

A Review of Green Supply Chain Management as a Need for Company's Continuous Improvement

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Abstract: Nowadays, there is an increasing need to pay attention to environmentally sound choices in all fields. The competitive market that has taken place in the millennial era requires companies to have strategic plans, critical attitudes and attention to the role of the environment. The company's business strategy must be revised, for example supply chain activities. Supply Chain activities focus to achieve a greener environmental. The focus of improvement is on minimizing the environmental damage. Minimization of environmental impacts is carried out from starting the process of industry until the finishing step. Activities carried out include green design, saving resources, reducing hazardous materials and recycling or reusing products. With helping of Green Supply Chain Management (GSCM) integrating action will activates all of the manufacturing process in an industry more safe and healthy and safe for environment and human life. Many factors that become the drivers of GSCM. Based on reports from companies in various countries of the world, those who have implemented GSCM have proven that there is an increase in company profits.

1 INTRODUCTION

Environmental awareness is currently increasing, and there is increasing recognition that environmental pollution due to industrial development needs to be addressed. This was reinforced by Conference in Stockholm, and in Rio de Janeiro. (H'Mida and Lakhali, 2007). Through Kyoto Protocol held in 1997, supervision of emissions caused by the activities of manufacturing companies became increasingly tightened.

In this era of openness, many customers asking everything that are more safe and healthy. The same thing is demanded by local communities, and non-governmental organizations (NGOs). They requested that companies provide reports on company activities. If these demands are not met, the claimants will disseminate the bad things. and can damage the company's image (Tuni, Rentizelas, and Duffy, 2018) Supply Chain helping management to faced increased attention to adverse environmental impacts due to company through the healthy environment. Any world communities feel the effects of global warming. This causes the people who are consumers of marketed products, demanding the government's attention to issue regulations on environmental management that are implemented on a world scale. (Kim, Youn, and

Roh, 2011). Environmental reports from world companies experience positive growth. A forum formed in the US, the Global Environmental Management Initiative, based on published research data, there are many companies who are members of them have reported their competitive advantage after considering environmental aspects in supply chain management.

Consumers who have felt the effects of global warming are demanding to issue environmental management regulations that are applied on a world scale. (Kim, Youn, and Roh, 2011). Initially, many considered this to be difficult for the company, but based on {Lakhali and Mida, 2007) it can be seen that companies that have complied with regulations regarding environmental management experience positive growth. This competitive advantage is also experienced by companies incorporated in a forum formed in the US, the Global Environmental Management Initiative. In China, the government produces many environmental regulations and strict tax policies. Through the determination of taxes and water quota prices, the community must save on water use. The same is done for other resources. The aim is to make efficient exploitation and use of all resources (Zhu, Sarkis, and Geng, 2005).

The general term used in connection with this policy is known as "Rs (Reduce, Re-use, Rework,

Refurbish, Reclaim, Recycle, Remanufacturing, Reverse logistics, etc.)".(Srivastava, 2007). All of this policy if used in human's life will make the environment cleaner and healthy (Büyüközkan and Ifi, 2012).

2 METHODS

To explore information about green supply chain that has been published from previous studies, some literature was reviewed. As a literature review , the reference journals is chosen to be analyzed (Winter and Knemeyer, 2013) From Figure 1, could be seen all of the step clearly.

Step 1 – choosing period of paper publication

Several studies in the Period between 2005 and 2018 have been chosen as the main references. The selection of this period of time is considered to have sufficiently represented thinking that is a developing science.

Step 2 – choosing journal

Some journal are chosen such as: *International journals such as international journal of managing value and supply chains, resources, conservation and recycling, international journal of production economics, international journal of sustainable engineering, environmental technology, journal of purchasing and supply management, journal of cleaner production*. These journals contain management, social science, operations/production, and social/environmental.

Step 3 – choosing article

The main criterion for selecting paper is relationship of the content of the article to the framework of the previously defined text.

Step 4 – analysis

The next step is to study and examine selected articles to find out how research has developed over time. This analysis also provides the manufacturing industry that research was conducted. Figure 1 shows the methodology of research.

3 RESULTS AND DISCUSSION

3.1 Green Supply Chain Management (GSCM)

Supply Chain is a flow of the entire physical process needed starts from the fulfillment of raw materials from suppliers that contain all steps of the process to produce finished products, directly or indirectly, so that this product finally arrives at the end user. In order to achieve competitive advantage, increase

company profits and expand market share, it is necessary to integrate environmental management practices into overall supply chain management so that a greener supply chain is achieved. Based on the literature that used as references there are various definitions about Green Supply Chain Management (GSCM). The following table shown principle of GSCM (Eph and Mafini, 2018).

Table 1: Some definitions of GSCM

Year	Author	Definition
2001	Gilbert	Concerns into Greening the supply chain
2001	Zsidisin and Siferd	Response to the natural safety environment
2007	Srivastava	Integrating environment for useful life
2007	Davies and Hochman	holistic effort to acheive environmental performance
2008	Rettab and Ben Brik	minimise impacts or footprint.
2008	Zhu et al	Life-cycle or the entire of product in management supply chains
2008	Walker et al	Analysed raw materials, process until end costumer.
2011	Large and Gimenez	GSCM to improve the performance
2012	De Giovanni and Esposito	a green company objective is environmentally friendly.

There is a close and integrated relationship among suppliers, ,manufacturers, wholesalers, retailers, and end-users of the product/ consumers) (Tay, Rahman, Aziz, and Sidek, 2015). In Table 2. can be seen the activities carried out by each part contained in the GSCM chain.

Table 2: The activities carried out by each part contained in the GSCM

Part of GSCM	Activities
Suppliers	All of product from wholesalers manufacturers, retailers and consumers are Supplied reverse supply
Manufacturers	Suppliers, wholesalers, retailers and consumers need distribution to and reverse distribution the design for disassembling of products and services,
Wholesalers	Retailers, consumers, manufacturers and suppliers need distribution to retailers/consumers and reverse distribution
Retailers	Distribution to consumers and reverse distribution from consumers, wholesalers, manufacturers and suppliers
Consumers	Acquisition and consumption of products/services; disposal of products/services and packages

GSCM focuses on delivering green knowledge applications and realizing the standardization of production and delivery processes. The GSCM activities will be successfully implemented among supply chain partners if there is a close relationship of trust, good and intense communication and collaboration, complete information about products and safe risks among partners..(Srivastava, 2007). Problems will not occur much if the company works well together efficiently and there is commitment among business partners to produce the best output (De Giovanni and Esposito Vinzi, 2012)

3.2 Drivers to GSCM

Many companies plan to implement the green supply chain concept because of the issuance of environmental laws. At first they felt hard to do it because a lot of changes had to be made. Based on (Diabat and Govindan, 2011) the following are some of the important drivers in implementing GSCM practices such as: Environmental partnership with ISO 14001 certification, suppliers, etc.

3.3 Methodological Approaches

There are some techniques analysis and model types in GSCM performance measurement. According to (Tuni et al., 2018) Modelling approaches in quantitative GSCM research could be seen in Table 4.

Table 4: Modelling approaches in quantitative GSCM research

Type of the method	Technique	Solution	
Mathematical programming	Single objective	Goal, linear and non	
	Multi objective	linear programming	
Simulation	System dynamics	-	
Heuristic	Artificial intelligence	Bayesian network Fuzzy logic	
	Metaheuristics	Memetic algorithm	
Hybrid models	-	-	
Analytical models	MCDM	AHP/ANP DEA	
	Game theory	Stackelberg model	
	Systemic		IO analysis
			Metrics
			LCA
Statistical	Energy methods Probabilistic model		

3.4 Some Studies in Manufacturing Area

Industry is widely known to be a major cause of environmental problems such as produce of machinery; gadget; aeroplane; printing; materials of building and others. Traditional pollutant industries such as producers in the chemical, electricity and paper industries generally experience higher environmental pressures. Some studies can be seen in Table 5.

Tabel 5: Some studies of GSCM in manufacturing area

Time	Paper by	Industrial Sectors	Place
2005	Zhu, Q., Sarkis, J., and Geng, Y	Manufacturing and processing industries	China
2007	H'Mida, S., and Lakhali, S. Y	Oil refinery companies	Canada
2010	Shang, K. C., Lu, C. S., and Li, S	Electronic companies	Taiwan
2011	Diabat, A., and Govindan, K	Aluminium sector	India
2011	Yeh, W. C., and Chuang, M. C	Electronic products	Taiwan
2011	Kim, J. H., Youn, S., and Roh, J. J	Global Korean companies such as Samsung Electronics, POSCO, LG Electronics, Hyundai Automotive, and SK	Korea
2012	Büyükoçkan, G., and Iffi, G	Ford corporation	US
2012	De Giovanni, P., and Esposito Vinzi, V	1400 organizations among Italy's firms	Italy
2018	Zainuddin, A., and Kuzaiman, N. A	Malaysian Automotive Company	Malaysia

4 CONCLUSION

Green supply chain management is needed in terms of competitive industrial commercialization. There are many incentives to create green supply chains, including pressure from global warming and environmental problems. The implementation of effective and green supply chains will apply throughout the world. GSCM helping company to make better achievement in all aspect.

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