Innovations in supply chain: "A strategic competitive advantage"

[1]Dr. Prashant M. Kotasthane
(Associate Professor at Sinhgad Business School, Erandwane, Pune)
pmkotas@gmail.com

[2]Dr. Vishal B. Gaikwad
(Assistant Professor at Sinhgad Business School, Erandwane, Pune)
vishalg7380@gmail.com

[3]Dr. Atul A. Pise
(Assistant Professor at Sinhgad Business School, Erandwane, Pune)
atul.pise@gmail.com

Abstract

The supply chain is one of the most important business areas in any industrial facility coOne of the most significant changes in the entire supply chain is the adoption of modern technology to enhance efficiency and accountability.Firms constantly develop capabilities to use supply chains to tap innovations that sustain their competitive advantage.Innovation leverages distinctive competencies in a firm's supply chain and are a potential source of competitive advantage. This is referred to as strategic supply chain innovation.

Pressures from the business environment compel the supply chain management to adopt a broader strategic approach to achieve strategic objectives and build sustainable competitive advantage. As predicted, strategic supply chain management may hold the key to sustainablecompetitive advantage based on innovation. This paper sites examples of some practical innovations that have been adopted by someindustry leaders:

The paper alsodiscusses a live example of innovation in an already existing supply chain of a polyester manufacturing industryas viewed from a broad strategic viewpoint**..**

Key Words:Innovation, Strategy,Melter, Reactor

Introduction

One of the most important business areas in any industrial facility is, of course, the supply chain. This is the point of operations that not only determine distribution efficiency but also the quality of the product a customer buys. Supply chain management is a key component of productivity and this has necessitated a paradigm shift in the way it is done. One of the most significant changes is the adoption of modern technology to enhance efficiency and accountability in the entire supply chain.

Innovation that leverages distinctive competencies in a firm's supply chain is a potential source of competitive advantage. Firms develop capabilities to use supply chains to tap innovations that sustain their competitive advantage. We refer to this as strategic supply chain innovation. Innovation within supply chains pertains to how firms leverage suppliers to develop more effective ways to serve either existing or new markets, whether by harnessing existing knowledge or by creating new knowledge. Building on these dimensions of market and knowledge, we propose a strategic perspective to capture the essential management capabilities of strategic supply chain innovation.

An efficient supply chain is vital for businesses to deliver their products to the consumers who want or need them. As the global marketplace continues to evolve, supply chain managers must think more innovatively and proactively to balance product flow and costs throughout a product's life cycle.

Suppliers as strategic innovation partners

Strategic supply chain innovation poses new challenges that require mastering new management capabilities. Firms cannot merely organize themselves to tap internal sources of innovation whenfactor leading to success lie beyond its boundaries. Some part of the efforts within supply chains can be mediated by information technology but the more intensive aspects of relationship building require development of a deeper sense of mutual understanding as firms struggle learn how to jointly tap the resources of other firms.

Supply chain management can still be viewed as a field dominated by functional expertise in operations it is also an ongoing process of evolution of the business environment and features regularly in academic research.

More recently, pressures from the business environment compel the supply chain management to adopt a broader strategic approach to achieve strategic objectives and build sustainable competitive advantage. More specifically, strategic supply chain management may hold the key to sustainable competitive advantage based on innovation. The remainder of this paper is aimed to provide a practical modelin the field of supply chain management as viewed from a broad strategic viewpoint.

Every product has a life cycle, consisting of four distinct phases:

1. Launch Phase
2. Growth Phase
3. Maturity Phase
4. Market Decline Phase

As a product moves through each of the four life cycle phases, the supply chain must also change in response.

Strategic supply chain innovation can be mapped into four subject areas. First, there is innovation which takes the form of the incremental development of new products, services and processes using the resources and capabilities found within the firm's supply chain based on existing knowledge resources used to satisfy existing markets.

The second type of strategic supply chain innovation involves the development of new ventures that tap entrepreneurial capabilities within the firm and its supply chain to leverage existing knowledge in pursuit of new markets

A third area of strategic supply chain innovation involves the development of new intellectual property based on the search for new knowledge to satisfy an existing market. Innovation has long been considered the product of scientific research conducted in a traditional R&D department. R&D develops knowledge from within the firm but also

draws on scientific work from outside the firm.This paper is aims to provide a practical example of innovation in the field of supply chain management buying scientific research conducted in a traditional R&D department.

The fourth type of strategic supply chain innovation deals with the introduction of disruptive technologies (Christensen, 1997) based on high levels of novelty, and new creative appreciations of opportunities to use new knowledge to create new markets.

Supply Chain and Innovation

Innovation can greatly impact supply chain performance. Here are five aspects of the supply chain that can be innovated to meet consumers' needs and save on costs:

1. **Design for manufacture/logistics**: Design the product to make it easy to produce, thereby reducing the costs of manufacturing or logistics.

2. **Design for assembly**: Design the product to minimize the number of components, standardization of components easing the assembly process.

3. **Design for product serviceability**: Design the product for ease of assembly, disassembly and component reuse. These products are often easier to repair, compared to products that are assembled with bigger components, making individual parts more difficult to access.

4. **Design for Six Sigma**: Design the product to eliminate failures, improve consistency and reduce costs. Standardizing parts throughout the supply chain is good example of design for Six Sigma.

5. **Design for environment**: Design the product to reduce its environmental impact throughout its lifecycle. This might be accomplished through appropriate packaging, ordesigning more efficient supply chain by eliminating non value added activities acrossorganizations.**This paper is aims to provide a practical example of elimination of non-value added activities in a supply chain**

When we look at those who are innovators in their respective industries, three distinct types typically surface:

1. **Fast innovators** – These innovators like to get products to market very quickly. Their supply chains must also be fast and capable of sourcing materials, producing and delivering products very rapidly.

2. **High-quality innovators** – These companies take a more cautious approach, emphasizing getting high-quality products to market while increasing customer satisfaction and loyalty. The supply chain strategy is designed to minimize failures, not for speed.

3. **Efficient innovators** – These firms fund new design, development and fulfillment projects with the lowest possible cost. Their supply chain is in place and ready to minimize or maximize economy of scale, to minimize costs.

Integrating technology in supply chain management ensures:

- Reduction in operational costs
- Improved efficiency through reduction of errors
- Greater customer satisfaction on the other end.

Examples of some practical innovations that have been adopted by industry leaders:

Radio Technology

RFID chips are placed on all items which helps employees to quickly detect any anomalies in an order. It is an innovative way of correcting a problem before it ruins the entire supply chain.

Advanced Weighing Technology

Modern technology includes the ingenious onboard truck scales allowing seamless operations when access to platform scales is not available.

Social Media Revolution

It is an ingenious way to open more channels and remain in touch in real-time with all stakeholders in the supply chain. It is easy to respond to questions and report in real-time about incidences in the supply chain.

Transport Management Software

Computerized supplies management is the future of the business. The use of computerized shipping and tracking systems helps to integrate all operations from one panel in your mobile device. This enhances customer experience and reduces errors in the entire process.

Data Analytics

The supply chain management can use available data from RFID, customer surveys, CRM transactions and call center logs effectively.

Examples of innovations in existing supply chain

Polyester yarn manufacturing is one of the prominent industries in the textile sector manufacturing yarn for woven andnon-woven fabrics.Major raw material for the process includes Dimethyl Terepthalate and Mono Ethylene Glycol. Dimethyl Terepthalate whichis required to the extent of 85% is available in the market in various forms as powder, flakes and pellets.

A major producer of Dimethyl Terepthalate includes Bombay Dyeing with manufacturing facilities at Patalganga 75 km off Pune - Mumbai highway near panvel. Bombay dyeing manufactures Dimethyl Terepthalate in pellet form of the size of about 1 cubic inch .

One of the major customers for Dimethyl Terepthalate is ABC public limited having a total daily consumption capacity of 60 metric tones having manufacturing capacity located on Mumbai - Pune road 18 km from Pune.Total distance worked out between the two manufacturing sites for transportation was 175 km.

Commercial B-B transactions between the two organizations are guided by a rate contract renewed after 3 months and the lead time agreed for the supply is one day (24 hrs). Dimethyl Terepthalate packages of 25 kg loaded on a 10 ton carrier was the general mode of transport .

Dimethyl Terepthalate produced in the process was in molten form which later on was palletized to right size cooled and packed for delivery.At the customer end the bags were transported from the stores through inbound logistics to a melter as and when required, mechanically torn to then fed to the melter where the temperature of the molten mass reached to about 250^0 C. This molten mass then was pumped and fed to poly condensation reactor the having hot Mono Ethylene Glycol at 180 ^{0}C.

The basic problem in the process involved cost of processing at both the ends.

Manufacturer had to palletize , cool the material pack and load on trucks on the other hand the customer had to load the material in the store, unload the material from the store, transport it to the melter, heat the material to required temperature and then pump in the reactor . All these operations involved unnecessary costs

The two organizations decided to have a serious look into this cost aspect by searching for designing a new procedure avoiding the non value added activities mentioned earlier

The hypothesis rested on the concept that the output of the manufacturing process was molten Dimethyl Terepthalate the manufacturing end which also was the input for of raw material to the reactor for further processing at the consumer end.

The question was can these two processes be integrated avoiding all the mentioned non value added activities.

The basic challenge in designing the integration was transportation of molten Dimethyl Terepthalate along 175 km road which included a steep ghat of 25 km between two destinations.

The probable answer was found out to be a tanker insulated by means of glass fiber. Experiments conducted to validate the system indicated the molten Dimethyl Terepthalate at a temperature of 250^0C remains in molten form for almost 8 hrs before it gets solidified in the tanker .

The next challenge was loading at manufacturing end and unloading the material at customer end within stipulated time considering the traffic conditions along the transportation road.

It was decided that the unloading the tanker would be given top priority by the customer organization which also included the time taken for quality checks by the customer quality assurance department.The tanker had been provided by a steam jacket to melt the solidified Dimethyl Terepthalate in case of unavoidable circumstances and a safety stock inventory of 1 day of raw material consumption was to be maintained by the consumer as safety stock.

Expenses saved by the manufacturer accounted to be to the extent of 6 %of the manufacturing cost. Expenses saved at the consumer end accounted to 8 % of the polyester manufacturing process.

It was decided that the modifications in the 4 tankers required for the process would be carried out by the consumer organization and in turn the manufacturing organization would give an additional discount of 2 % on material transported by the new process.

The pay back for the capital expenses required for the process by customer organization worked out to 14 months.

Conclusion

Thus it can be concluded that activities under supply chain management can be improved by innovation through research and development facilities in the supply chain organization for mutual benefits, developing a competitive advantage if perused by these organizations as a core strategy.

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