USE OF LEAN IN SUPPLY CHAIN DECISION MAKING

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Annotation:
In a very complex business environment during and after the global economic crisis Supply Chain Management SCM shaping is gaining in importance due to the required quality of service, complexity of implementation, networks forms, ways of servicing and competency price. The goal of this article is a real life example of the use of Lean methodology in a company, which is a logistic service provider, for one of the largest PC manufacturers (PcC) in the world. The corporation required that from 300 orders only one could be unanswered. The paper shows the way to achieve this goal.

Introduction

Meeting of customers' demands remains a crucial part of the overall supply chain model in today's service industry. One might say it should always be like that; however, increased cost of operation, lack of funding, tough competition and reduced buying power of the people, led to a shift in decision making. In the case that we analyze, in the past, EPCS (Electronics Production Corporation Supply) had the main say in selecting a vendor to support supply chain of the company, such as warranty support and replacement order fulfillment. Scorecards were reviewed for each potential vendor, site audits were performed, processes reviewed, and improvement methods scrutinized… Nowadays, the decision making has shifted towards the financial department that make it very clear: "How much, how many, and how fast?" Does this mean Quality is irrelevant? On the contrary, quality becomes more important than ever to battle fierce competition and low competitor prices in an emerging new world after the market crisis.

Supply Chain Management (SCM) is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996). [2]

There are numerous businesses out there that are interconnected and intertwined in the complex network of supply chain. Some provide parts, some provide services and others provide financial backing, consulting, transportation…They are all customers and vendors at the same time. It would be an understatement to say that managing this complex system is difficult.

The goal of this article is not to go into depths of theoretical explanation of SCM and how it should be applied at strategic, tactical or operational level and how is Lean applicable to it. This subject has been covered in enough.

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Instead, the article shows a real life example of the use of Lean methodology in a company that is a logistic service provider for one of the largest PC manufacturers in the world. Its business covers electronic repair and shipping of PC monitors to end users. Here will be presented an example of use of Lean tools, such as Value Stream Mapping, KAIZEN Blitz and KANBAN, to name a few.

As a service provider, this company, which will be called PC Corp. (PcC), is responsible for receiving orders from the customer, fulfilling them with refurbished units, receive defective units, test them, perform electronic repair and testing and store them into finished goods area to be used for fulfillment. This function is extremely important part of SCM since it directly affects satisfaction of the end user and therefore a bottom line of the customer. When the product fails, the last thing a company needs is poor product/customer support and replacement speed.

Problem of decision making

It is always good to start with an explanation of circumstances under which PcC decided to apply Lean methodology to resolve the problem. As stated earlier, the main purpose of PcC's business is to receive defective units from the end user, perform testing and repair, store refurbished units into a finished good warehouse and fulfill daily orders for defective units replacement. Fulfillment units are shipped directly to the end user and defective ones are received straight from the end user. Customer demand is for PcC to keep fulfillment service level at 99.7% or higher. This means that PcC can miss only three fulfillment orders for every 1000 orders. For the second quarter of FY09, PcC maintained average 99.38% fulfillment rate (241 order missed out of 39,007), therefore not meeting customer demand.

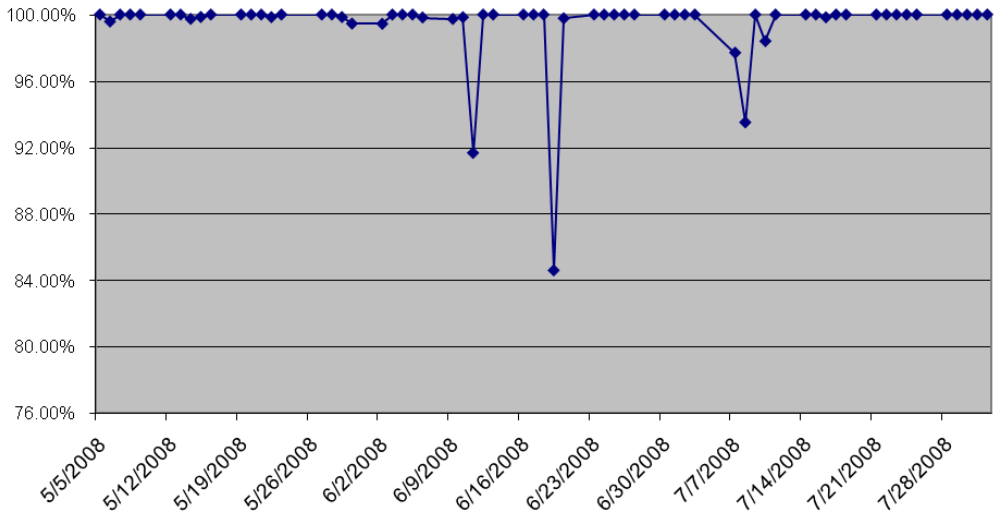

Figure 1 –Fulfillment Rate Data

However, as shown in Figure 1, during the three month period shown, there were 64 days that had 100% fulfillment rate. Also, three spikes are notable in June/July months, when fulfillment rate dropped into 80% area, which is unacceptable. Overall impression of the management team was that

the problem was due to lack of available units to be shipped (i.e. certain sizes and performance characteristic). Managers tried several unsuccessful attempts to solve the problem, from rearranging the work schedule of the shipping department to working overtime to produce larger buffer in the finished good. It did not yield desired results.

Decision has been made to organize a Lean Team to evaluate the process and recommend solutions that would:

1. Eliminate sudden drops in service level
2. Increase average service level to 99.7%

Strategy for resolution

Lean team was composed of process engineer (Lean expert), quality engineer, shipping supervisor, materials manager and lead by engineering manager. The first order of business is always to develop a high level strategy for problem resolution. The last thing that team needs is aimless wondering and attempts to fix the problem through trial and error method.

Following was a problem resolution strategy established:

1. Perform end to end process walk-through.
2. Create Value Stream Map of the overall process.
3. Identify bottlenecks and non value added steps
4. Identify opportunities for Kaizen Blitz.
5. Perform a Kaizen Blitz event and create solutions for the problem
6. Implement solutions.
7. Validate results.

At the high level, this strategy represents a guideline, a compass of sort, for a Lean Team on its journey towards the problem resolution.

Value stream mapping

The beginning of Lean journey starts with Value Stream Mapping (VSM). This is, arguably, one of the most powerful tools form the Lean toolbox. VSM combines Material process flow with Information flow, as well as with some other important relevant data. VSM is data rich map, it contains data, such as cycle time, lead time, work time, and inventory levels, value add and non-value adds time. It is different than process flow chart and allows identification of bottlenecks and wastes (non-value added activities). Traditional types of wastes in Lean are:

1. Over-production: producing more than customer or market requires. These products take up space and do not make profit.
2. Transportation: moving of product that does not add value (double handling, PcC production, movement of parts and materials in and out of storage, poor production layout…)

3. Motion: movement of people that does not add value (looking for parts, documents, or tools…).
4. Waiting: idle time created when equipment, people, materials or information are not ready for work.
5. Processing: effort that adds no value from customer's point of view (paperwork, multiple cleaning of parts, oversight tolerances …).
6. Inventory: excess material or products those are stored and not immediately required by the customer (WIP-Work in progress, parts, raw goods, finished goods).
7. Defects: work that contains mistakes, non-conforming product…
8. Un-utilized workers: employees not leveraged to their own potentials.

Lean team has performed a detailed process walkthrough and created a VSM and Process Family Matrix (shown in Table 1). Process Family Matrix is a tool used to identify families of different services or products that flow through same or similar process steps.

Table 1 – Process Family Matrix

Type of Proces	Quantity (avg)	Unload	Sort and Stage	Wait in Staging Area	Receive into System	Restage	Wait for Production Release	Load the Line	Travel to Test	Testing	Travel to Technician	Repair-Diagnostic	Repair-Wait for Parts	Repair-Reassembly	Travel to S/W Update	S/W Update	Travel to Hi-Pot Test	Hi-Pot Test	Travel to Burn-In	Burn In	Travel to Final Test	Final Test	Travel to Packaging	Packaging	Travel to Out of Box Audit	Out of Box Audit	Travel to Finished Good Staging	Staging and Storing in Rack Location	Pulling Units to Fulfil an Order	Staging for Ready-To-Ship	Load the Truck
DEFECTIV	800	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CRA	150	X	X	X	X	X	X	X	X	X													X	X	X	X	X	X	X	X	X
DNC	200	X	X	X	X	X																	X	X	X	X	X	X	X	X	X

In addition to VSM and Process Family Matrix, process walkthrough provided the following:

1. Company operates in 3 shifts during working weeks and one shift on weekends.
2. Handover between the shifts is very loose with minimum communication between the supervisors and managers.
3. Each shift during the week operates on its own trying to reach a goal of 250 units in finished good area. There is no synch between the shifts efforts, which results in zero-sum game at the end.
4. Weekend shift has poor supervision and acts as a set up shift, but its role is not clearly defined by the operations.

5. Incoming truck arrive only during the work days. The first truck is at the dock door at 6:30AM and the last one around 3PM.
6. Outbound trucks leave during the day, but he last one leaves at 9PM.
7. Materials planning process is reactive and relies on ordering parts for the units that were not fixed due to lack of parts and placed on so called AWP list (Awaiting for Parts list)
8. There is no effective forecasting method for parts or orders. Everything is done “on the fly”.
9. Shipping department uses substitute units if a requested unit is not available. The substitute unit must be equal or greater value model. This practice results in increased cost for the customer.
10. Certain end users (banks, schools…ePcS) do not want substitute unit due to layout of their branches and offices. This causes missed orders since no unit is available to send to the end user.

After mapping, Lean team started to identify weak nodes. The aim was to reduce waste of material and to shorten production cycle time. By combining a flexibility of the functional oriented production with effectiveness of process oriented production techniques, risk was significantly reduced. Key demands was results of the ”Voice of the customer” (VOC). The main questions in the study were:

- Our capacities?
- Possibilities for further development?
- Lead Time?
- Integration of ITs in the system?
- Are we stable, on the verge of stable, or completely unstable?
- What methods we use for optimization? ...

Answers to those questions were very important part of whole SCM because users expect from their provider more convenient offer and/or lover price for service/product next time when they will make annex or revision of the contract. The base for this expectation lay in a belief of users that company, during the time, has ability to optimize its processes and make some savings. Numerous studies showed that discounts given to the customer often lead to increasing of the volume of delivery. In the most number of cases that leads toward the increasing of profit. Lean team study showed that in previous period the company could not optimize its SCM processes, and, as a consequence, could not reduce prices. Therefore the company lost its “competitive edge”.

After the analysis Lean team chose to apply Kanban and continual improving, Kaizen, that cover:

- When to make order, what to order, order quantity and from whom make order?

- Continual improving of processes in small steps;
- Relatively painless introduction of small improvements;
- Every and any employee took a part in the processes improvement, from top managers to production workers
- It is not important amount, but momentum of changes introduction.

Conclusion

The aim of this article was to show, on the example of one real corporation, the way of achieving of more precise planning in the frame of supply chain. End user normally does not want to take active part in the process of a corporation SCM creating. He is mostly not interested in the relations between the corporation and corporation's suppliers. End user wants to stay out of the problems in product development and production, quantity of delivery, time of delivery and so on. He has his own expectations, and wants only to fulfill them.

Methods become vital for the success of the whole supply chain. Appropriate methods can help in more precise defining of end users expectations and demands, as well as in defining costs and potential delays in delivery. In addition, CRM methods are required if certain supply chain partners are unable or unwilling to share information with their suppliers. Supply chain needs this high accuracy preliminary data for a customer who does not share information in order to reduce time and costs of product and delivery. Set SCM approach is simplifying the management of supply chain.

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