	7.747	0.000
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S.E= Standard Error, T Value = t statistic value, P value= Probability value

Results of the structural model are used to test the research hypotheses of the present study. Hypothesis can be tested on the basis of results of path coefficients, p values and t values; significance level is 0.05 as shown in table 4 given above. The path coefficient assessment shows that all hypotheses are accepted on the basis of path analysis. The present study established significant and positive relationship between all three dimensions of Green Logistics Awareness and business performance.

Table 5: Hypothesis Results

There is a positive significant relation between:		
	Independent Variables	Results of Hypothesis
There is a positive impact between (Independent Variable) and Business Performance		
H1	GLA on Transportation	Accepted
H2	GLA on Warehouse	Accepted
H3	GLA on Packing	Accepted

V. CONCLUSION

This study identified the relationship between green logistics awareness and business performance among transportation companies in Johor. At the end of the analysis showed the results that all hypotheses are accepted. Three variables of green logistics awareness which is transportation, warehouse, and packing have significant relationship with business performance. This study can be improved to enrich the results.

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