

A Supply Chain Transformation Methodology

Solayappan Chidambaram, Larry Whitman, S. Hossein Cheraghi
Department of Industrial and Manufacturing Engineering
Wichita State University, Wichita. Kansas 67260.

Abstract

Supply chain management is about improving the products, processes and functioning of the chain of enterprises involved in the delivery of products and services from raw materials. This paper provides a brief review of supply chain management and reviews some supply chain transformation methodologies. A standard methodology that guides in the transformation of the supply chain is presented. Also an IDEF0 model of the proposed methodology is provided that details the various activities that are involved in transforming the supply chain.

Keywords: Supply Chain Management, Enterprise Engineering

1. Introduction

Today, customers have the upper hand. The days when customers had to take whatever is being offered are gone. They expect the precise products they want, when they want them, and at the right price. With the advent of new communication networks, the world has become a smaller place. Customers can now decide on products offered by suppliers around the globe. So the competition is no longer regional; it is global. In order for the enterprises to remain globally competitive they have to rethink their strategy and manage things differently. Today's major emphasis is effectively managing the supply chain.

2. Supply Chain Management

2.1. Supply chain

The three primary elements of any supply chain are suppliers, producers and customers. Also they may encompass retailers and distributors along with service and support functions [8]. There are many definitions for supply chain that are in use today. The APICS dictionary definition is, "The Processes from the initial raw materials to the ultimate consumption of the finished products linking across supplier-user companies" "The functions inside and outside a company that enable the value chain to make products and provide services to the customer" [2 p.93]

2.2. Characteristics of world-class supply chains

The organizations that are part of a world class supply chain display an array of distinguishing characteristics as compared to the traditional organizations. Some of these characteristics include:

- Developing relationships, which deliver results that produce solutions for its customers,
- Providing products and services that often exceed customer requirements,
- Giving Quality and safety the highest priority,
- Responding efficiently to sudden changes in market requirements,
- Earning a return on investment which contributes to the success of all members of the supply chain, and
- Remaining the leader of the industry irrespective of time. [4]

2.3. Supply chain management

Today, most of the enterprises of a supply chain operate independently. For example, marketing, distribution, production planning, manufacturing, and the purchasing organizations have their own objectives and these objectives are often conflicting [3]. This way of functioning prevents the enterprises from providing the right products to the right customers at the right time. All these organizations are individually efficient enterprises, but they lack coordination to produce required end results. As Russell Ackoff puts it, "If each part of a system, considered separately, is made to operate as efficiently as possible, the system as a whole will not operate as efficiently as possible."

Supply chains are all about linkages. A supply chain is only as strong as its weakest link. Whenever a chain breaks, it usually does at the weakest link. In a supply chain there are many interfaces (links), like the ones between customer and supplier, product development and marketing, and sales and manufacturing. Problems develop at these interfaces [7]. And the best way to overcome these problems is to, manage the supply chain efficiently. This helps the organizations to act and not react to the unexpected changes in the market situations.

3. Literature Review

Extensive research has been carried out in finding better ways of managing the supply chain and optimizing its performance. Anderson. et al. [1] suggests that there are seven basic principles in managing a supply chain. They are: 1. Segmenting the customers according to their demands and providing them with a tailored set of products and services that will have maximum impact on them, 2. Customizing the logistics network through more robust logistics planning, enabled by real time decision support tools that can handle flow-through distribution. More time-sensitive approaches to managing transportation will result in significant increase in revenues and return on investment, 3. Listening to signals of market demand and planning the production according to them helps the organizations to avoid situations like over stocking and out of stock during peak seasons, 4. Differentiating products closer to the customer avoids product obsolescence and increases the impact on the customers, 5. Sourcing strategically from suppliers who share the common goals improves the supply chains efficiency as it reduces inventory and gives way to concepts like vendor managed inventory, 6. Developing supply chain wide common technology strategy improves interaction between the supply chain partners, 7. Adopting a common supply chain wide performance measure directs all the supply chain partners to work towards a common goal and facilitates comparisons across organizational boundaries.

Harland et al. [5], suggests that there are six pillars that have to be built for the success of a global supply chain planning process. They are: 1. Integrating supply chain planning activities, wherein the organization integrates all the activities crossing functional boundaries, so that all the activities are done so as to attain the organizational goals, 2. Establishing uniform business policies and rules for all the business units on issues like sales incentives and pricing, forecasting etc, wherever possible. Standardizing on common supply chain planning information systems within and across the business units can increase adaptability, 3. Unified supply chain planning information systems help in reducing the costs involved in interpreting the data from different systems and helps the company to sell the products at a higher profit, 4. Establishing planning centers of excellence, with the core staff responsible for coordinating the supply chain planning process co-located in a central or regional planning centers, helps in identifying new capabilities whenever needed and they will be able to identify opportunities to convert supply chain innovations into distinct competitive advantages, 5. Shared performance measurements facilitate evaluating partner contributions and worker skills across the organizational boundary and helps in directed progress, 6. A process based organizational structure supports global supply chain planning by improving communication and stream lining reporting hierarchy throughout the supply chain.

4. IDEF0 – Integrated Definition Methodology

IDEF0 is a modeling tool used to produce a model or structured representation of the functions of a system and of the information and objects that tie those functions together. The boxes represent functions such as activities, actions, processes or operations. Boxes are denoted by an active verb phrase inside the box, such as the "Transform/Manage the supply Chain" box A0 in Figure I. Arrows indicate data. In IDEF0, data can be information

(like "Market Requirements") or physical objects (like "Powerful change Methods and Tools"). They are named by noun phrases. The position of the arrow indicates the type of information being conveyed. The arrows entering, and leaving the boxes, on the left and right represent "**Inputs**" and "**Outputs**", respectively. The function transforms the inputs into the outputs. Arrows that enter from the top indicate "**Controls**", or things that constrain or govern the function. Arrows entering the bottom of the boxes are "**Mechanisms**". Mechanisms can be thought of as a person or resource that is required to perform the function.

An IDEF0 model is made up of several diagrams. Each diagram describes in more detail a box (activity) from a more general diagram. IDEF0 models are read in a "Top-Down" fashion. The top-level diagram, also called the Context or A-0 (A minus zero) Diagram (Figure 1), summarizes the overall function of the system which is represented by a single box. The A0 diagram represents the first decomposition of the system (Figure 2). The A0 and all subsequent diagrams must contain 3 to 6 numbered boxes. The location of the boxes on a diagram does not necessarily imply sequence or time. [13]

5. Suggested Supply Chain Transformation Methodology

Due to the advent of efficient communication networks and globalization, the manufacturers are able to cater to the needs of customers throughout the world and customers can reach products/service providers anywhere in the world. So the competition is no longer regional; it is global. In order for the enterprises to remain globally competitive they have to rethink their strategy and manage their supply chain effectively. Transforming an organization to meet the global standards in order to stay competitive in the market is a difficult task.

With the notion that the supply chain is an extended enterprise, and with a prior knowledge of enterprise engineering concepts and supply chain management techniques, a transformation methodology is presented. It leads towards the creation of a world-class supply chain, which helps organizations to realize their goals efficiently. There are essentially five important activities involved in the effort of creating a truly global supply chain as shown in Figure 2. The details of these activities are discussed in the following sections.

5.1. Define the scope of supply chain

In addressing the globalization challenge, an organization should establish a transformation team whose mission is to "meet with businesses around the world to identify the nature of business environments and competitive conditions" [6, p.87]. With this information the corporate planning people should determine the long-term goals of the company as a whole and then generate a strategy for achieving the goals, bearing in mind the probable changes in its environment. The best in industry and world class practices have to be identified to analyze the current practices of the company. The current situation has to be mapped in detail in conjunction with line experts, and an as/is model has to be built [6]. The core competencies that the company can take advantage of and the processes that need improvement should be identified. The team should come up with an initial model of the supply chain that they feel is truly world class. Representatives of each major business should review and redesign the suggested model. The result of this is a clearly defined common process model. [6]

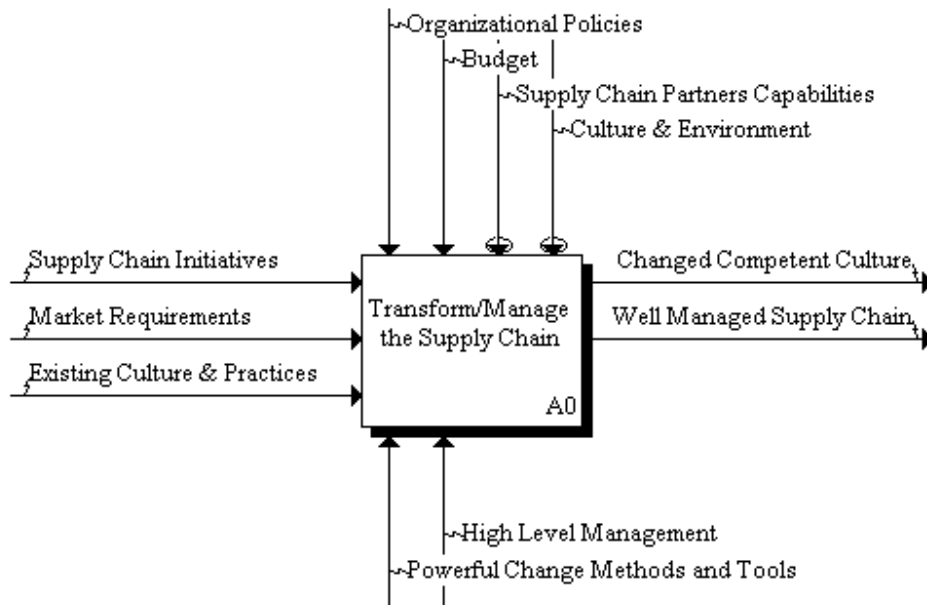


Figure 1. A-0 Level Diagram of the Supply Chain Transformation Model

5.2. Change culture

Having set the goals and the strategy, to achieve the same the members who are directly involved should understand that the company's business objectives cannot be achieved using the existing processes. The supply chain partners should understand the full scope of the supply chain processes. The goals and performance requirements should be communicated without any ambiguity. To ensure that whatever has been planned takes place correctly, the organization structures and business practices have to be altered in accordance with the supply chain goals. The suppliers have to be managed strategically, meaning that the manufacturer should get into long term contracts with its key suppliers, that will ensure more commitment from the supplier's side. The suppliers should have access to information regarding inventory levels, production planning to enable in better and timely supply of goods. The supply chain partners have to be empowered with making certain decisions, and they should share the goals and the gains that arise from this new partnership, so that you build better trust and win their commitment. [10][6]

5.3. Establish customer-integrated decision making

The supply chain decisions that are made should always be from the customer's viewpoint. When a new process is added or changed, the basic question of what value does it add to the customer, has to be answered. In order to achieve maximum impact, the customers have to be segmented based on their specific needs. "The companies should apply a disciplined, cross-functional process to develop a menu of supply chain programs and create a segment- specific service package that combines basic services for everyone with the menu that will have the greatest appeal to particular segments" [1]. The customer need, that is, demand, should be the basic driving factor for production planning. The products have to be manufactured based on the current market requirements, and the production system should be made flexible enough to respond to sudden changes in market needs. This requires robust demand planning tools. This reduces the inventory cost, increases sales and profits and enhances customer satisfaction. The products should be customized as late as possible in a supply chain. This enables the company to reduce safety inventory levels for every product and effectively respond to change in demands. In order for all these things to take place, the logistics network has to be flexible enough to handle all kinds of customer requirements. The company might have to get into partnerships with third party logistics providers. As Lamming (1995) puts it, "the way to face the pressures is to collaborate with other firms – to find new strengths outside the boundaries of the

firm.” There should be reliable real-time decision support tools available to handle frequently changing demand. The customization of logistics networks reduces warehousing and inventory costs. [1][5]

5.4. Develop supply chain wide technology strategy

Customer-integrated decision making calls for world class information systems and other new tools that are agile and can be used to arrive at meaningful and valuable decisions, as needed in the case of forecasting, production planning, and logistics decisions, that support the supply chain planning activities. The information systems should be uniform throughout the supply chain, which enables common understanding of the information. Technology has to be chosen carefully through analyses of the alternatives and the exact needs. To facilitate a global supply chain view in decision making, global planning centers could be established which are comprised of experts in various fields who can think in terms of the final customer [5].

5.5. Adopt supply chain wide performance measures

Once the new processes and technology are in place, their performances, with respect to the set targets, have to be monitored. The performance measures have to be standardized across the supply chain. The measures should be in terms of customer satisfaction, return on investments, market share etc, apart from the regular financial criteria. This channel- wide standard performance measure ensures focussed and directed progress towards the supply chain goals. The supplier’s and other member’s performance has to be weighed based on their delivered services, which affect the final customer.

6. Summary

Supply chain management is all about having the right products, at the right time, to the right customers at minimal cost. In order for an organization to reach the helm of industry leadership, the organization should start thinking radically and the leaders of the organization should be willing and determined to shift to the new paradigm. Information technology is an important and essential component and the organization should make the best use of its potential. The benefits of a leveraged supply chain strategy include increased customer satisfaction, lower inventories, less product obsolescence, and reduced manpower. The experiences of global leaders who have reached the helm, suggests that achieving supply chain excellence is not easy, but it is worth putting so much effort in terms of the global benefits that can result from it.

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