



# Study on Digital Approach to Mitigate the Vulnerabilities in Traditional Supply Chain Model through Supply Chain Management with the Realm of Ecommerce and RFID Technology

Archisman Chakroborty  
West Benal, Kolkata  
India

Sumanta Chatterjee  
West Bengal, Kolkata  
India

## ABSTRACT

Supply chain is a collection of organizations that works in an assembly line approach to accomplish a job starting from supply of a raw material to receipt of the final product by the customer. In a supply chain, essentially all of the members function as customers and suppliers simultaneously. Supply chain management is required to coordinate the transport of materials and information in the supply chain. Supply chain management deals with connecting the organizations within the supply chain in order to meet demand across the chain as efficiently as possible. Supply chain management is important to get the maximum benefit from procurement, delivery and logistics. It plays the main role to make outsourcing efficient, diminish transportation cost of inventory and give the particular company an edge over other companies. With the birth of e-commerce the traditional supply chains have changed. This paper discusses about a modern supply chain model used under e-commerce and RFID technology playing the most important role for the survival of an e-business in this competitive digital world of ecommerce with identifying and analyzing the risks associated in it.

## General Terms

Supply Chain Management, Radio Frequency Identification Number.

## Keywords

Supply chain, Supply chain management, e-commerce, RFID technology, identify risks, transportation cost, and outsourcing.

## 1. INTRODUCTION

Supply chain is a collection of organizations. Supply chain consists of the functions that are involved in producing and delivering a product or service to the customer. To survive in this competitive world, supply chain management has become the sole parameter to ensure profitable output. In traditional supply chain a company would give order to the sales representative of a supplier company. The sales representative would accept the order and deliver the items. After the raw materials were delivered the manufacturer company had to manually search for all the items ordered. It consumed huge time and manual work thus more cost. The manufacturers always had to think about the availability of raw materials. Warehouse management was very tedious job. It lacked demand management. Collaboration among the chain members were rare. Feedback management was difficult. With the help of RFID technology (radio frequency identification technology) and e-commerce models the

challenges faced under traditional supply chain can be abridged, thus providing a new expression of supply chain beneath e-commerce.

The paper is organized as follows: Section 1, describe the traditional supply chain and its problems. Section 2 describes the model of a world class Supply chain and its advantages. Section 3 describes the challenges of modern supply chain and its remedy.

## 2. SUPPLY CHAIN MANAGEMENT AND RISKS INVOLVED IN TRADITIONAL SUPPLY CHAIN MODEL

Supply Chain Management is also considered as integrated Supply Chain Management where it consists of Vertical integration and Horizontal integration. The concept of vertical integration came into being to solve the holdup problem. The Holdup problem arises when one of the two companies working in joint venture gets increased bargaining power and eventually leads to severe economic cost and might also lead to underinvestment. Vertical Integration involves taking on more of the supplier activities or taking on more of the distribution activities. For example if company A and B operates in a cooperative manner, company A is the supplier and company B is the manufacturer, if there is rise in demand of the product company B manufactures, company A can demand to increase the price of raw materials thus making it difficult for company B to manufacture. Company A holds Company B. To resolve this we introduced vertical integration. There are two types of vertical integration- Backward vertical integration and Forward vertical integration. The example of backward vertical integration would be a shoe manufacturer that starts manufacturing leather rather than buying leather from a leather supplier. An example of forward vertical integration would be a shoe manufacturer that starts marketing their shoes directly to grocery stores. On the other hand Horizontal integration involves companies, reducing competition by acquiring other companies creating the same product units. It increases market share by using economics of scale, while on the flipside it engage in monopoly pricing which is disadvantageous to the society. Some management issues are also associated with it. Manufacturers would like to produce in large lots because it is more cost effective to do so. The disadvantage is that ordering or producing large lots can result in large inventories of products that are currently not in demand while being out of stock for items that are in demand. Ordering/producing in large lots can also increase the safety



stock of suppliers and its corresponding carrying cost. It can result in bullwhip effect. The bullwhip effect is the phenomenon of orders and inventories getting gradually larger. Some of the causes of variability that leads to the bullwhip effect includes demand forecasting where many firms practice the min-max inventory policy. This means that when the inventory level falls to a minimum level an order is sited to bring the level back to the maximum level. Other reason includes batch ordering where suppliers witness a large order followed by periods of no orders followed by another large order. This pattern is repeated such that suppliers see a highly variable pattern of orders leading to variability. Price fluctuation in which if prices to retailers fluctuate, then they may try to stock up when prices are lower, again leading to variability. Inflated orders takes place when retailers expect that a product will be in short supply, they will tend to inflate orders to insure that they will have ample supply to meet customer demand. When the shortage period comes to an end, the retailer goes back to the smaller orders, thus causing more variability. However we can diminish variability by reducing uncertainty, variability, strategic partnerships and cross docking which involves unloading goods arriving from a supplier and immediately loading these goods in trucks for various retailer locations. This eliminates storage at the retailer's warehouse. Another method to reduce variability is known as Delayed differentiation involves adding of differentiating features to standard products late in the process. Direct shipping allows a firm to ship directly to customers rather than through retailers. This approach eliminates steps in the supply chain known as disintermediation thus reducing variability but it is not possible to eliminate the problems. Thus an effective supply chain model has to be present to mitigate all the hazards related with traditional supply chain in a wise manner so that actions that mitigate one risk does not end up exacerbating another as risks are interconnected.

### **3. IMPACT OF E-COMMERCE TO BUILD A WORLD CLASS MODERN SUPPLY CHAIN MODEL**

Introducing ecommerce in the supply chain introduces some new features like speed, connectivity and information visibility. Speed includes two factors: 1. Increasing rate of change. 2. Pace of decision making. 'Internet time' is a new term that has tossed up in the e-business. Few years in e-commerce is similar to several years in the traditional supply chain model. It is so fast that a company losses its customer as because his competitor has already developed a solution that apprehends the customer. The companies with the benefit of ecommerce can reach the customer more quickly than the companies with traditional protocols. E-commerce has

exaggerated the emphasis on speed so much that it has reduced the product cycle time. Due to the cutthroat competition of innovation among the companies the rate of new product introduction has increased. The speed of customer's transactions have also increased. Thus the connectivity among the members of supply chain increased rapidly. They started to interact with each other more frequently which lead to better understanding of the challenges faced. Enlarged interaction and market access became most significant due to connectivity. It removed the technological barrier between the supply chain members and brought them closer. Companies were able to reach customers who were difficult to reach before the advent of e-commerce. It helped to understand what the customers wanted. Enhanced market access have aided companies to not to be restricted to markets in their own geographic locations. They are able to reach geographically distant locations thus expanding their market access. E-commerce also allows the visibility of information to all the members of the supply chain. In the old model of supply chains information was not visible to all the trading partners and organizations of the supply chain. With the advent of the new model customers can check the current status of the transaction which was not possible earlier. But too much information is also not advantageous as it could lead to confusion because they are not used to it. Information visibility caters to better management of supply chain as managers can plan, implement and assess results beforehand with greater accuracy and swiftness. There has been a paradigm shift in the market structures due to ecommerce. New companies can enter in the supply chain as intermediaries between the suppliers and customers already in the market by taking advantage of ecommerce. Thus existing companies have to compete with these intermediaries to stay directly connected to their customers. The emergence of ecommerce allowed the manufactures to market directly to the customers, eliminating the need of traditional supply chain, therefore a power shift have occurred among the members of the supply chain. Features of ecommerce like speed, connectivity and information visibility have changed the market structures. It is more dynamic now. As the consumers have huge facilities to connect to the company's website, they can easily clarify their demands and feedbacks. The modern supply chain model in the era of ecommerce has mitigated many of those errors but the new model also has to face challenges like uncertainty due to huge information visibility and dynamic market structures. We are able to make use of ecommerce due to some business models through which ecommerce is implemented most prominently the B2B and B2C business model.

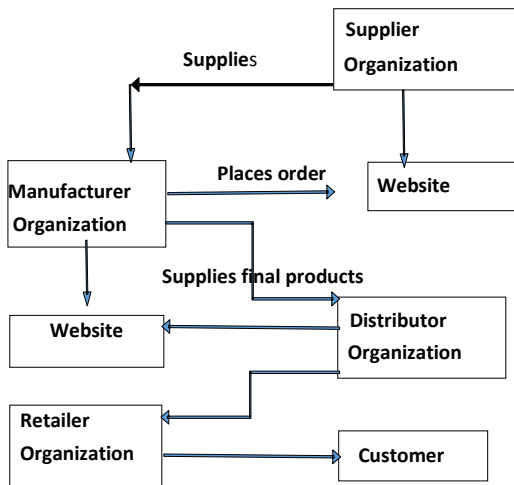


Fig 1: Business to Business Model

#### 4. SOLUTION TO THE UNCERTAINTY PROBLEM DUE TO HUGE INFORMATION VISIBILITY

The uncertainty problem related to information visibility is reduced by using RFID technology to gather real time information about the products of the company. RFID technology is known as radio frequency identification technology. RFID technology consists of RFID tags on each product. It can be used against barcodes. It makes the supply chain much more efficient and reliable. We will be able to track any product at any place. RFID guarantees the right product to be in right place without any errors. Real time information is made available. It hugely helps in the manufacturing process. As we use RFID tags in place of barcodes, manufacturers don't have to scan every product under the scanner. Products with RFID tags can be scanned by scanner without being in the line of sight of a RFID scanner. Multiple number of items can be scanned simultaneously. It reduces the manual work and improves visibility. RFID tags are very useful in warehouse management. It helps to keep track of the vast amount of inflows and outflows of products in the warehouse. When an item enters the warehouse the RFID tag is scanned and all the information related to it is stored. While the items leaves the warehouse the scanner registers it and send a message to the backend. Thus aids to manage the goods entering and leaving the warehouse. It

helps in tracking the items and offers visibility of real time cargo.

#### 5. CONCLUSIONS

Here, different modern model of supply chain is studied and presented. It is a part of integrated manufacturing system of engineering products and this paper will help to develop introductory information about the topic.

#### 6. REFERENCES

- [1]. The impact of Ecommerce on supply chain relationship by Susan L. Golobic, Donna F. Davis, Teresa M. McCarthy and John T. Mentzer., International Journal of Physical Distribution & Logistics Management, Vol. 32 No. 10, 2002, pp. 851-871.
- [2]. Supply Chain Management under E-Commerce Environment by Meng Yang. International Journal of Innovation, Management and Technology, Vol. 3, No. 3, June 2012.
- [3]. Identifying and Assessing Supply Chain Risks. by Debra Elkins, Devadatta Kulkarni, Jeffrey Tew. International Journal of Physical Distribution & Logistics Management, Vol. 32 No. 10, 2002, pp. 851-871.
- [4]. Michael S. Garver and John T. Mentzer, "Logistics Research Methods: Employing Structural Equation Modeling to Test for Construct Validity," Journal of Business Logistics 20, no.1 (1999): 33-58.
- [5]. Richard G. Netemeyer, Scot Burton, and Donald R. Lichtenstein, "Trait Aspects of Vanity: Measurement and Relevance to Consumer Behavior," Journal of Consumer Research 21 (March 1995): 612-26.
- [6]. Gavin E. Staude, "The Physical Distribution Concept as a Philosophy of Business," International Journal of Physical Distribution and Materials Management 17, no. 6 (1987): 32- 37.
- [7]. Douglas M. Lambert, James F. Robeson, and James R. Stock, "An Appraisal of the Integrated Physical Distribution Management Concept," International Journal of Physical Distribution and Materials Management 9, no. 1 (1978): 74-88.
- [8]. Martha C. Cooper, Douglas M. Lambert, and Janus D. Pagh, "Supply Chain Management: More Than a New Name for Logistics," International Journal of Logistics Management 8, 1 (1997); 1-14.
- [9]. Joseph C. Andraski, "Leadership and the Realization of Supply Chain Collaboration," Journal of Business Logistics 19, 2 (1998): 9-11.