GREEN LOGISTICS IMPLEMENTATION FACTORS: A STUDY ON A GLOBAL LOGISTICS PROVIDER

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ABSTRACT: Green logistics has become the newest trend in doing business that is not just economy sustainable but is also environment sustainable. As the world ecology is becoming worse due to globalization and industrialization with the rising temperature and sea levels, many logistics companies are applying green logistics as it helps mitigate climate change by reducing carbon emissions. This paper identified and analyzed the internal and external factors in implementing green logistics. In this case study, a global logistics company which is DB Schenker Malaysia was chosen as the research location. Qualitative data were obtained through various literatures and through 30 semi-structured open-ended interviews. This study found that there are four internal implementation factors and three external implementation factors in green logistics. The four internal factors are cost efficiency, human resource skills, knowledge and supports, information technology and system, and organization's/top management support. Meanwhile, the three external factors are public and consumers' pressures, competitions, and collaboration and integration with suppliers and partners. Findings also indicated that implementing green logistics has many benefits but only a few implementation factors found in the literatures were relevant to DB Schenker Malaysia. Nonetheless, the company still implements green logistics in order to be a top logistics company.

KEYWORDS: *Green Logistics; Implementation Factors; Sustainable; Sustainability Development; Logistics Industry*

1.0 INTRODUCTION

There are extensive acknowledgements that logistics activities produce the sought after benefit and an inevitable negative ecological effect at the same time [1]. One of the logistics processes that have significant impact on the environment is transportation, where carbon dioxide (CO_2) and other greenhouse gases (GHGs) emissions from automobiles, airplanes and vessels used to transport goods produce environmental pollution, frequently known as one of the core reasons of the global warming consequence threatening the universe nowadays. Furthermore, related logistics activities bring serious water pollution, air pollution, solid garbage disposal and fuel consumption [2]. In order to minimize the severity of these problems, the concept of "green logistics" was born to describe logistics systems that utilize cutting-edge equipment and technology to limit ecological harm while expanding the use of assets. Green logistics is one sustainable development concept that can solve environmental problems while maintaining the activities and economy of an organization and country within the processes of exchange goods and services [3]. Green logistics also aid organizations to deal effectively the relationship between the environmental protection and logistics development, and make the economy interests, environmental interests and social interests'unity [4]. It is exceptionally reassuring that organizations identify that the greening of logistics can lead to a sound stream of conventional business benefits [5]. In this research, the implementation factors of green logistics in terms of both internal and external factors will be identified through various secondary data sources. The factors are also being explored and analyzed through primary data sources from DB Schenker Malaysia and lastly, conclusion will be made at the end of this study.

2.0 METHODOLOGY

This paper's main purpose is to conceptualize the factors in implementing green logistics. This research applied positivism as the research philosophy as it emphasizes the power of evidence, which arose from verifiable facts and is neutral in the whole process [6]. After the factors in implementing green logistics were identified in secondary data sources, further clarification and confirmation were

obtained through primary data sources to know which of the factors were applied in the logistics company. This research is also a qualitative exploratory study that used case study as research strategy and deductive as research approach. According to [7], an exploratory study is an important means to ask open questions to find out what is really going on, seek understandings about a topic of interest and elucidate certain understanding of a problem. In this research, primary data were obtained from 30 managers at DB Schenker Malaysia through semi-structured one-to-one interviews with open-ended questions. Data was collected using purposive sampling. The main reason that DB Schenker Malaysia was chosen as the research location is because the company is a part of Deutsche Bahn AG division that focuses on logistics and is responsible for contract logistics, land transport, sea transport and air transport.

3.0 RESULTS AND DISCUSSION

In this research, data were collected from various literatures and from 30 managers at DB Schenker Malaysia through interviews. Table 1 shows the managers' response according to the implementation factors.

Table 1: Managers' response to green logistics implementation factors

Implementation Factors	Themes / Benefits	Managers' Responses
Cost Efficiency	Green efforts that save costs and create effectiveness and efficiency advantages	Dedicated teams for each customers (Managers 1, 6 and 7)
		Utilize multimode or combine transportation (Managers 8, 9 and 21)
Human Resource Skills, Knowledge and Supports	Improve human resource quality	Internal budget allocation for training (Managers 2, 5, and 10)
	Organizational knowledge sharing	Information sharing with respective group in other countries (Managers 10, 14, 17 and 28)
	Employees' supports	Willingness to improve (Manager 25)
Information Technology and System	Enhance logistics efficiency, reduce logistics costs, improve performance, and as competitive advantage	Utilization of appropriate information technology and system (Managers 2, 3, 4, 26 and 27)
Organization's / Top Management Support	Main player in executing green plans internally	Implement key performance indicators (Managers 5 and 10)
		Daily and monthly report to HQ (Managers 11, 19 and 30)

Public and Consumers' Pressures	Green needs or demands that helps supervise and motivate organization to go green	Fulfil variety of customer's demands in order to maintain, improve relationships and attract new customers (Managers 12, 20 and 23)
Competitions	Help improve and regulate organizations, increase competitiveness	Priority is to be more profitable or successful than competitors (Manager 15)
Collaboration and Integration with Suppliers and Partners	Information sharing, trust, environment conscious	Collaborations are not based on green measures (Managers 13, 22, 24, and 29)
		Better chance of collaboration with lower price quotations (Managers 16 and 18)

3.1 Internal Implementation Factors in Green Logistics

According to [8], cost efficiency is one of the internal driving forces that affect green initiatives in four Swedish logistics service providers. Cost efficiency is defined as the proportion of yield to input. A system where its yield costs less per unit of input is considered cost efficient with respect to another system. By maintaining yield with a less than equivalent increase in inputs, a system can increase its cost efficiency [9]. In the case of this research, implementing green logistics is more cost efficiency than traditional way of doing logistics. The weight of cost savings is getting to be stronger and this is more than apparent in the logistics industry, which is justifiable and legitimate from the financial perspective [10]. Enhanced vehicle tracking or eco-driving, for an instance, are two greening efforts that instantly reduce emissions and costs as it can be effectively actualized into the logistics industry. In business reality however, numerous greening initiatives requires a longer term perspective on logistics decisions and strategies, although many greener measures tend to lead to short term profit. One example is the structure modification of logistics system which is a greening plan that can substantively reduce emissions, but might be too excessive to execute in any case. Then again, it will create advantages if grasped over a more extended period of time [11]. The cost of going "green" may appear to be high for some however the cost of not doing so on a meaningful and timely scale will be incalculably higher [12]. Consequently, cost efficiency is an essential factor in executing green logistics.

The second internal factor is human resource skills, knowledge and supports. According to [13], green initiatives implementation is positively affected by organizational knowledge and human

resources quality from 153 logistics service providers operating in Taiwan. Trained, skilled and high quality human capital especially employees are important to an organization in distributing knowledge internally. Green approaches development in an organization's will be higher with greater percentage of trained employees. Accordingly, with all the more generally well-trained employees, organizations will be more eager to execute green logistics. Besides that, many green initiatives such as environmental management in a logistics industry are beyond organizational boundaries which require internal employees' knowledge and support. In order to reach the targeted green logistics implementation outcomes, staff training and communication for knowledge sharing is therefore needed [14]. Therefore, human resource skills, knowledge and supports come hand in hand with organization's successful implementing of green logistics.

Third internal factor is information technology (IT) and system. Suitable information technology and system is needed in any logistic activity especially when it gets to a big scale as it is used to enhance the efficiency and lower the cost of logistics. Marinagi et al. [15] stated that the use of IT techniques and practices enable the integration of both internal and external business functions in addition to the sharing of information across partners in the supply chain. Business profitability, productivity and efficiency can be increased through the alignment of strategic supply chain management with IT objectives and goals. Alshawi [16] explained that information systems are also known as technology based resources which include communication systems, hardware, software, and peripherals that support numerous business activities. Logistics companies can even use information systems as a force to obtain more advantages over competitors as goods cannot flow without information. Information technology and system allow, check, confirm or forbid information that direct the flow of physical goods, provide proof or audit trials for billing and taxes and so on. It is therefore important to regard information technology and system as an implementation factor in green logistics systems since the physical movements of goods are closely related to the information flows.

Organization's / top management support is the fourth internal factor. Organizations are the main players to execute any green plans internally. Only organizations that actively support in green efforts can execute the development of green logistics [17]. An empirical study by Hu and Hsu [18] also demonstrated that the most significant factor for green practices to be successfully implemented is top management support. This indicates that it is important to have top management support for green practices to be successfully adopted and implement in the organization. Green logistics is an integral approach for the organization environment, for it can not only enhance the business activities" impact on the environment, but also improve the whole logistics system where products and services are involved, and then promote the whole society green. In this manner, the organization is the most central actors for sustainable development approaches and is the immediate perpetrators of green logistics [19].

As for DB Schenker Malaysia, there are many cost efficiency measures that the company took to implement green logistics. One such measure was mentioned by Manager 1 who said that each particular customer is handled by one dedicated team and the logistics operation involved is called a "program". The dedicated team is responsible for fulfilling the customer's demand, providing support and advice to help improve the logistics operation and also to help customer and DB Schenker to minimize any expenses incurred during the logistics operation (Managers 6 and 7). Utilizing multimode or combine transportation is another significant way of cost efficiency in implementing green logistics as mentioned by Managers 8, 9 and 21. This strategy enables companies to decrease transportation cost and reduce CO_2 emission than a road only transportation [20].

All of the participants do not know whether there are specific allocations for implementing green logistics in DB Schenker Malaysia as it may be deemed confidential for the participants to reveal to the researchers. "Most budget allocations were decided by the Singapore Regional Office. I also do not know if there is any financial plan for going green in Malaysia" (Manager 10). However, they do know that there are internal budgets for trainings such as 5S, Permanent Optimization Program (POP) and Six Sigma (Managers 2 and 5).

Trainings for DB Schenker Malaysia are done internally and are divided into center and northern region where each session is conducted with only 15 participants maximum. All of the trainings are conducted in Bukit Jelutong Head Quarter (HQ) or also known as Cooperate Office. Each session usually cost around RM 2500 and is conducted for one day. Topics were provided by German or Singapore office (Managers 10, 14, 17 and 28). "So far there are no employees in Malaysia that suggest the training topics" (Manager 10). This saying by Manager 10 is the opposite of the factor "human resource supports" but Malaysian employees are still open-minded and willing to improve themselves through the trainings provided by the company (Manager 25).

The third internal factor "information technology and system" is also required for DB Schenker to implement green logistics. The service quality of DB Schenker is also determined through the efficient of IT. DB Schenker Malaysia previously used KODIGO, an all-purpose PowerBuilder framework using Service Based Architecture as their main system but now they are currently using Warehouse Management System (WMS) as the main system, System Analyze (SAP) for particular customers details, e-leave software for employees to apply leaves and KULSXA which is a system for inbound / outbound (Managers 2, 3, 4, 26 and 27).

So far, DB Schenker Malaysia does not largely implement green logistics like their respective companies from German or Sweden do. "We do not actively go green like how the Europe DB Schenker companies do" (Managers 5 and 10). Despite these draw backs, DB Schenker Malaysia still implement certain key performance indicators (KPIs) that help lower costs and improve the company's efficiency. According to Managers 11, 19 and 30, they have to send daily and monthly reports to HQ in order to meet their KPIs and also to report their daily work status or any problems that they face at the particular month. Hence, organization's / top management support is not the main factor for DB Schenker Malaysia to implement green logistics.

3.2 External Implementation Factors in Green Logistics

A public and customers' pressure is the first external factor in implementing green logistics. The public and customers have green needs such as preferences, purchase criteria, decision-making process, buyer behavior and functional needs [21]. In actual marketplace, the affordable and appropriate green needs should translate into a driving force of supervision which is the green demands that motivates organizations to implement green logistics, making the public and customers a significant part in the implementation of green logistics in organizations. This is done firstly where the customers advocate organizations in executing green logistics through the patterns of green consumption. Secondly, the public and customers force organization to self-control their green logistics management behavior [22]. Zhang and Mu [23] likewise concur that both the public and customers are ultimate victims of ecological contamination and crucial players in protecting our Mother Earth. Their environmental protection awareness and pressures can supervise and promote green logistics implementation in organizations. It is the public's and customers' concept of green consumption that forces organizations to actively offer green services, green packaging and green products.

Second external factor is competitions. Competitors are among the stakeholders that have an influence in the implementation of green logistics as found by Denisa and Zdenka [24] in a research on 250 small and medium enterprises in Slovakia.

In fact, competitors can drive organizations to implement green logistics as a means to increase organization's competitiveness. Organizations involved can also continuously improve themselves by benchmarking against their rivals and subsequently regulate their way of doing business [25]. Competition may increase especially the emergence of new competitors caused by factors like deregulation, brand extensions, low-prized competitors, and globalization [26]. Albeit numerous logistics companies have held onto globalization as a potential source of revenue and to open new markets, it has likewise expanded the rivalry in current markets, undermining current revenue sources. Hence, organizations have to offer something different such as green services to outshine their competitors.

Third external factor is collaboration and integration with suppliers and partners. Organizations implementing internal green operations certainly demand their procurements from suppliers also meet certain base environmental measures. Collaboration efforts can be in the form of information sharing, integration of information resources or using standardized database [27]. Trust, mutuality, communication, openness and honesty are also elements of collaboration [28]. An organization that is environment conscious should seek a similar awareness and obligation from the suppliers and partners they collaborate with [29]. It is also important to choose the correct suppliers and partners for an organization to efficiently react to dynamic changing economic environments. Even in stable economic situations, a logistics organization will have a problem to offer high quality of customer service if the organization works with partners and suppliers that have low delivery and quality records [30]. Hence, suppliers and partners play important roles in helping organization to implement green logistics.

As stated by Managers 12, 20 and 23, DB Schenker Malaysia has not been pressured by public or customers to go green. However, they do have customers with variety of logistics demand. They also stressed that the company do business based on what their customers want and they try to give their best services to customers in order to maintain and better the company's relationship with current customers and also to attract more new customers.

The second external factor in implementing green logistics is competitions. All of the participants are not aware or do not know whether competitors have influence on the company here in Malaysia to go green. However, they do know that DB Schenker as a part of Deutsche Bahn (DB) Group is constantly fighting to be more competitive than other global logistics companies as said by Manager 15: "As priority now is to be more profitable than competitors". In fact, based on the rankings of DB Group in varies world standing where competitions do play a vital role in the group to be more successful. Currently, DB Group which includes DB Schenker Malaysia is third in both air freight and ocean freight globally and fifth place for contract logistics worldwide [31]. Hence, competitions is in no doubt an external factor for the group to stay competitive but

it is still not clear in terms of being a factor for implementing green logistics.

According to Deutsche Bahn AG [32], important transport services are carried out through the collaboration of sub-specialists in land transportation, airlines and shipping companies. DB Schenker Malaysia is no exception as the company collaborates with several shipping companies such as JNC Corporation, Agility, Yang Ming Marine Transport Corporation and so on to facilitate logistics operations. However, collaborations with suppliers or partners are not based on green measures but on the transportation usage term for inbound and outbound purposes (Managers 13, 22, 24 and 29). Packaging supplier is also not based on green concept but on the pricing where lower price for packaging materials means better opportunity to collaborate with DB Schenker Malaysia (Managers 16 and 18). Therefore, integration with suppliers and partners is not the factor for DB Schenker Malaysia to implement green logistics.

4.0 CONCLUSION

As traditional logistics has produced many externalities, it is therefore important to implement green logistics to create a sustainable environment as well as to maintain a high level of economic activity in the long run. Cost efficiency, human resource skills, knowledge and supports, information technology and system, and organization's / top management support are the internal factors that organizations should be aware of when implementing green logistics. External factors which are public and customers' pressures, competitions, and collaboration and integration of suppliers and partners also need to be taken into account if companies want the implementation of green logistics to be successful. For DB Schenker Malaysia however, not all factors are put into action. DB Schenker Malaysia do not implement green logistics as actively as their respective group in Europe, but the company in Malaysia is slowly following the footstep of their parent company in order to be one of the leading logistics company in Malaysia.

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