Practices of Green Supply Chain Management (GSCM) towards Manufacturing Sustainability

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Abstract. This research we are intends to explore and to clarify the extent of improvement efforts on corporate environmental governance support in enhancing firms' financial sustainability. Specifically, the research attempts to measure the strength of the correlation between GSCM implementation and supply chain practices within the corporate governance environment to derive firm's sustainability. In addition, this research helps to clarify the concept of GSCM and sustain development via solutions to barriers on green efforts from Malaysia perspective. GSCM practices integration was identified by extensive search of the literature. In this article, we are proposing the conceptual model by taking the relationship between the GCSM practices and manufacturing sustainability. Our expectation on this research is to provide important contribution to the firm's sustainability. Most importantly, based on the obtained result the manager can enhance the GCSM performance accordingly.

Keywords: Financial Sustainability, Life Cycle Assessment (LCA), Globalization, Economic Transformation, Environmental Degradation, Natural Resources Depletion, Transportation Emission

1. Introduction

Green supply chain management (GSCM) has its roots in both of the environment and supply chain management (SCM) literature. Nevertheless the term of "*green*" was included in the SCM by addressing the influence and the relationship between SCM and the environment preservation. However the theory and GSCM practices in relation to business organization are paid more attention by many researcher and the firms recently. Most of the researcher belief supply chain (SC) as main contributor for the environmental degradation and global warming causes. Beamon [1] Manufacturer has been looks as complete business operations where started raw resources supply, product fabrication, logistic and been are responsible as main contributor towards environmental degradation issues. Despite of that, Turan et. al [2] was add-up the issues of logistic and product distributor has been making supply chain a major role on the climate change.

Business today is facing on the environmental issues [1,3]. Consequently business operations are subject to increasing pressures and scrutiny from various stakeholders inside and outside organization [4]. This is over and above growing demand of customers and environmental societies for more environmentally friendly products. These challenges and pressures push firms to seriously considering environmental impacts while doing their business. Whereas, green terms commonly application to portray the environmentally-friendly image of products, processes, systems and technologies, and the way business is conducted [5].

2. Literature Review

The environmental degradation and global warming have emerged as a major concern in most of the business organization local and globally. The growing of environmental regulation was enforcing the business organization to respond on the current issues. For instance, the European Union recently emphasizes on the "electrical and electronic waste equipment" (WEEE) and the "restriction of hazardous substances (RoHS). The intensive 3R campaign with the purpose and promoting re-use, re-cycling, reducing and eliminating the use of hazardous substances of the product in the market [6]. Because of the enforcement of WEEE and RoHS, upstream and downstream supply chain manufacturers face tremendous pressure to work together on green management practices [7].

The needs for regulation to environment protection get widespread but grudging acceptance and it's not easy task to do however, Porter and Linde [8] viewed *"green"* practices as ecology trade-off versus the economy. One side of the trade-off is the social benefits that arise from strict environment standard. In the opposite way, industry will faced challenges on the cost increasing for prevention and cleanup that will lead the higher prices and reduced the competitiveness. However the substances of the knowledge on the GSCM

objective should have a clear definition and strategy scope rather than have a specific purpose would reduce the uncertainty on the GSCM practices [9].

Adding the environmental practicing throughout SC can improve organization performance by offering competitive advantage and satisfying the customer demand [10]. However the organizations are required to reacting or making an initiative proactive strategy on the regulatory enforcement to stay competitive in market need by having a number of justifications on GSCM adoption. The GSCM definition depends on the investigator, however Hoskin [11] defined the GSCM concept boundary has range from green purchasing flowing from supplier to manufacturer to customer and even reverse logistic [12]. Consequently, Samir [13] viewed GSCM as an integration of the environmental thinking into supply chain management, started with product designed, material resourcing and selection, manufacturing process, final product delivery reaching the end consumer, and the end-of-life management of the product after its useful life. At this point, the substances of knowledge and having a clear scope of strategy have taken into consideration by the managers rather than practicing GSCM without have any specific purpose

2.1. Economy Globalization Add Environmental Issues

The forces of globalization in today's business world are unstoppable. The word of globalization has evolved everywhere and implies a strong cultural, technology and economic interconnection between people and the others country, and been accepted widely as a part of improving the wellness in between communication in the economic transformation. General Tariff and Trade (GATT) was recorded the average of global trading was increasing 6 percent per year which is engine the world economy [14]. However the acceleration of economy globalization has partly reflects a corresponding on the role of environmental which is industrial sectors (manufacturing) has been seen as forefront environmental issues.

The role of manufacturing and operation was leaded of the environmental degradation, indeed of waste generation and depletion of natural resources [15,16]. Follows the current state and trend of the environmental issues (from stringent environmental, stakeholder pressure and social responsibilities) indicate the need of manufacturing to move forwards to sustainability through vast reduction such as a natural energy resources, minimize on waste producing and make the operational efficiency and effectiveness.

Outsourcing is a part of manufacturing process where is the mobility from one plant to another plant on the other side of the world. It is requires manufacturing firm responsibility acceptance on the of increasing of CO_2 emission due to logistics transportation causes. The blame laid business firm's for environmental an impact which is regards an incidental externalities. The firm need to addressed on practical development align with environmental enforcement and compliance.

As global competition increased, forced firm's to consider the merit of having partners who could help in reducing cost, include market scope, reducing delivery time and develop new products. Competition also force firm's to consider how make their supply chain efficient and efficiency. The green supply chain management has a potentially effective way of managing a company environmental policy by linking it closely of activity on the entire business network. Thus, they have to more focusing on clean up and control to the one embraces avoidance of environmental harms through product cycle assessment (LCA) [17,18]. Treading this path requires more comprehensive means to reduce pollution through attacking the source of pollution at every stage of the process [19].

2.2. Manufacturing in Malaysia

Increasing globalization and continued outsourcing in most of the manufacturing organization have caused industry and business organizations to function in competitive supply chain demand networks level especially offshore activities. In 2011, Malaysia Foreign Direct Investment (FDI) was RM56.1billion increasingly RM56.1 Billion (18.8%) compared in year 2010. It stayed Malaysia as 21st rank in the global competitive index. Malaysia has been choosing as global hub operation by the Multinational National Company (MNC) by pace of the economy activities and the rapid growth of manufacturing trend locally [20]. The continuously government policy improvement and initiatives were put the manufacturing in place to strengthen the sector in the light greater competitiveness and integration of the economy world. For an example, the Ministry of International Trade and Industry (MITI) will continuously legacy in the driving an expansion of manufacturing clusters. Besides that, Malaysia government trough not relayed MITI but there a few agencies that were foster the manufacturing growth such as Ministry of Entrepreneur and Cooperative Development, the Ministry of Science, Technology and Innovation, MIDA, MATRADE and SMIDEC.

2.3. GSCM Practices towards Environmental Performance

Numerous of studied very much considered the effects of GSCM practices on the performance outcomes by indentified on the internal and external environmental system of the firms. The relationships between the GSCM practices and economically showed are strong relationship between the variables [21]. According to Zhu [22] indicate the inter-firm linkage facilitate as critical to improving the organizational performance, such as environmental and quality management system. The quality management has been views as lubricants of the GSCM and under the rigorous quality control organization can improve their product quality [24].

2.4. GSCM Practices and Firm Competitiveness

Do GSCM lead to competitiveness? This issue has been debate and gaining increasing attention among managers and the academia. Zhu *et al* [25] suggested that to stay competitive in the market, the managers should improve their environmental compliance which has been setup by the authority; addressing the environmental concern of the customer and mitigate the environmental impact of their products and services. Allen H. Hu [26], identified greening in the supply chain ultimately leads to competitiveness and economic performance, but the degree of green application is differs between phases

2.5. GSCM and Total Quality Management (TQM) Integration

Change in the business environment triggered the need of supply chain integration. For instance, many studies have attempted to find and explore on the GSCM. For instance, Crandel *et. al* [27] describe condition make an integrated supply chain desirable; from mass production to mass customization; from vertical integration to horizontal integration and from homogenous culture to diverse culture. For instance, total quality management becomes a competitive advantage for the firm's performance consequent. TQM has disseminated widely and presume on the manager's belief that improves firm performance throughout accordingly. As an example of Total Quality Management (TQM) is the green supply chain which focuses on the effectiveness and efficiency [28]

3. Theoretical Framework and Hypothesis Development

The theoretical have helped to frame and identified the relevant concept, interest variable and formulate the research hypothesis. The literature review leads the research framework and identified few related theory towards GSCM practicing. Therefore, the theory was indicate for studies based on the following theoretical foundations

3.1. Institutional Theory (IT)

In GSCM practising, the institutional theory is to examine how pressure influence firm reaction [29] being stayed competitive in the market demand. The three popular in IT philosophy isomorphism widely accepted in most research discipline namely coercive (external pressure) [30], normative (legitimate compliance activities)[31] and mimetic adoption (attempt to imitate) [32], which is underlying on the organization factors [33].

3.2. Ecological Modernization Theory (EMT)

The early environmental development principle was introduce the integration policy and institutional theory (IT) [34]. EMT derived lead the industrial development and environmental protection through innovation and technological development and widely acceptance to explain environmental planning, restructuring of the manufacturing operation [35;36]. Pollution from the industrial sector has been contributed to the environmental degradation. The new politics of pollution, which is inspect on the legislative and policy development and their significant on the environmental innovation. However, in other hand EMT, gain operational opportunities performance improvement [37].

3.3. Total Environmental Quality Management (TQM)

Change in the business environment triggered the need of SC integration. For instance, many studies have attempted to find and explore on the GSCM. For instance, [38] describe condition make an integrated supply chain desirable; from mass production to mass customization; from vertical integration to horizontal integration and from homogenous culture to diverse culture. For instance, total quality management becomes a competitive advantage for the firm's performance consequent. TQM has disseminated widely and presume on the manager's belief that improves firm performance throughout accordingly. As an example of Total Quality Management (TQM) is the green supply chain which focuses on the effectiveness and efficiency [39].

The relevant literature, studied found that environmental management generally beneficial for environmental performance and some aspects of economic performance of the firms'. Numerous studied have prove the relationship between the GSCM practice and economic and environmental output. Zhue [22], improve the firm competitiveness [24] TQM practices as supply chain focus [21]. Therefore bellows hypothesis are proposed;

- GSCM practice is positively related to firm sustainability
- GSCM practices is positively to improve the firm competitiveness
- TQM intervening variable between GSCM practices and firms sustainability

4. Research Methodology

The theoretical and hypothesis is theorized and construct will be describe and defined with a focus on the manufacturing organizations. In this respect, quantitative data is useful research tool to establish the nature of study, whilst quantitative has been viewed an extension in determining the current nature needed . Meanwhile, the deductive theory [41] application will be start with abstract, logical relationship among the concept and subsequently moving towards concrete empirical evidence on the GSCM ontology assumption and epistemology implications [42]. This study employs a quantitative research paradigm using structural to investigate GSCM practices and measure of GSCM performance with respect to firm competitiveness and performance of the organization [43,44].

Structural Equation Model (SEM) will be use as the main statistical analysis tools to purify the measurement item for each variables and the hypothesis testing. SEM is a statistical tool that combine model measurement model on the confirmatory factor analysis into simultaneously on the path of analysis statistical test Garver and Mentzer, [45]. Moreover, SEM, has been choose for this study because it able to handle multiple relationships simultaneously and efficiently. It is also able to assess relationship comprehensively and provide a transition from explanatory to confirmatory measurement analysis Hair *et. al* [46]. Again the data reliability and validity of quantitative methodologies will be measure accordingly Harland *et al* [47]. Considering on manufacturing organization as a focus, the data will be collect through questionnaires sent to a stratified random sample respectively. The questionnaires addressed who may provide in depth knowledgeable operational and green practises. Therefore, the manufacturing organization selection bases on the ISO140001 compliance on the GSCM practising to maintain the manufacturing organization existence successfully.

4.1. Depend Variable

Consist with previous research perceptual measures of performance were used in this study. Perceptual measures of performance have been found to be well correlated with objective performance and appropriate organization willingness aligned organization objective, to provide financial and environmental performances. To capture the organization respondent perception of firm performance, we used Likert scale with started 1=not considering (lowest) and 5=implementing successfully (highest) scores, to extend their firms perceives implementing of the dimension GSCM practicing. In particular respondent will be ask, how the GSCM practices on their firm with respect of environmental differential, operational efficiency and customer effectiveness towards firm's sustainability [47]

4.2. Independent Variables

Our independent variable of interest was the organization specifically on the GSCM antecedents. GSCM is a complex set of network of activities involved in delivering the finished product to the end–user customer and reverse logistics for the re-fabricate and re-use of the products. This was accomplishing by asking the respondent an appropriate questionnaires green practising on the main level of supply chain; upstream, midstream and downstream [18]. The green applications that include the potential strategies reproduce firm financial objective without failed on the environmental preservation issues [47].

5. Conclusion

In brief the growth attentiveness on the degradation globally has enforces organization to look externally to determine how the firm's will be sustaining in a long-term. The firm performance is not stand-alone on the operation system but needed to include the strategic and inter-organizational requirements. It requires the firm begins to focus of competitiveness on environmental friendly. The internal and external stakeholders have caused organization too explicitly consider the environmental as their strategy on the operational planning and execution. Therefore, this pressure has extended across the supply chain network in-particularly aid GSCM practices and implementation. There is at least need a planning for conceptualize firm

performance measurement system. Which is ranging from the various (internal and external) pressured that need to be addressed as a tool and result of GSCM performance.

6. References

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