

IMPLEMENTATION OF GREEN SUPPLY CHAIN MANAGEMENT FOR PRODUCTION: A CASE STUDY IN SONY (MALAYSIA) SDN. BHD.

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Abstract

Nowadays each company is going green due to global greenhouse gas emission has reached a critical level and awoken the social awareness. Companies are requested to be responsible for all direct or indirect pollution of their act. Malaysia Green Technology Corporation (Green Tech Malaysia) has embarked on a carbon footprint (CFP) labelling project to help the customer differentiate between green and non-green product, with the support of policy it will affect the customer purchase decision. Therefore, organizations need a way to comprehensively manage their entire business in a manner that meets green and profitability targets in order to maintain their competitive advantages. Green supply chain management (GSCM) is designed to consider the environmental effects of all processes of the supply chain from the extraction of raw material to the final disposal of goods to achieve minimized environmental impact while assuring maximized consumer satisfaction. Thus GSCM Green supply chain management (GSCM) will be a key approach for an organization to make sure their businesses are environmentally sustainable. In this case study SONY Malaysia Sdn. Bhd. was selected to investigate the process to implement GSCM and the activities that involved in each process to allow the company imply the insertion of environmental criteria within the decision –making context of the traditional supply chain management. The respondent of the study will be aims for 25 managers through interviews to ensure the research validity. This study proved that the application of GSCM in SONY brings a lot of benefits such as social responsibility enhancement, inventory improvement and lowered the cost. As a conclusion, GSCM might become the most efficient strategy for SONY to go green and it could be implemented for other manufactures that to transform their supply chain management.

Keywords: *Green supply chain management (GSCM)*

1.0 Introduction

In 2008, global economy faced a serious financial crisis. The financial crisis has caused the global economic downturn and directly affect the competition among each organization in the market. To sustain competitive advantages in the market, most of the companies have begun to focus on their supply chain management. According to Taylor (2003) the classic model of company vs. company is starting to give way to a new model: supply chain versus supply chain.

The success of a company now depends on assembling a strong supply chain to deliver the best product at the best price. Beside that global warming issue is highly emphasized by the social nowadays, green product are slowly demanded by the market. Thus, companies must implement green into their organization in order to produce green products. Greening supply chain could be the new area that ensures the organization gain double wining situation by creating a more competitive advantage and reduce company carbon footprint. The idea of green supply chain is also supported by the World Wildlife Fund (WWF). According Pollard (2010) the time for action on greening supply chains has come, WWF created the Global Forest and Trade Network (GFTN) to provide structured support and framework that provide confidence and encouragement for both suppliers and buyers to take the necessary steps to green their operations and supply chain that connects them. Most of the companies think that it will not bring any benefits if they go green on their supply chain, but with the correct strategy, there are possible to gain extra tangible benefit as lower cost and inventory efficiency of the company while moving towards a green supply chain.

2.0 Problem statement

Most recently The World Meteorological Organization (WMO) reported that the amount of greenhouse gases in the atmosphere has reached a new record high in 2012, continuing an upward and accelerating trend which is driving climate change and will shape the future of our planet for hundreds and thousands of years. The awareness of social not only changes the customer life style, but it also has raised a new trend to push most of the electronic product going green and minimize hazardous material contents. The European Union had set up its own Restriction of Hazardous Substances Directive (EU-RoHS) to control every electronic product that contain restricted substances. Thus, manufacturer must act fast to implement green into the production line to ensure its product fulfil did not contained over hazardous materials. In this case, the organization will be likely to identify the most efficient sector to control its product's hazardous material contents and implement green into the organization production. The best place to start implementing green will be supply chain. According with (Vachon and Klassen, 2007; Vachon and Klassen, 2006; Vasileiou and Morris, 2006). Environmental sustainability is a supply chain imperative rather than an organizational imperative. The research question will guide the researcher to investigate the ways of implementing green supply chain for production.

The research question constructed as below:

- i. How SONY Malaysia Sdn Bhd implements the green supply chain management (GSCM) to its production?
- ii. What are the activities involved in green supply chain management (GSCM) implementation in SONY'S production?

3.0 Literature Review

Green supply chain management

The traditional supply chain described as the functions used to manage all the demand and supply activity. According to Crandall, et al. (2010) defined supply chain management as follows:

Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partner, which can be suppliers, intermediaries, thirdly party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies.

The formation of green supply chain management can be completed by implementing green properties into the existing supply chain management. Emmett and Sood (2010) state green supply chain management will fully integrate environmental considerations into traditional supply chain management. However, there is another view of green supply chain management. Wang and Gupta (2011) state industries have been gradually shifting towards environmentally friendly supply chains by integrating green technologies into their product designs, production, and distribution processes. These efforts, together with the desire to incorporate extended producer responsibility (EPR), have led to the evolution of green supply chain management (GSCM). Thus, the steps and each involved activities for implementing green supply chain management will needed as a guideline to the organization.

Scope of implementation strategies must be formed to implement green supply chain management in an organization. Seven key areas that implement green supply chain management have been proposed by Emmett and Sood (2010). However, three key areas will be selected as the most significant area that relate to production and there are:

- i. Green supply chain planning
- ii. Green procurement
- iii. Green supply chain execution

Green supply chain planning

Green supply chain planning is the first key area to implement green supply chain. Each activity that involved with supply chain will implement green concepts during the early stage of planning. According to Emmett and Sood (2010) green supply chain planning introduces a revolutionary new mindset to the traditional supply chain planning. All activities across the entire supply chain are planned with a viewpoint of minimizing the environmental impact of the overall endeavor while still achieving the same result.

Green procurement

Procurement also known as purchase, according to Benton (2010) the function of purchasing is to provide a firm with component parts and raw materials. Green procurement is aimed to green the company's resources. Emmett and Sood (2010) state that green procurement aims to reduce overall expenditure on organizations, products, and services by removing or minimizing the usage of "hazardous to Green initiatives" in the entire supply chain.

Green supply chain execution

The last key area of implementing green supply chain management is green supply chain execution. This step is aimed to execute green to another area or activity that is related to the green supply chain. According to Emmett and Sood (2010) green supply chain framework, there are five activities that underlie green supply chain execution. Those five activities are green products, green logistics, green packaging, green marketing and supply loops. Green production will be selected as the most significant area that relates to production.

Activities in green supply chain planning

Activities in green supply chain planning are the significant activities that are involved during the early stage of planning. Green supply chain planning will gather all important planning stages in the supply chain and implement green practices to form a green supply chain plan. According to Emmett and Sood (2010) the activities in supply chain planning are:
Life cycle engineering

Life cycle engineering

Life cycle engineering is directly related to the company's product. It forms a basis for the green supply chain plan, the aim was to reduce waste by reusing and thus readily assist in promoting sustainable development. It leads to collaboration and integration between various groups such as marketing, engineering, production and others. With life cycle engineering the potential economic, environmental, and technical impacts of products, services, or processing methods are analyzed for the entire life cycle at conceptual and design phases.
Green sales and Operations Planning (S&OP)

Sales and Operations Planning (S&OP)

Sales and Operations Planning (S&OP) is seen as an organization process aimed at harmonizing plans across different functional departments within an organization. The main components of Green Sales and Operations Planning (S&OP) are green demand planning and green supply planning. Table 2.1 will show the details of green demand planning and green supply planning.

Table 2.1: Green sales and Operations Planning (S&OP)

Components of (S&OP)	Key elements
<p>Green demand planning The main objective is to create collaborative forecasting. Collaborative forecasting is the process for collecting and reconciling the information from diverse sources across the supply chain to create one single unified's statement of demand.</p>	<p>Applying statistics and other algorithms to pass data to recover relevant information. Process and systems that collect customer level input from the markets routinely. Process that merge management decision overrides with the data collected at customer level. Process that merge Green marketing input, which is usually product focused. From the sale's view, which is usually customer focused.</p>
<p>Green supply planning Supply needs to come essentially from production or inventory. The important consideration is in what stage of production does store the material to achieve maximum profitability and 'Greenness'.</p>	<p>Green production planning -Adds variables related to the environmental impact on the decision-making process. Green Inventory planning -Consideration of the overall supply and demand.</p>

Source: Emmett and Sood (2010)

Supply management is recommended to include at the early stage of planning. According to Monczka et al. (2009) supply management is a strategic approach to planning for and acquiring the organization's current and future needs through effectively managing the supply base, utilizing a process orientation in conjunction with cross-functional team to achieve the organization's mission. Thus supply management will measure each of the planning resources needs to ensure the planning achievable.

Activities in green procurement

The Green procurement target was to reduce overall expenditure and reduce company carbon footprint by controlling the input that provide by the supplier. However, to achieve green procurement there are five main key activities that contribute to green procurement. Table at below shows the main activities that propose by Emmett and Sood (2010):

Table 2.2 : Activity in Green Procurement

Activity	Description
Collaboration	An organization can get more return on their Green initiatives if involve partners and examine the entire upstream and downstream supply chain and not just their own part.
Incentive Alignment	Substantial saving and waste reduction can be achieved by providing incentives to suppliers to find ways that will help reduce material consumption.
Supplier Development	Any effort of a buying firm with a supplier, to increase its performance and/or capabilities and meet the buying firm's short and/or long-terms need.
Energy-Efficient Procurement	Setting minimum energy efficiency standards and all of the measures that will promote energy efficiency across the organization. Once the standard has been created, procurement will purchase item base on the standard.

Source: Emmett and Sood (2010)

Supplier performance management can be one of the green procurement activities. According to Gordon (2008) supplier performance management is the process of evaluating, measuring and monitoring supplier performance and supplier business processes and practices for the purpose of reducing costs, mitigating risk, and driving continuous improvement. Thus supplier performance management will help the organization to identify potential supplier for developing programs and measure supplier, carbon footprint before purchase any material from the supplier.

Activities in green supply chain executive

Green production

According to Emmett and Sood (2010) green production incorporates the search for and the deployment of alternatives to existing manufacturing technology, strategy and design, whilst taking into consideration the internal and external requirement and constraints, risks, safety measures, regulations and the environmental impact.

Green production is an organizational strategy that focuses on profitability through using environmentally friendly operating process. There are three fundamental objectives for green production.

4.0 Theoretical framework

While implementing green supply chain management, there are selected step and combination of activity that need to be implemented. By then, a model has been constructed by the researcher for a better view of the framework.

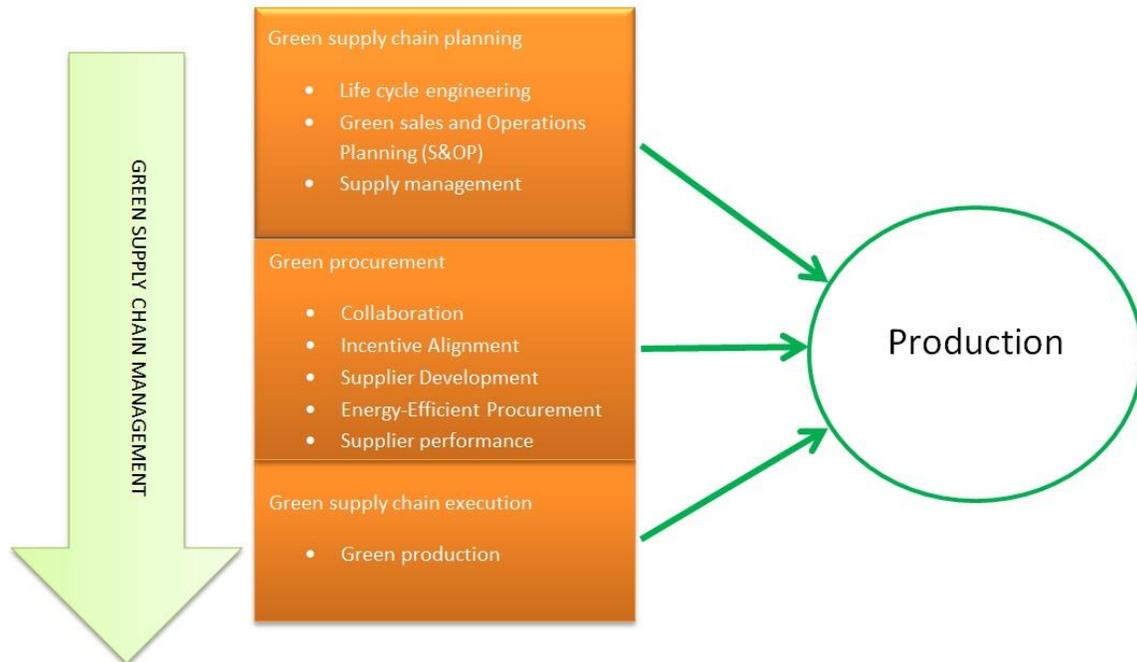


Figure 1.0 : Theoretical Framework for implementing Green Supply Chain Management

Each of the key areas is the step to implement green supply chain management to organization's productions. Every movement towards key area will have its own objective and each of the activities will be the supportive activity in the key area to achieve implement green supply chain management into production.

5.0 Research method

Research methods had been considered as one of the most important parts while conduct a research, without implementing proper techniques and procedures it will cause the entire research to unreliability. According to Cooper and Schindler (2011), research method is a systematic inquiry that provides information to guide researcher in a research. It is a process of planning, acquiring, analyzing, and disseminating relevant data and information for researchers to take appropriate actions in conducting the research successfully Saunders et al. "2012" mention that methods refer to techniques and procedures used to obtain and analyses data. Thus the importance of research is being highlighted as the big map to lead researcher, research methods also been seen as 'tools or ways of proceeding to solve problems' (Ghauri and Gronhaug; 2010).

In this research, the researcher has selected qualitative as the methodological choices, exploratory as research design and case study as the research strategy. More explanation will be found at the following part with justifications of how the research is conducted and why these methods been selected by the researcher. According to Chew (2013) research methods needs justification of how did you conduct your research (data collection and data analysis) and why those methods were chosen.

Research design

Research design is a logical and systematic plan prepared for directing a research study. It specifies the objectives of the study, the methodology and techniques to be adopted for achieving the objectives. Zikmund et al. (2013) agree that research design is a master plan that specifies the methods and procedures for collecting and analyzing the needed information. Consequently, it shows research design is the blueprint for the collection, measurement and analysis of data. The validity level of the research data that answered the research question will determined by how well is the research design is being planned.

The researcher chooses descriptive studies as the research design. The objective of descriptive research is to gain more accurate information. According Saunders et al. (2012) descriptive research is to gain an accurate profile of event, person or situation. This may be an extension of, or a forerunner to, a piece of exploratory research or, more often, a piece of explanatory research. It is necessary to have a clear picture of the phenomenon on which you wish to collect data prior to the collection of the data. Therefore, the researcher will need to go further and draw conclusions from the data which have been described. SONY Malaysia Sdn Bhd has succeeded implement green to its procurement department and aim to achieve green management in 2015. Based on the company's achievement in implement green to its management, SONY Malaysia Sdn Bhd has been selected as the study location and 25 managers from SONY Malaysia will be selected as the main source of investigation. Primary data will collected throughout qualitative with the expert to answer the questions during interview section.

Qualitative research

This case study of implementation of green supply chain management in SONY Malaysia Sdn. Bhd was conducted through qualitative research. Qualitative research aims to achieve an in-depth understanding of this case study as Cooper and Schindler (2012) explains that qualitative research includes a variety of interpretive techniques which seek to gain an in-depth understanding in a case study. It is used for both collection and analysis of data stages in a research. The interpretive technique that is used in this case study is an in-depth interview among the 25 managers in SONY Malaysia Sdn Bhd.

Qualitative research use existing theory to develop a richer theoretical perspective. The existing theory that the researcher explored in this research are the supply chain management. Thus, the qualitative research is designed to tell the researchers' in-depth understanding of how

green supply chain management able to implement into SONY Malaysia Sdn Bhd production and what are the activities that involved at each step.

Methods of data gathering are as below;

a) Case study

The researcher explores the step to implement green supply chain management into SONY Malaysia Sdn Bhd production by investigating with the manager.

b) In-depth interviewing

The researcher managed to obtain 25 respondents in SONY Malaysia Sdn Bhd about the idea of implementing green supply chain into the production.

Hence, to achieve generalizability and reliability, qualitative method is adopted. There will be 25 respondents positioned at the executive level that from the supply chain department and Corporate Social & Environmental Responsibility department and the person that has authority to make a decision will be selected for an in-depth interview. The questionnaire also been tested by pilot test, by conducted with three of the SONY managers.

Method of primary data collection

The researcher has chosen case study as the research strategy for this case. According Sekaran and Bougie (2009), a case study involves in-depth, contextual analyses of similar situations in other organizations, where the nature and definition of the problem happen to be the same as experienced in the current situation. With the implement of green supply chain, the management at SONY Malaysia Sdn Bhd been considered as a new area. Therefore, research strategy that capability to gain a richer understanding is being encouraged.

Beside that the primary data also will be collected with 25 managers in SONY Malaysia by In-depth interviewing. By using case study methods the researcher will able to have in-depth understanding about the step and activities that involved to implement green supply chain management into production.

Data analysis and discussion

Investigate the process of implementation green supply chain management (GSCM).The first research objective was aimed to investigate the process of implementing green supply chain management in the production. According to Emmett and Sood (2010) there are seven key areas that need to be implemented green. However, three key areas will be selected as the most significant area that related to production and there are:

- i. Green supply chain planning
- ii. Green procurement
- iii. Green supply chain execution

The researcher will discuss each stage separately to ensure reader understand the importance of each stage and also the process to implement green supply chain step by step starting with supply chain planning, procurement and lastly supply chain execution.

Green supply chain planning

Supply chain planning is being considered as the first step in the implementation process of green supply chain management. Green supply chain planning introduces a revolutionary new mind set to the traditional supply chain planning and it was the main guideline for the following progress to refer. Thus, each progress and activities across the entire supply chain will be planned with a viewpoint of minimizing the environmental impact of the overall endeavour while still achieving the same result. Hence, based on the theory, the first step to implement green supply chain management in the implementation process will start with planning.

From the data collection process, the researcher not only found out the SONY first step of implementation process, but also found out the importance of the first implementation step. The green supply chain planning has been considered as the most important step in the entire progress. Even though that green supply chain planning was the first steps of the implementation process, but each of the processes are linked with each other and shared the same information. Therefore, clear information and direction of green product will be provided by green supply chain planning stages. The experts believed that new implementation should start with green planning.

“The planning or Research and Development (R&D) of green implement are the most important guild line creator. The guideline will be used by each department to refer. Without the information from planning stage, the procurement and the following department will not able to perform in the right track as looking for the correct parts or heading to the right track.”

(R&D Manager 1)

“In the first stages of planning, product will be designed and the green element will be implemented into the product by following the controlled substances policy that set by the company. The policy will refer to the European Union- Restriction of Hazardous Substances Directive (EU-RoHS). After the design has completed, procurement will only start with sourcing.”

(R&D Manager 2 and Design Manager 1)

Based on the experts view, the planning stage is the step that implements most of the green elements into the product. Each part of the product will have its own standard which is based on the company controlled substances policy that referred to the EU-RoHS. R&D department played the role to design the products that fulfill with the global RoHS standard. The experts from procurement also agree that the first step of the process should start with green planning.

“The procurement will not able to start green procurement without green planning information. Procurement will need to refer the green product planning standard as a guideline before interacting with the suppliers. The parts will require approval from the R&D.

(Procurement Manager 1, 2 and 3)

There is one expert from the procurement department had stated the consequence of green procurement without green supply chain planning. According to procurement manager 4 Procurement will refer the standard that provided by the planning or the R&D department before they can begin to look for the right suppliers. Procurement must maintain strong communication with the planning or the R&D department in order to ensure the product parts that offered by the supplier fulfill with the requirement of R&D or planning.

There are secondary data which show the collaboration is required for each process. According to Zhu et al. (2010) in the context of GSCM, inter-organizational collaboration is even more important for managing the internal and external coordination and cooperation to have the system successfully implemented throughout the whole supply chains.

Based on the researcher opinion, the first stage of the implementation process will play the role as the leader or guideline for other department. In order to succeed implement GSCM process, all departments will required to share a clear direction together. However, in the sharing process, there must have a main department that played as the expert or leader for other departments to refer. In SONY, design and R&D department are involved in the early stage of planning and beside design green product or green policy. Both departments also will play as a leader where the green procurement will refer the information that provided by the green supply chain planning process before started to play their own role.

Implementation of GSCM required each department implement green element into the traditional operation. There are lots of details that required high justification level and well trained employees with green policy knowledge, and the first stage of the implementation process will ensure both requirement has been archived before started to implement the new GSCM.

Green procurement

After planning, green procurement was the second step in the entire implementation process. In the first step, green planning was more emphasized on design green product. After design, sourcing for the green raw material will be the next step after the product design is established. Based on the theory, procurement and purchasing are related and they function as purchasing the raw material for the organization. According Benton (2010) the function of purchasing is to provide a firm with component parts and raw materials. When talk about green procurement it has different aims. Emmett and Sood (2010) stated that green procurement aim to reduce overall expenditure on organizations, product, and services by removing or minimizing the usage of “hazardous to Green initiatives” in the entire supply chain. In the expert views, green procurement is one of the important steps to implement the green supply chain into the production. According to Procurement Manager 2, he believes that even the procurement was following the information from planning, but without strengthening in sourcing for green material, some of the product parts may need to be re-modify.

The researcher believes that even procurement is the second step after planning, but it still played the important role in the external area. The experts from planning explain that the procurement holds the important position to handle with the supplier and procurement played as the first gatekeeper for the green material.

“Besides ensuring the product component is fulfill with the requirement from the R&D, procurement department will concern about the cost and quality of input material that provided by the suppliers. The performance of the supplier will directly affect the entire implementation process, thus planning and procurement both are the same important.

(R&D Manager 3 and 4)

Based on the statement from R&D manager 3 and 4 above, the researcher notices that not only R&D department has the authority to decide qualification of supplier product, but the procurement also has the same authority. The R&D department had the authority to decide which supplier material qualify with the environmental sustainability policy, but the procurement will have the authority to disqualify the supplier material if the price that offered are too high or the supplier have poor performance in the previous supply. Hence, material quality, price and supplier performance are important to the organization. Beside measure supplier performance, the green procurement also will be a channel for the organization to gain extra feedback from the external to support the green product planning. According to Purchase Manager 1, procurement department will be the main resources to gain feedback from supplier regarding the green component requirement. It will allow us to know either our standard is overly low or excessive.

The expert also believes that to successfully implement the green supply chain management, company must have strong communication between planning and procurement to ensure procurement understand with all the component requirement before started to communicate with the supplier. According to Purchase Manager 2 and Procurement Manager 2, they believe that the biggest challenge for the early stages was to understand the requirement and the controlled substances policy. Lots of meetings had been set up for both departments to achieve understanding before procurement made further communicate with suppliers regarding the green input material.

Based on the research opinion, green procurement and green supply chain planning played the same important role in the GSCM implement process. Green supply chain planning focus on internal development and green procurement is on supplier development. The green procurement will face more challenging tasks to ensure the company supplier are following SONY footstep heading to go green together.

The reason why green procurement played the same important role with green supply chain planning is because green procurement is the department that communicate with supplier, sharing green knowledge and leading the supplier toward the green direction. As a result, the difference between green supply chain planning and green procurement are the develop target.
Green supply chain execution

Green supply chain execution was the third step where after the product design and raw material are well prepared and ready to move forward to the production. This step is aimed to execution green to another area or activity that is related to green supply chain Emmett and Sood (2010). The researcher found out that the quality assessment has played the most significant role in the execution because the material and product outcome will need to pass the quality assessment. The experts believe that quality assessment is the best execution because it able to ensure the product outcome and raw material to fulfil with the green standard.

“Quality assessment will test the raw materials that send by the supplier before used for production. The parts must fulfil with the standard that set by the organization and once the product assembly is complete. A test will run again on the product to ensure the product achieve the green standard.”

(Quality Assessment Manager 1)

“If the product or material that failed quality assessment testing will be rejected and investigation will be started to improve the process, it was the important information to find out which part of the process can be improved.”

(Quality Assessment Manager 2)

According to Figure 4.1 secondary data from SONY (2013), it shows that the green implement of SONY was started with the R&D and operation is the last step for the production area. The logistics have not been discussed in this case is because the logistics are more emphasized on the product delivery till the hand of the customer. Therefore, based on the secondary data and view of expert, the process of implement GSCM for production is the process that started to implement green in planning and ended with execution.



Figure 4.1 : Sony basic policies for Achieving Green Management 2015

Identify the activities that involve in green supply chain management for production. Each of the implementation process played a different role, but the three processes shared same policy. Each process or department required strong communication with each other. However, to successfully implement green supply chain management in the production area, the activities of each process is required to keep the process efficiently operating. The second objective will be discussed on this part where the researcher will explain each process activity separately, which are green supply chain planning activities, green procurement activities and green supply chain execution activities. Meanwhile, the researcher will show clear view of each activity's function and some extra benefit of green procurement activities.

Activities in green supply chain planning

The activities in green supply chain planning were playing the role of implementing green element in the product design. According to Monczka et al. (2009) supply management is a strategic approach to planning for and acquiring the organization's current and future needs through effectively managing the supply base, utilizing a process orientation in conjunction with cross-functional team to achieve the organization's mission. The green element of the product will be referring to the global market demand request and also each country environmental regulation, it was considered as green market demand. The implement of green demand information is one of the important activities during the early stage. Emmett and Sood (2010) explain Sales and Operations Planning (S&OP) is seen as an organization process aimed at harmonizing plans across different functional departments within an organization. The main components of Green Sales and Operations Planning (S&OP) are green demand planning and green supply planning. The experts from SONY believe that green planning has played the role as a guideline for other department.

“A special team that combined with different specialty expert will be specific studies the controlled substances policy that published from the potential consumer government. Each country policy will act as reference while the company creates its own policy and the policy will be followed by the organization.”

(Procurement Manager 5, R&D Manager 5)

“R&D and the planning department will play the main role to share the green knowledge with other department regarding the company green policy. Meeting and training programs will be set up for procurement, quality assessment and other related departments. The purpose of the training was to ensure each department has the basic green knowledge and also to ensure each department is moving in the same direction.”

(R&D Manager 1, 2 and Procurement Manager 1)

The environment's sustainability policy that was set by the government are the main resource to refer or being considered as green demand. With green demand as referent, organization able to design the green supply for the internal organization to ensure the organization has the capability to produce green products. Besides that, from the interview section the researcher also found out that to implement green supply chain planning, long period of time is required to understand the green policy. In this issue, communication of each level was the biggest challenges and the benefit was strong relationship will reduce error percentages.

“It takes several of years to complete implementation of green concepts into the traditional system. Communication and research on the policy is the main key to success the green implementation.”

(Purchase Manager 3)

Sometimes extra meeting will be called when changes happen within the market. The organization will revise the green policy when there are changes with the green demand in the market. According to R&D Manager 2 before a new product design or the policy had been revised, a meeting will be called for related department to ensure each department understands

the changes and to ensure all of them are on the right track. Thus the green demand is playing the role as process the external information, and the green supply's role is more focus on the organization internal planning and cooperation between each department to produce the green product.

Activities in green procurement

Procurement is all about suppliers, in green procurement activities the organization will focus on improving the supplier performance. Thus activities that contain supplier performance measurement will be more emphasized. Gordon (2008) explains supplier performance management is the process of evaluating, measuring and monitoring supplier performance and supplier business processes and practices for the purpose of reducing costs, mitigating risk, and driving continuous improvement. With green procurement activities, the companies will grow together with the supplier and the activities are designed for both parties.

According to Procurement Manager 2, the company would not able to achieve green procurement without the green partner activities. The green partner programs have not only benefited the organization, but it also allows the suppliers increase the competitive advantage. Based on the expert's statement, the activities will increase the supplier's competitiveness to gain contracts with the organization by fulfilling the organization green material demand.

In the meanwhile, with the activities that develop supplier performance will able to increase the chances to do business with the organization. Thus, suppliers are willing to grow with the company because they would like to maintain the business with the company. Beside increase the supplier business opportunity with the organization, the researcher also found out that, green procurement activities were able to create win-win situation for the suppliers to grow their own business opportunity in other market sector.

“There are few supplier requested to join as one of the company green partners, even that there is no business between the organization with the suppliers. The main reason of those suppliers wanted to become one of our green partner was because of two reasons, the activities that help them grow, and the audit will ensure their product qualification. Once they qualify as the green partner, other customers will have confidence regarding their green product and it brings the benefit of their other business.”

(Procurement Manager 3, Head of Green Partner 1)

Before development program, the organization will audit the supplier to ensure they are qualified as one of their green partners. According to Procurement manager 1 and Head of Green Partner 2, the auditor will audit the supplier operation and overall performance based on the company green policy. The current green partner will be audited once in each one or two years. The audit was important to ensure each of the elements are fulfill with the organization policy to achieve qualify green supplier standard.

There are also secondary data that prove the green procurement should focus on ensure the supplier's environment certification. (Hsu and Hu, 2008) agrees green purchasing practice is comprised of environment-based initiatives, such as supplier environmental audit and assessments and supplier's environmental certification. Beside audit activities, researcher also found out that the organization had provided some supplier training and first priority benefit to the supplier if they able to provide suggestions to improve the organization.

“We will help our supplier to achieve the standard by providing them extra information and consultant when they failed to achieve the new standard of green partner policy. The suppliers that provided better suggestion will be given first priority as a reward, unless the suggestion is not approved by the R&D or the price that offered is too high.”

(Procurement Manager 6, Purchase Manager 5)

The inspection and other green procurement activities able to bring benefit to the company, but in the meanwhile the activity are costly for the organization. The organization must have enough resources to execute the audit and supplier development programs.

“It was not easy and it was not cheap to train a green partner auditor. Currently we just only have less than 20 employees qualify as the green partner auditor. Each time when the auditor went out for audit trips, it will cost extra cost for the company.”

(Procurement Manager 3)

Based on secondary data, activities in green procurement are more to encouragement on supporting the supplier. Lee and Klassen (2008) explain that buyer firms should support suppliers regarding complex regulations that must be complied in various international markets. Thus, in the researcher opinion each activity must able to bring win-win situation for the firm and suppliers. Sony not only creates activities for the suppliers, but also had created a system for SONY and supplier to exchange information.

According to Sony Green Procurement Guideline (2001) SONY has also set up an environmental issue research page on the Sony Web site for the Sony Procurement Integrated & Rationalized Internet Trading System (SPIRITS) e-procurement system. Besides heightening awareness of environmental issues, SPIRITS encourage interchanges between suppliers and Sony.

Organization that interested to establish good relations with their partners must willing to share information with their partners high interchanges between the partner and organization will not only save time but it also will reduce the risk of miscommunication. Beside that the organization also will required willing to invest and develop in the procurement department to organize or create activities such as audit team, better communicate system and development program that able to bring benefit to the organization and the suppliers.

Activities in green supply chain execution

The activities in the green supply chain execution was to ensure the product outcome was qualified with the product quality requirement and to ensure the raw material that supply by the suppliers are fulfill with the controlled substances policy. The expert believes that the quality check will able to ensure the product fulfill with the green policy.

“Our responsibility was to ensure the raw materials that send by the suppliers are qualified green parts. It was to ensure the entire product outcome able to qualify as a green product. The material will be rejected if the materials are not qualified as stated in the controlled substances policy.”

(Quality assessment Manager 2, 3)

Limitation and Innovation solution

The main green information that referred by the organization at the early stage are the green demand from the market. Most of the company will not implement green into the product unless the rule and regulation said so. Expert believes that the implementation of green element should not base on government policy but should be set as one of the company long term objectives.

“Most of the organization will only start to implement green into the production when the product is unable to fulfill with the European Union- Restriction of Hazardous Substances Directive (EU-RoHS) or other country regulation. When this issue happens, it will cause extra cost for the company to expose the product and time pressure to implement green. The organization should start to implement the green element in the production as early as possible.”

(R&D Manager 1)

In the context of GSCM, inter-organizational collaboration is even more important for managing the internal and external coordination and cooperation to have the system successfully implemented throughout the whole supply chains (Zhu et al., 2010). Therefore based on the researcher opinion, the government is playing an important role to awaken the awareness of environmental issue for the organization. However the company should not only awake when its loss profit, the company should premeditate the environmental practices as one of the public responsibilities to ensure the environmental consideration aspect is as important as the company profit.

Besides that, the researcher also found out that the involvement of the suppliers in the early stages is less and sometime when came to the stage of the supplier, some policy may need to revise due to the standard that set by the organization is unable to fulfill by the market.

“ Temporary the supplier did not involve much in the early stage of green planning, when new parts or better component parts has been proposed by the supplier, green procurement will only inform the R&D department and it take times to investigate the proposed parts.”

(Procurement Manager 2 and R&D Manager 3)

According to Emmett and Sood (2010) suppliers should involve in the early stage of green supply chain planning to achieve efficiency. However, they are secondary data mention that some supplier may not be ready to involve in the early stage of planning due to poor performance. Lee (2009) agrees they are mostly small- and medium-sized enterprises (SMEs) which often lack human resources with expertise on Restriction of Hazardous Substances (RoHS) Directive compliance, as well as financial resources to initiate expensive environmental management systems (EMSs) such as ISO 14001

Based on the researcher's view, the well establish and high reliable suppliers should started involve in the early stage of planning and on the meanwhile the undeveloped supplier will require more training from the company if the supplier being considered as future potential suppliers.

6.0 Conclusion

In the entire research the researcher found out that implementing green supply chain management in the production area will require resources such as time and cost. Most of time will be used for understanding the environmental policy, design green product, communication and also supplier's development. Good internal communication within each department are also highly required when implements green supply chain. However the researcher believes there are solutions to wilder the implementation of GSCM.

The researcher notices, during the early step of green planning, the organization did not involve any supplier in the early stage because to ensure new product development information will not leak from the supplier. Time will be wasted to revise the plan when the green product parts are unachievable due to out of the market ability. Thus to reduce the risk and wilder the implementation of GSCM, the researcher suggests that main supplier may require to involve during the early stage of green planning.

The main purpose to involve supplier in the early stage was to reduce the risk in the planning stages. Beside that it also able to reduce the time for green procurement communicate with the suppliers. The suppliers might able to provide extra suggestions based on their expertise and wide experience in the market.

High flexibility system and good communication within each department are also able to help the organization to success in wilder the implementation of GSCM. During the interview section, the researcher notices there are strong bones between those departments that involved with the GSCM. The researcher believes with strong communication and helping culture, the organization able to increase the organization employee knowledge and awareness regarding the environment substances sector.

Recommendation for further study

Even though the Green supply chain management implementation of this case study are for Electrical and Electronics Industry (E&E) industry, but the researcher believes that beside E&E sector, service sector and other industry also can implement GSCM to reduce the carbon footprint of the organization output. The researcher hopes that the readers could gain benefit and inspiration through this research to discover more about GSCM.

7.0 Reference

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