

Introduction to lean supply chain management



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“Lean concept” has become well-known in today’s business. Lean principles help any company to eliminate waste in business activities. By eliminating waste, companies can gain more profitable, flexible, and controllable over the processes. The term “waste” in lean concept is including everything that makes the process flow unsmooth. There are 7 wastes in TPS, which are waiting time, excess inventory, defect, over production, waste in process, useless motion, and transportation [1]. Even lean concept emerged from the manufacturing; it can be applied to the other types of activities; such as supply chain management.

Even though Toyota - the Japanese company - was the one who made the lean concept widely well-known with the Toyota production system (TPS), there is a fact shows that lean did not just emerging but it was partially used in the United State. For example in 1908, “Scientific management” made by Frederick W. Taylor was the concept of using scientific method such as standardization to apply with the working process. This scientific idea was criticized to be the initial stage of developing the lean concept, since it helped workers to work in system and ignored the unnecessary jobs [2], [3]. However, Henry Ford is considered to be the first person, who used the lean principles. In 1910, Ford has developed the concept of continuous flow - called Ford’s model T production system (MTPS) - for manufacturing assembly line. This MTPS was to have workers focusing on their individual jobs and moving work from station to station by conveyer until the individual works became a complete unit. However, the MTPS was criticized to be not suitable in the long term production, since it cannot present customers with more variety of products [4].

Figure : Ford's assembly line

Source: [6]

In 1950, Taiichi Ohno and Shigeo Shingo have studied the MTPS and the other principles such as just-in-time (JIT) while visiting the US super market, and then developed the “ pull system”, which was applied to the continuous flow system of Henry Ford; thereby, helping TPS to emphasize on the process work rather than the individual works or machines [2], [5], [6]. The word “ lean” was emerging in 1980 by the Massachusetts Institute of Technology (MIT); in order to describe the TPS [5]. Lean concept became famous and widely-used in many companies around the world; however, many firms then realized that they cannot gain the highest benefits from the lean system unless their suppliers and customers in the supply chain system became the lean users too. Therefore the lean concept and supply chain concept then merge together into the lean supply chain management [7].

2. The emerging of lean supply management

Supply chain management has faced with more complicated issues, because of the changes in global business. Many challenges have risen up in today's business. Companies have to deal with real-time decisions in order to survive in their business. Since lean concept can help firms to reduce waste or non-value activities in the manufacturing processes and improve the flow of process to be more fluidity, the concept of lean then overlap with the supply chain management approach as shown in figure 2.

Figure 2: Comparing lean and supply chain management

Source: [8]

In order to gain more effective in supply chain management, the lean concept then was applied into the supply chain concept to be lean supply management.

As said by Toyota that having a good process can show good results than having brilliant people manage the poor process [3], Toyota then adopted the lean concept into its supply management process as shown in figure 3. In the Toyota case, Toyota realized that it is not a good idea of choosing the suppliers, who are far away from Toyota's plants, due to it increases the total cost and difficult to control lead-time. Toyota also thought of too many suppliers as the supply chain waste, so Toyota decided to minimized the number of suppliers as low as possible; to keep the best suppliers rather than the lowest cost suppliers [9]. This idea of lean supply management can help Toyota strengthen its supply chain process. With the short and strong supply process, Toyota then can has more controllable on its supply chain, since the long term strategy is needed in today's business.

Figure 3: The lean supply chain in Toyota

Source: [9]

3. The imperative point of lean supply

Unlike the traditional supply concept, the lean supply considers the entire flow in the supply chain as the whole process. While the traditional supply concept is focusing on the individuals benefits, the lean supply is looking for the benefits of the integrated chain in a longer-term. In lean supply, too

many suppliers are considered to be the waste in supply chain; however, more suppliers can provide more reliable for firms in the traditional supply idea. Whether firms decide to use lean supply concept or the others; it is inevitable to point that lean supply management also has pros and cons.

3. 1 The advantages of lean supply

In the long term business, lean supply management can serve and play role as a good strategy. By following lean approach, firms can eliminate the unnecessary activities along the supply chain and increase value to the deliverables, since lean supply concept is focusing on optimizing the performance of supply chain process and provide more value to the customers [7].

Lean supply management can integrate with both the internal and external aspects along with the supply process. The internal factor in supply management is focusing on the relationship linkage, while the external aspect is considering the operations amongst the suppliers or contractors. Generally, there are five aspects in both internal and external aspects, which many firms cannot fully integrate by using the traditional supply management: product flow, information flow, customer needs, upstream and downstream linkage, and the cash flow [10]. By eliminating wastes in the supply process, firms can lower their operational cost, which results in more efficient value-added in goods and services. Basically, most production flow is driven with the “ push system”, which tends to keep inventory in a high level in order to response to the forecast. In lean supply management approach, it suggests companies to use the “ pull system” that helps companies map and re-design the process to response to the true drivers.

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Not only the product flow becomes more liquidity, the actual demand from the end consumers can drive the supply chain process via the effective information flow, due to the supply process becomes lean. Since the lean supply management aims to minimize the number of suppliers as low as possible; to maintain only the best suppliers, the relationship between firms and their suppliers then can possibly be improved effectively.

Fundamentally, when the whole supply process becomes more efficiency and effective, the cash flow in the process then results in positive side too.

3. 2 The disadvantages of lean supply

Like the other management concepts, lean supply management also has the disadvantage side too. When companies become leanness with fewer suppliers, companies might face the problem of erupted chain, if their suppliers meet with the severe risks. For instance, there was a fire at the Philips semiconductor plant in New Mexico in March 2000. On that time, Ericsson - one of Philips' customers - did not have a contingency plan of additional suppliers. Ericsson chose to wait its suppliers, Philips, and thus Ericsson faced with a long delay in production line and had huge losses in phone business [11].

Furthermore, lean supply management is not suitable for unpredictable market. Due to lean supply management is focusing on optimizing the process to do less but gain more, firms might not be able to catch the rapidly changes on demand. That makes lean supply management do more positive effect on the commodities rather than fashion products [12].

Moreover, firms, who use lean supply management with improper balancing, will not success on acquiring new customers. By using the lean supply management concept, most firm only focus on the voice of customers (VOC), which helps firms maintain their customers. However, VOC does not have more powerful on expanding the new customers. In contrast, the voice of the market (VOM) can provide the information on market dynamic, which precisely one of the competitive drivers that helps companies stay competitive in market share aspect [13].

4. Journey to lean supply management

4. 1 Initial phrase

Fundamentally, lean supply chain lowers total cost by shortening the length of supply chain with the lowest number of suppliers. Therefore, any firm should get start by reviewing the current supply system and then create the optimization goal. That is because most of the supply management issues usually come from the level of relationship with suppliers. The more strength in relationship means the less in waste and cost [14].

According to lean supply concept, companies do need to determine list of key suppliers, who can embark to the lean approach along with companies. The reason is that firms might get the benefits of becoming lean; however, the chain waste might not be eliminated as seen. The waste is just moving to hide in the suppliers' side, thus it will be back in the form of extended cost, delay problem, quality problem or whatsoever [14]. After determining the key supplier candidates, organizations then need to choose the best key suppliers as first-tier suppliers by focusing on the lead time, because lead time impact is usually the best key factor on selecting suppliers [7].

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Additionally, it should be better to select the first-tier suppliers, who already implement lean concept, so the first-tier suppliers can cooperate on optimizing the sub-tier suppliers [7]. Next, firms should discuss the optimization goal with the selected suppliers, in order to map the supply system in the best way.

Furthermore, firms should involve with the first-tier suppliers on selecting the sub-tier suppliers, who can afford to optimize the supply system with the lean approach. Therefore, it can be possible to have an opportunity of successful in using lean supply management concept.

4. 2 Develop lean supply stage

When all suppliers are identified, firms then should cooperate with suppliers to document the macro value stream map (MVSM); in order to understand and improve the supply chain system [7]. Due to the supply system is normally a complicated system, it is very difficult to communicate and cooperate along the stream line; thus the MVSM will help in these activities.

Figure 4: The example of basic value stream map

Source: http://leansoftwareengineering.com/wp-content/uploads/2008/02/value_stream_map.gif

Any improvement project cannot be successful, if there is no person or team to directly take responsibility. To develop lean supply approach, companies need to build the core team, who will monitor on lean improvement and take responsibility in communication. The member of the core tem should consist of people from various departments – operation, procurement, human resource, and so on – and from suppliers. In addition, the core team should

at least have one person, who is the lean expert; in order to play role as a lean consultant [7].

Key evaluation metrics is also required in the lean supply management too. As the other projects, firms cannot improve anything, if firms cannot find the ways to measure. There is a suggestion from Martin, J. W. on the 12 key metrics in lean supply management. The 12 key metrics are Inventory Investment, Profit/Loss, Inventory Efficiency, On-Time Suppliers Delivery, Forecast Accuracy, Lead-Time, Unplanned Orders, Schedule Changes, Overdue Backlogs, Data Accuracy, Material Availability, and Excess & Inventory [15]. It is also required that firms should continually evaluate the system; in order to ensure that the improvement is going to the right way.

4. 3 Sustaining stage

It is essential for organizations to continually improve and monitor the supply system; in order to sustain the implementation. As any typical project, there is no end-point in lean supply management too. Companies must prepare to move forward into the future. Firms need to create the culture in lean supply management for the entire stream process in both internal and external. In creating lean culture, it requires a good leader to continually advance the project. There is an idea of leadership criteria in leading lean that a good leader should possess: intelligence, integrity, stability, belief structure, self-confidence, flexibility, high-levels of energy, dominance, and sensitivity [16], since these factors are matching in line with lean supply management.

Continued evaluation has to be review frequently in order to sustain lean supply management approach. This is because there are always changes in

doing business. Firms might need to change some activities to achieve the lean approach. If the measuring ways are not match with the changes, firms will get the wrong results and might fail in sustain lean.

In order to sustain the lean approach, firms should celebrate the success of using lean supply management to all participants. This is for encouraging people and to let people realize on the important of using lean supply management. In addition, firms might show the results of lean supply management: lower cost, lead-time, inventory; to attract suppliers to have great passion of becoming leanness [7].

5. Conclusion

Due to the increasing of competitive intense, organizations have to change the ways of running business. Supply chain management is challenge in today's business. In order to survive and have growth, organizations must explore and exploit the supply chain system. Lean supply management is an idea of forming the higher collaboration. With the strong relationship, firms can help each others utilize the supply chain system; to gain more profits. To achieve lean concept, non-value added activities needs to be eliminated; include with the supply system dynamic improvement. In lean supply idea, choosing the right suppliers is better than selecting the lowest cost suppliers. Even the supply cost seems to be higher; the overall benefits will come to organization in the longer term rather than just the short-term lowest cost. As the other projects, lean supply management is an eternal improvement. Firms, who like to become leanness, must continually monitor and improve the system. Additionally, the right metrics are needed to be identified to ensure that firms do not go in the wrong way. However, lean supply

management may not fit with every organization, and becoming very much leanness might not worth to do. Organizations must pay effort in study the feasibility of using lean concept before embark to the world of lean.

Question #2

1. Introduction

Supply relationship management (SRM) is the topic in the supply chain management, which considered in the aspect of establishing and sustaining the business relationship along the supply chain. SRM concerns the practical processes to integrate the communication and coordination between organizations and their suppliers.

Supply chain relationship was considered to be one of the important factors in most business, since it can influence the potential of supply chain concept. Now, the modern business seems to be more complex with high competition. Due to the information has more valuable in the supply chain management, firms then need to re-design the ways of managing and sharing information among each others. Organizations cannot independently run the business by themselves. Not only good relationship can help companies to have more competitive advantage to survive in the market, but it can also help companies expands the market too.

SRM is not the new concept used in today supply chain management, but was recently exploited in order to increase benefits across the supply chain. SRM has now become one of the key factors that influence the supply chain. In the future, SRM will not just only an option for firms, but it will be one of business fundamentals, which firms need.

2. The growing importance of SRM

Business has changed many times in the last decade. Only making and selling are not enough for firms to survive in current business. Since we now live in the age of information, information then becomes the important factor in supply chain management. There are some points illustrate that some organizations need supply chain management; in order to reduce costs and improve their benefits, not the information. Information might not be the acquisition of using supply chain concepts, but information is the key driver in supply chain mechanism. Information, on the other hand, can lead to the goal of reduce cost, increase benefits, reduce lead-time, reduce variability, better forecast the demand, improve distribution system, effectively manage the supply chain, and so on [17]. In order to focus more on information, organizations has changed from independently develop supply chain to a multiple coordination with supply chain relationship idea.

Before the importance of supply relationship has been more considered, firms believed that strong customer relationship was very important, due to the belief of existed customers are more important than the new customers. In addition, firms believed that the future direction of their business will come from the feedback of their existed customers, who have more experiences on firms' products or services [18]. To acquire the benefits of existed customers, the concept of customer relationship management (CRM) has emerged into the world. The goal of this idea is to increase customer satisfaction and learn customer expectation, so firms then can add more value to their products or services. Later on, companies have realized that satisfying customers is insufficient to gain more competitive in business. Due

to the procurement cost is criticized to be one of the largest expenses in most companies, the idea of proactive strategy with the advanced collaboration, called SRM, then pop up [19].

Not only procurement can cause trouble to the buyers in supply chain, it also can make the sellers suffer in real pain too. For instance, Boeing – the aircraft suppliers – has faced with the \$2.7 billion financial impact, due to American Airlines has postponed the purchase of 54 out of 56 aircrafts from Boeing in 2004 [20]. This example illustrates the problem of sharing the forecasting information, because these two firms did not consider on establishing the sufficient supply relationship; in order to provide information and set contract truthfully. Firms, who only concern themselves and not consider on their reputation, usually cannot survive in the long-term business. Therefore, SRM plays an important role in helping both suppliers and buyers concern each others, that their strategies will support their future business collaboration.

The growing of changes in modern economical environment is now beyond the basis market mechanism. Due to the changes of technology in communication area such as online banking and online trading, it is clearly that the business behavior across industries is now more complexity and competition. Firms need to rethink their way of creating strategies; doing business solely is possible, but very difficult. Effective coordination with partners is more suitable in order to overcome any changes in modern business. Ohmae (1994) has suggested an idea that firms will no longer solely compete in the new business but as supply chains, due to the coming of information technology eliminate the business boundaries [21]. Therefore,

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SRM were developed to solve the challenges of new business relationship and communication along the supply chain.

SRM provides benefits for organizations along the supply chain; by reduce risk and negative impact in the supply chain. Moreover, SRM can helps organizations improve and integrate performance in procurement and sourcing process. There are four benefit areas that SRM can build a collaborative framework along the supply chain as shown in figure 5 [22].

Figure 5: The value of SRM

Source: [22]

Collaborate and execute: SRM provides solutions to form basis network collaboration such as decision-making, procurement process, and so on. In this area, SRM can ensure that the overall supply chain will reach the business objective. In addition, SRM can optimize workflows across supply chain with different partners, cultures, and geographies as well as communicate in internal organization.

Progress monitoring: Since information is precisely important in supply chain management, real-time information should be tracked effectively; in order to overcome any business issues. SRM can notify firms in required details visibly; to increase more level of agility to track and respond any changes.

Measure performances: Suppliers performances must be visible, since it is involved in supply chain mechanical reaction. Clear measure performances make organizations control on logistic operations, sourcing process, and so on easier. Accurate data also helps in establishing commitment and

relationship along suppliers and buyers; which results in more effectively arrange firms' strategies.

Source: SRM can solve some issues of conflict in procurement process. For instance, Win-Win sourcing is the way of sharing a long-term commitment. This idea help organizations and their suppliers avoid irritable negotiation process. Firms can utilize and optimize in the way that everyone will receive their benefits throughout their coordination.

3. Essential considerations for appropriate relationship with suppliers

There is an idea suggests that establishing relationship is more strategic, while managing relationship is more operation [18]. Fundamentally, the performance of SRM is depended on the level of trust relationship. In SRM, trust is not only the confidence in partnerships, but also involves in considering the impact on partners from our action too [23]. Before getting start, firms need to evaluate the overall performance of their partners; to identify who will be the key partners in the supply chain. The cheapest suppliers are not the key suppliers, but the best suppliers in term of coordination are rather worth.

3. 1 Strategic basis

Strategically, firms should strengthen their internal relationship across functions and people; in order to advance in external relationship. The reason behind this idea is that organizations, which have weak internal relationship, are not dependable [24]. The important thing in long-term SRM is the power of trust must be balance. When one stage in supply chain has

more power than the others, it usually causes the trouble of resistance and conflict, which cause the supply chain disaster. Chopra, S., and Meindl, P. (2007) have given an idea of designing strategic relationship in four stages as follow [23]

Evaluate the value of partnership: The first step in SRM method is to spot the value and benefit that firms might have in establishing relationship. The idea of this stage is that the total profits from relationship can be produced by the partners' competences. Moreover, equity is the key factor, which helps firms sustain the relationship. In order to obtain those criteria, firms must ensure that their partners can provide or improve the successful factors across in the supply chain.

Design the operational tasks for each stage: In order to balance the power in relationship, every organization along in the supply chain must clearly decide on each player's role. If one stage has more allocation than the others, the benefits of relationship will not be success. That is because there is no one wants the others to take the upper hand rather than themselves. To achieve this balanced power, the mechanism, such as performance measurement, progress tracking, and information sharing, must be developed to fill the roles in collaboration.

Set the effective contracts: In most practical relationship, there are always issues. The clear coordination mechanisms and contingencies should include in the contracts. The effective contracts can increase the level of trust and benefits in collaboration. In the longer-term, the contracts must be reviewed over time, because it is more effective than the initial fix contracts.

Prepare the conflict solution: Conflicts are usually fall into coordination. Firms should prepare the solution mechanism to deal with the conflicts, which might happen over time to time. It is greatly importance that the conflict resolution and contracts must not conflict each other. Communication and information sharing are the important factors that can help strengthen the relationship. Frequently meeting and reviewing plan are also importance in order to avoid conflicts and sustain relationship too.

3. 2 Operation in relationship

3. 2. 1 Initiating stage

To achieve the operational relationship, firms should select the style of relationship that fit to the procurement and market characteristics. The four factors that should include in selecting style of relationship are flexibility, quality, delivery, and cost. The important consideration on these four factors is sometimes these four factors cannot go along together in constructing the relationship. Therefore, firms should measure the best benefits, while evaluating these factors [25]. The example of relationship styles are shown in figure 6.

Figure 6: The style of relationship

Source: [25]

Clear strategic goals and objective must be done in this stage too. Firms might start by initiate and implement the internal approach and mechanisms within themselves. So firms can ready to support with the external supply relationship; in order to take the mutual benefits of SRM.

3. 2. 2 Replenish relationship

The relationship will not be successful, if companies choose their partners poorly. The reason is companies and their alliances cannot get along with too much different in culture, strategies, and vision [26]. In order to implement relationship, firms should start in a small scale, and then adjust the relationship over time; to motivate the relationship to be evolved. When the value of relationship is generated, organizations should appreciate this value to all internal and external partners; in order to encourage people to have more confidence in forming and developing this relationship. Technology can support and enable the relationship in the supply chain. The supportive technology can give more advantages and competitiveness to the supply chain; especially the information technology is very useful in geographic relationship. There is a relationship implementation model called 5-s framework, which helps organizations focus on their core dimension of relationship management [18].

Structure: Organizations should construct their relationship in two levels: first is the internal structure and the second is the macro structure along the upstream through down stream in the supply chain.

Staff: Any activity requires respond. People are absolutely the core resource in business. In addition, people are the crucial dimension of relationship. Organizations must clearly identify the representatives for SRM, or the relationship might not happen or maintain.

Style: As mentioned before, the right style of relationship is the key factor in SRM. Companies, who select their relationship style poorly, will not success in managing their relationship.

Systems: Effective mechanisms, such as procurement process, relationship performance, service function, and supply chain process, are required in order to fulfill the relationship. The unclear operational processes usually conflict the relationship, and cause the collapse of relationship.

Schemes: Support relationship programs are very importance in order to implement relationship. SRM is not the logical function, but involve with the emotion too. Relationship will not be replenished, if firms do not have more interact or communication with their partners.

3. 2. 3 Sustaining relationship

Frequently review and improve are necessary in maintain the relationship. Firms should review the key contracts that influence the relationship. If it is better to update or change the detail of contracts, firms should do rather than keeping the initial contracts. Furthermore, organizations should frequently define the new potentials or benefits in this supply relationship, and then improve them into the coordination. It is importance that firms should identify and solve any problem together with their alliances; in order to avoid conflicts and increase their level of relationship. The more interaction means the more close-relationship. In addition, close-relationship can affect to the way of their collaboration too. Bowersox, D. J., Closs, D. J., and Cooper, M. B. (2010) have given the idea that sustaining relationship

depends on three key factors: strategic and operational goals, performance measurement, and feedback mechanisms [26].

Strategic and operational goals: Even goals must be identified in the initial stage of construct relationship, it is better to review, and update over the longer-term. Goals can be changed, because there are always changes in running business. Moreover, the initial goals might not be suitable for managing the partnership, since companies might have not much knowledge on constructing relationship at the beginning stage.

Performance measurement: Basically, we cannot manage things, which we cannot measure. Not only performance measurement can influence in managing relationship, it also helps avoid the conflicts too. However, it is necessary that the measurement must not be one-way measurement. Any firms include in the same supply relationship program must have opportunity to track each others. Moreover, the measurement process must be clear and clean; in order to increase and maintain the level of trust.

Feedback mechanisms: Feedback mechanisms should be visible, or organizations might not have the benefits on feedback. It is not important that the feedback must be in formal report. An informal feedback also available too. While the formal feedback might set in an annual report for top management, the informal ones, such as weekly or monthly, are more proper for support team or staff. That is because the relationship issues can happen in any way and any time. Firms should be more agile; in order to deal with any uncertainty.

4. Conclusion

Since we live in the age of information, it has changed the market behavior. Firms cannot solely survive in business as they were in the past. Supply relationship management then becomes the important factor in running business. SRM can help organizations reduce the negative impacts and increase benefits along the supply chain. SRM can provide four benefit areas in the supply chain: collaborate & execute, progress monitoring, performances measurement, and source; which relate to firms' strategies and operational processes.

In order to success in developing and sustaining the relationship, organizations need to indentify the best partners and consider the level of relationship. In the first phrase, firms should clearly decide on each partners' roles and benefits include with the entire goal and objective in forming the relationship; in order to avoid any conflict when start the SRM. A clear effective contract is very necessary too, because it can helps companies settle their agreement on any changes. Moreover, the contracts can increase