

Supply Chain Responsiveness in an Asian Global Electronic Manufacturing Firm: ABX Energy (M)

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Abstract — The purpose of this study is to scrutinize the significance of supply chain strategies - Lean and agile supply chain - as well as the strategic supplier partnership towards improving the supply chain responsiveness in Abx Energy (M). All stated strategies show a simple logic that it does give impact on manufacturing firm like Abx Energy (M). A conceptual research model is constructed in demonstrating the firm that implement a proper supply chain practices to support and execute its supply chain strategy which will boost its responsiveness on the subject matter of supply chain. The collections of primary data are collected through interview with the managers. The study is carried out on qualitative data basis, which differs it with other research on this subject which most have been in quantitative form. An Asian global company, Abx Energy (M), is selected to investigate its responsiveness towards supply chain. The results from this research shows that it will greatly benefit the firm if the strategies of their supply chain being considered thoroughly. This paper aimed to raise a research subject that previously being held mostly in quantitative form and to further overcome the shortcoming in current debate beyond any previous description mentioned.

Keywords— Supply chain responsiveness, Lean supply chain, Agile supply chain, Strategic supplier partnership

1. Introduction

Supply chain responsiveness has been considered as an integral part in the industry in changing market requirements and their overall efficiency. According to [14],

responsiveness is the capability to persistently act in response to and in a reasonable time-scale to the demand of customer and also to adapt to the variability that exist in the marketplace in bringing out and sustaining competitive advantage. Thus, this paper focused on the factors that influenced supply chain responsiveness.

Furthermore, strategies such as lean and agility in supply chain played a major role in contributing to the responsiveness of any supply activities from one end to the other. Mentioned in a book titled Logistics and Supply Chain Management written by [2], lean strategy performs very well in high volume, less variability and works best in high volume, low variety and in a well-known environment. While, agility required in a less expected environments where the demand for variety is high. In addition, choosing a good supplier through a strategic supplier partnership will also lead to the responsiveness in supply chain. This can be done by improving the inventory, costs and also make possible for the suppliers to plan ahead of time by adjusting their schedule [18]. Therefore, all these factors have their own relation in contributing necessary benefits in achieving supply chain responsiveness in Abx Energy (M).

This paper investigates the determinants of supply chain responsiveness in Abx Energy (M). Therefore, mainly the study focuses on answering the following questions:

- i. What are the factors impacting using so is the meaning of supply chain responsiveness from practitioner's point of view?
- ii. What is the importance of supply chain responsiveness towards the company?
- iii. What are the factors that influenced supply chain responsiveness?

1.1 Problem Statement

Supply chain is the most crucial part in any business organizations. The prime idea for the subsistence of any supply chain is to gratify consumer desires and engender trade returns [19]. In today's fickle business setting, it is needed for the supply chain network to endow with swift responses to consumer demands, as it is vital for companies to pull their competitive edge in the volatile marketplace [21]. Similarly, Abx Energy is heavily involved in global supply chain in sourcing resources and managing customers around the globe. Therefore, it is essential for Abx Energy to take serious attention on the factors involved to successfully execute it in the firm.

Unfortunately, due to increasing customer demand and intense global competition there is a serious need to fulfil customer requirement in term of timeliness and cost effectiveness. However, there are studies that have shown supply chain responsiveness is the key to win global customers and gaining competitive advantage [16].

2. Literature Review

2.1 Supply Chain Responsiveness

There are two parts in defining supply chain responsiveness which is concerning time indications of both the flow of information and the flow of goods in the supply chain, and indicates the product demand lucidity in the supply chain before four theoretical evaluation variables that were useful for analysing each of the three constructs in the SCM analysis model [14]. According to [21], to bring about or maintain competitive advantage, one must have the ability to react purposefully and within an appropriate time-scale to customer demand and the volatility in market place, to bring about or maintain competitive advantage and responsiveness.

In today's ever rapid changing industrial environment, a supply chain network was involved directly and indirectly. Thus, it is an obligatory subject to the industry players in providing quick responses to customer demands and preferences. Leveraging the competitive edge in the ever-changing marketplace is consider vital for companies to pull their competitive edge in the volatile marketplace [21]. To quickly detect market changes, processes need to be reconfigured so as to meet new market requirements, information sharing across organizational borders, taking maximum advantage of information processing systems and adopt new product and process technologies ahead of their competition [16]. To ensure this, company must be able to adopt organizational responsiveness.

According to [14], companies are seeking ways to become more responsive to the market atmosphere apart from forming an extended enterprise to enhance cooperation by streamlining and restructure the organization structure and by adopting information technologies in order to exploit knowledge within and beyond the organization. It is considered as a challenge at all sectors in developing strategies for responsive supply chain as it requires detailed

analysis of interaction among major factors responsible for responsiveness [16]. [13] mentioned agility is essential to enhance the ability of the supply chain to respond faster to the market volatility and thus improve the responsiveness of the supply chain. Lastly, the responsiveness of supply chain depends highly on the integration with significant factors such as supply chain strategies, the act of postponement and relationship with suppliers [14].

2.2 Lean Supply Chain Strategy

Mentioned in a book titled Logistics and Supply Chain Management written by Martin Christopher, high volume, low variety and predictable environments are where lean strategy works best in. Japanese manufacturers started to show an intense interest in lean practices during the 80s, with the growth in imports of Japanese products into western countries [2]. Efficient, well organised and devoted to continuous improvement and the elimination of all forms of waste is an the objective of lean [9].

[13] pointed out that through reducing waste in the value stream chain will create value on the lean supply chain. Anything that interferes with the smooth flow of production is defined as waste [10]. Overproduction, waiting, conveyance, overload in transportation and inventory, over processing, defects and unused employee creativity in the lean supply chain management is included [9]. It is a difficult task to find waste and non-value added activities in a supply chain, or a company [7], [17]. [10] proposed six useful tools and techniques for finding waste among the supply chain:

- Process activity mapping
- Supply chain response matrix
- Production variety funnel
- Quality filter mapping
- Demand amplification mapping
- Value analysis time profile.

Eliminating duplication in process and activities, and continuous improvement among all units of a chain is an important characteristics of lean supply chain [7]. In ensuring suppliers survival, lean suppliers will ensure that their value is transferred to the end consumer in the most efficient way [22]. Open communication and a standardisation of all things including the status of a supplier's relationship with the main assembler are the characteristic of the lean supply relationship [10].

2.3 Agile Supply Chain Strategy

An ability to respond rapidly to changes in demand both in terms of volume and variety defined as agility [6]. It is a business-wide wherewithal that embraces organizational structures, information systems, logistics processes and mindsets. Flexibility is a key characteristic of an agile organization. Thus, the genesis of agility as a business concept lounges partially in flexible manufacturing systems. It was primarily thought that the course to flexibility in manufacturing was through automation in enabling rapid changeovers or reduced set-up times and thus facilitate a

better responsiveness to changes in product mix or volume [12].

In current production and business literature, flexibility is now been replaced by the word agility. Flexibility with a fair amount of speed and competitiveness is the need of the hour [12]. Supply chain agility is a key to reduction in inventory, enabling response to consumer demand more quickly, efficiently adapting to market variations, and integrates with suppliers more effectively [11]. As mentioned by [3], firms who aspire to apply supply chain agility must have fondness in managing their supply chain and firm-level strategies consistent with their supply chain orientation and their objective of competing through agile response must be developed.

Mentioned by [6], in adhering to the concept of agility to be agile, a supply chain must seize a number of particular characteristics such as, as the agile supply chain is market-sensitive then the supply chain is competent in responding to real demand. Most organizations are forecast-driven rather than demand-driven [1]. There are other factors which are essential to inculcate agility in supply chain other than market sensitivity. The importance of integrating demand and supply and process flexibility will be discovered once a firm develop such agile strategies [3]. Thus, for a better integration and response it is essential for a firm to adopt the agile supply chain strategy.

2.4 Strategic Supplier Partnership

In achieving efficiency in supply chain activities, having an interdependence among organization that were working

together collaboratively is essential [8]. The supply chain relationship can be a partnership if both parties in the supply chain act together [4]. Supplier with similar goals and have the willingness to adopt to the needs of buyer is an important subject to be taken into account in selection and development so that an effectively managed strategic supplier relationship can be done [5]. The purpose of developing strategic relationship with supplier is to develop competitive advantage, cost reduction and quality improvement [5].

The reason why retailers are regarded as an important component of the supply chain because they may dictate the channel involve and also as a boundary spanner [5]. Partnership collaboration in supply chain are a resource-intensive investment that involve financial and strategic risks [15]. A variation or performance difference between partners and the other strategic group act as an attribute to the network effect [8]. Commitment between buying and supplying firm was develop into an augment collaboration in adding value for collaboration in adding value for their customer are the result of evolution from sample to formal partnership [15].

Supply chain partnership defined as a strategic alliance of firms in a network of supply chain to facilitate collaboration and effort in creating activities with an intent to reduce total cost of acquisition, tenure and disposal of goods and services [4]. Critical issues in various areas of supply chain partnership can be improve by making systematic efforts by providing training, incentives and a great environment that promotes partnering and enhance the knowledge on importance of partnering objectives [4].

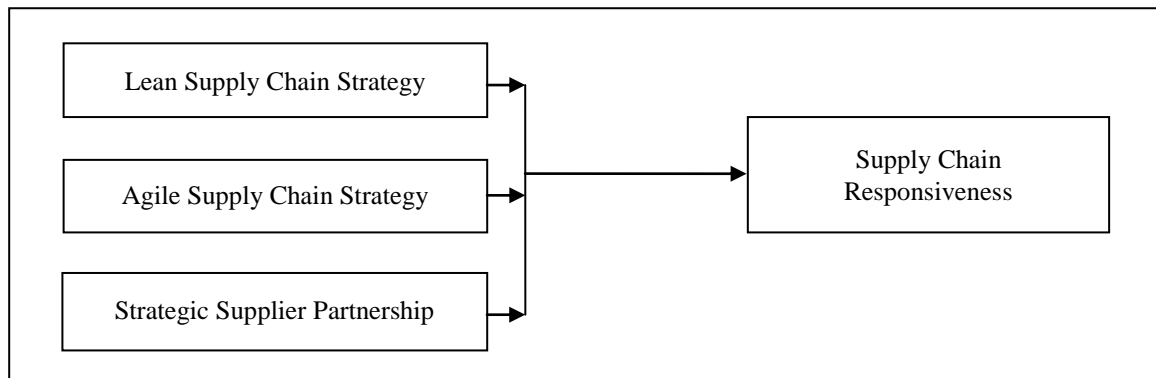


Figure 1. Theoretical framework

3. Methodology

3.1 Research Design

This study adopts qualitative method, where it was carried out through a recorded audio interview session with 5 respondents to avoid bias and provide data reliability in the analysis. Also, this study used an in-depth, semi-structured interview where the interviewers are well-known on the information needed and supported with a list of questions to

be asked. The questions asked were open-ended questions where the respondents were not restricted in responding to the questions asked [20]. Face-to-face and recorded audio interview was adopted involving the two senior managers and three assistant managers from the SRO department.

4. Analysis and Results

Information's are gathered from an interview session with the selected respondents that are involve in the whole supply chain aspects particularly in identifying the responsiveness.

There are 3 main questions and 9 sub questions depend on the interview as this was an in-depth, semi structured interview. Table 1 notes the respondents' answers are mostly based from the logistics department of the company. It is believed that lean supply chain strategy, agile supply chain strategy and strategic supplier partnership have impact on the supply chain responsiveness. When all the dimensions were carried out in a proper manner, thus responsiveness is possible in any situations that might occur with or without prior notice.

4.1 Importance of Responsiveness

When asked about the importance of responsiveness, all respondents respond by saying that responsiveness is an important component in their working environment. Even so, each of the respondents has their own view and perspectives on this matter. For example, respondent number 3 maintain responsiveness in three different aspects which is maintaining continuous after-sales, delivery time and cost impact.

“Because if your quality is not good your customer turn into another supplier, another shipper. So, they don't want to buy from us. We are supplier to our customer. So, our customer is always right. So, for customer, if you offer good quality the continuous after-sales will be there. That is number one. Number two is delivery time. We have to deliver to them in short period of time because they also have to responsible to end customer. If deliver late and then that will give negative impact to them. And the third one is cost impact. We cannot have the same cause for years or every month with the same cost. We must be cost impact. Cost impact means we have to find a way to cost cutting in our own operation. When we do cost cutting here, customer also not going to buy the same price with you everytime. You will buy this month and next month they ask to reduce cost because they said other suppliers also selling the same thing. So, before they ask, we must prepare everything.” (R3)

4.2 Dimensions in Supply Chain – Lean Supply Chain Strategy

Mentioned by Respondent 1, lean is a team based approached. It is focused on eliminating waste in a continuous improvement prospects to ensure the only remainder in every process is value. While R2 also have the same point of view as R1 and R5 by saying that lean means minimizing any waste that exists. Also, it is essential to maximize customer value and minimize waste at the same time. Whereas, R3 said lean is something that is easy to work with, how fast and how much the materials can be available upon production request and cost cutting. This lean concept is important for their suppliers to understand so that no misunderstanding on the concept will occur. In other words, for lean to work well in the company, they must have a proper communication with their partners.

The way they maintain their quality in the supply chain is either they inspect first or they do correction after any

distortion in quality happened. The first respondent state that both inspection and correction take place in the operation. Additionally, R1 states that high level of quality control is important in order to avoid any defects on the profitability. However, in term of quality control R1 mentioned that their quality control starts at the early stage as early as from the raw material itself. R1 answer is also aligned with respondents R3, R4 and R5.

Nevertheless, in reducing the amount of potential failures other respondents have different opinion. R3 and R4 state that they will provide buffer time in order to solve any problem occurrence. While R5 mentioned that Abx Energy reduce any sorts of unimportant activities so that they can reduce potential failure in their working process. In a nutshell, Abx Energy does apply the lean strategy on their working process. This is to ensure the smoothness of workflow whilst maintaining the quality and reducing waste in ensuring they can save as much cost as they can.

4.3 Dimensions in Supply Chain – Agile Supply Chain Strategy

The question whether agility aid the supply chain network was asked to all respondents to get their opinion on the subject. R1 opinion is more on quickness on identifying any changes and the quickness of their operations is due to the system they use which is SAP. While R2 said that agile means that the company could handle unpredictability: *“An agile strategy means not committing to the final product until actual demand from customer becomes known. Company can also overcome volatility in the supply chain”*. Other respondents state that agility aids in managing things quick and being alert. Also, the company increased their number of suppliers and builds suppliers that are close to the plant so that they can response quick to any situation related to materials ordered or transportation issues. In addition, one of the respondents point out that having more alternatives and less lead time is how agility aids in the process.

When speaking of agility, quick response in sudden changes is not a rare incident. Thus, in the case of Abx Energy this study question on the product customization and the customer requirement in terms of lead time. According to R1, they respond quickly to the customization requirement of product design, for example, when there are sudden changes in packaging quantity or models. Same goes to the changes in customer requirement in terms of delivery time, they also respond quickly upon any requests. This is greatly supported by respondent R2, R4 and R5. Consequently, R3 said that they are responding quickly to the changing requirement of customer order by keeping a buffer stock. This is due to the inconsistency of product demand. Concisely, in terms of agility the company really adopt this strategy and always take actions promptly to the sudden changes in requirements.

Table 1. Interview Summary

No.	Question	Respondent 1 (R1)	Respondent 2 (R2)	Respondent 3 (R3)	Respondent 4 (R4)	Respondent 5 (R5)
1.	What is the operational definition for responsiveness?	Ability to react purposefully and within an appropriate time-scale to customer demand or changes in marketplace, to bring about or maintain competitive advantage.	Ability to react purposefully and within appropriate time for customer demand or any changes in the marketplace.	What is sensitive to us or another word is we suppose to be aware on the market.	Sensitive and aware about the market and the industry.	More sensitive and aware about the market and the industry.
2.	Why do you think responsiveness is important?	Short lead time might be critical. So, it is essential to have inventory which can allow fast response.	Industries can overcome against the changes in quantity demanded.	To sustain continuous after-sales, ensuring on time delivery are met and to find a way to cost cutting in the operation.	To fulfil the customer's requirement and to reduce aging stock in the plant.	Ensuring customers satisfaction and hence it will generate the profitability.
3. How does each dimension in supply chain works in detail?						
a.	Define lean based on the organization perspective.	Team based approach to continuous improvement focused on eliminating non-value activities or waste.	Maximize customer value while minimizing waste.	For lean, we are talking on how much we can cut in terms of cost and how much we can get supply chain material to our production at anytime.	Lean is operating with low cost and making more profit.	Lean is when you add value in your operation by minimizing waste.
b.	Is quality built into your supply chain, or do inspection and correction occur after the fact?	There is always inspection and correction after an actual incident or fact.	Quality is built from raw material where inspection takes place at the early stage in order to ensure quality of end product.	Quality start from the market material itself.	We do inspection during the incoming of materials to prevent mistake from happening or quality occurrences.	The quality of our products always starts from the early stage which is the raw material.

c.	Does your supply chain minimize the amount of touches and the touch time in supply chain transactions, so as to reduce the number of potential failure points?	Yes.	Yes.	Yes.	Yes.	Yes.
d.	How does agility aid the supply chain network for this company?	Quickly detect changes, opportunities in term of market because of brand name and fast accessibility due to the type of system implemented.	It helps the company to identify cost and revenue in advance.	Quick response and alertness so if there's something wrong we need to take actions.	Less lead time and have more alternatives.	By quick response and being flexible to deal with any situations.
e.	Can you respond quickly to customization requirement in product design?	Yes.	-No comment-	Yes. We need at least a week.	Yes. Within a week.	Yes. We need at least one week.
f.	In terms of delivery time, do you respond quickly to the changing of requirement of customer? How?	Yes. Planned for sea shipment and change mode to air which will reduce 90% of lead time compare to the sea.	Yes.	Yes. Battery supply and demand are always changing and cannot be certain.	Yes.	Yes.
g.	How important is your suppliers in achieving supply chain responsiveness?	Important.	Very Important.	Very important.	Very important.	Very important.

h.	How early and often are you collaborating with suppliers? Are you sharing forecasts?	Frequent communication. Yes, we are sharing forecast.	Company always follow up with supplier so company get the supply delivery on time. Yes, the supplier sharing the forecast of the shipment.	Weekly basis. Every week Yes – will inform what’s the trend, what’s happening, what going on, what they have to do.	Weekly and daily basis.	Weekly basis. Yes – discuss on current trend in the market.
i.	Do you have supplier performance management (including KPI-based measurements) and supplier development programs formally in place?	Yes – have supplier performance management program. No – Don’t have any development program.	Yes – company applies KPI-based measurement.	Yes – have supplier evaluation.	Yes – have supplier evaluation form and performance form.	Yes – have supplier evaluation.

4.4 Dimensions in Supply Chain – Strategic Supplier Partnership

Strategic supplier partnership is one of the essential subjects in assuring any supply chain works smoothly. All respondent agrees in saying that suppliers are very important to them in achieving responsiveness in many ways. R3 says *“It’s very important to us because they must meet our requirement. Otherwise we also call. We have a system call supply chain partners evaluation. So monthly we will evaluate them. If their performance is not good, then we have time to chop them before they chop us”*.

This study also asked fellow respondents on how early and often are they collaborating and sharing forecasts with their suppliers. Both R1 and R2 state that they communicate frequently with the suppliers and they do share forecasts. Although, other respondents responded by saying they will share forecast in weekly basis. It is when they would have a weekly meeting with the suppliers and the Managing Director (MD). The outgoing warehouse superior mentioned that they share their forecast with suppliers on weekly basis, but they also respond to their customer on daily basis so that they can support on the materials if there are any shortages.

Normally organization will evaluate their suppliers from time to time, thus the question on how respondent evaluate their suppliers was asked. All respondents responded by saying that they do evaluate their suppliers through a performance management in term of KPI-based measurement. One of the respondent says *“We do have supplier evaluation. We called it KPI and we will analyze it weekly in our SLS meeting”*. To sum up, supplier relation is important as they are the responsible parties to ensure the arrival of raw materials on time. It is also essential for them to form a well communication among them.

5. Discussion and Conclusion

All respondents have their own view on defining supply chain responsiveness. However, the message that they try to convey are somewhat similar. Definition such as being aware, react purposefully, fast action and being sensitive are those mentioned by the respondent on defining responsiveness.

Other than that, respondents also state various importance of supply chain responsiveness to the company. It is important to be responsive as it will make possible for the company to compete in a competitive market. Not to mention that it will also help overcome changes in quantity demanded efficiently. One of the respondent also state that being responsive is possible by maintaining continuous after-sales, delivery time and cost impact. Still, the most important thing is to always be able to meet customer requirement.

In Abx Energy, they greatly adopt the lean concept. They are focusing on increasing profits by reducing waste. Even the Director of the SRO department is the GOC or key person from HQ in Korea who is in charge in the supply chain management (SCM) as well as the value chain management (VCM) for Abx Energy in Malaysia. Thus, all

employees and respondents seem to be clear on the lean prospect in their job. They are also agile in their whole supply chain process. Not only that, they are also flexible in meeting the customer requirement. In addition, at Abx Energy, in assuring their supply chain works perfectly they have a strategic supplier partnership with their domain suppliers. Likewise, they are sharing forecast and often evaluate their partners to ensure their capability are up to par. These dimensions are very important in achieving responsiveness. According to [21], the most important insight is the interdependence of the dimensions of responsiveness.

From the beginning, this research aim is to analyze on how Abx Energy works on its supply chain responsiveness. It is finally concluded that responsiveness is determine by workforce and customers. Other than that, as per the findings, dimensions such as lean, agile and strategic supplier partnership act as the catalysts to a responsive supply chain. In short, responsiveness is necessary for manufacturing firm like Abx Energy to ensure a smooth flow of supply chain network management.

6. Recommendation for Future Research

There are several facts that this study points out as recommendation to conduct further research. Firstly, all employees in Abx Energy need to be aware on the importance of responsiveness in the supply chain management. Responsiveness need to be adopted in order for a smooth flow of network to be possible.

Secondly, it is suggested that by implementing a lean culture it’s the key to every success from the early stage of the chain until the very end. This is because lean culture is where waste is being minimized and profit margin will increase. It is not only applied in the production process but it should be implemented in every department so that Abx Energy (M) will become a company of lean culture and values.

Third, organization needs to achieve greater agility so that it can be more flexible to respond to customer demand. It is advisable for Abx Energy to focus more on demand than forecast. It is good to have forecast, but forecast in certain point it will incur losses and it’s hard to be flexible to meet variant customer’s demand. Thus, it is supposedly essential for Abx Energy and any other manufacturing company to focus more on demand chain or by being agile.

Lastly, having a strategic partnership with fellow suppliers will make possible the process of information sharing on the current market trends and also on the information needed regarding current cost of materials. By having integration between buyers and suppliers all information shared can be fully leveraged. Information sharing is not the only thing, sharing the same system between partners are also important in making a joint decision making. Having to communicate using similar system brings out the easiness to work together towards common goals.

To sum up, it is recommended that conduct further investigation to determine what the other factors that can have possibility to affect the supply chain responsiveness.

The main reason is to encourage more academicians to get involved in investigation of various academic fields especially in supply chain industry. By doing this study, it also will help personnel who involved in the supply chain industry to gain more knowledge about the right way in order to associates well the supply chain strategies towards the supply chain responsiveness.

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