



## **Developing and Measuring Supply Chain Management & Logistics Concepts In India**

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### **ABSTRACT:**

Supply Chain Management and Logistics involves optimizing the delivery of goods, services and information from supplier to customer. An effective supply chain makes companies competitive and profitable. Information is essential to making optimal supply chain decisions because it provides the global scope needed to make optimal decisions. Information Technology (IT) provides the tools together this information and analyses it to make the best supply chain decisions. Latest and the state of art technologies and management tools Enterprise Resource Planning (ERP), Customers Relations Management (CRM), and Supplier Relation Management (SRM) along with auto ID technique Radio Frequency Identification (RFID) have to be used for improving the performance of Supply Chain Management and Logistics in India. Supply Chain Management has gained significant importance in the 21st century. It is so because small companies like Wal-Mart, Dell, and Amazon owe their entire success to their agile and adaptive supply chain. These were small companies virtually unknown not so long ago and suddenly they became the most competitive and admired companies on the stock bourse. However some Indian companies are moving towards making their supply chain and logistics efficient, most of them have done very little or nothing.

**KEY WORDS:** Supply Chain Management, Logistics & Chain Makes

### **INTRODUCTION:**

The Indian economy has been growing at an average rate of more than 8 per cent over the last four years (Gupta, 2014) putting enormous demands on its productive infrastructure. Whether it is the physical infrastructure of road, ports, water, power etc. or the digital infrastructure of broadband networks, telecommunication etc. or the service infrastructure of logistics – all are being stretched to perform beyond their capabilities. Interestingly, this is leading to an emergence of innovative practices to allow business and public service to operate at a higher growth rate in an environment where the support systems are getting augmented concurrently. In this paper, we present the status of the evolving logistics sector in India, innovations therein through interesting business models and the challenges that it faces in years to come.

Nowadays, the management's challenges are increasingly formed from a complex network of suppliers that can do threaten the business and the creation of new opportunities for agency management. To understand the supply chain risks which the companies are faced to makes possibility for agencies managers to make more power to realize and challenge against unexpected happenings. In the unsecure and unstable terms of competitive environment, recognizing of above mentioned risks cause the adaptation and act as a strategic lever in the organizations competitive process. Supply chain risk appraisal process can help to make strategic decisions and operational plans to reduce the quantity of supply chain defects (Zurich Insurance Company,2010). The process of advancement in this regard is described in the way that, at first, organizations were trying to produce the products with better quality and the least costs by standardization and improving their own internal processes in order to increase their competitive power. In the past, the dominant thinking was that the powerful engineering and designing and also harmonious and consistent

production operations are the leading factor to access market demands and, as a result, to get more market share and, therefore, the organizations do their best to increase efficiency. In later years, with increasing of diversification in customer's expected patterns, the organizations were concerned with increasing elasticity in production lines and development of new products for customer's satisfaction. In later time, by improving of production processes and using further engineering models, most of the industrial managers found that to continue their presence in the market, it's not enough to have improvement in internal processes and flexibility in companies abilities. But parts and materials producers should produce the materials with the best quality and least costs and also products distributors must have a close relation with policies of market development of producers. By such a view point, the supply chain approaches and its management were born (Mentzer.etal). Most of the companies take different actions like contracting to manufacture diversified productions to have cost advantage and market share. These actions may be efficient due to the stable conditions. But these actions by itself can effect on supply chain by different kinds of risks. The risks like unsecure economic cycles, customer's uncertain demands and human and natural events. So, in regard to more increasing of these actions, the need to study of different methods and strategies for supply chain risk management in the superior companies has also been put to agenda more than before (Sharafati,2009). In this research, besides explanation of the concepts of supply chain, supply chain management, risk and non determination in supply chain, we talk about the existing risks in supply chain and finally, after inquiry of risk models in supply chain, we examine one of the them and the questionnaire which has been extracted from the best selected model, is analyzed by DEMATEL method.

## **ISSUES AND CHALLENGES IN SUPPLY CHAIN:**

### **(I) SUPPLY CHAIN INTEGRATION:**

Supply chain management (SCM) executives face unique challenges, with respect to integrating supply chainspecific strategies with the overall corporate business strategy. In recent years, given changing business realities related to globalization, the supply chain has moved up on the chief executive officer (CEO) list of priorities, but it's not always for the right reasons, in many cases, CEOs only pay attention to the supply chain when they want to cut costs or when something is wrong. Since the supply chain essentially moves the lifeblood of the organization, process efficiency on a global scale is essential to optimized business operations. The importance of global integration to the Multi-National Company (MNC) lies in the differential advantage to be gained from the ability to exploit differences in capital and product markets, to transfer learning and innovation throughout the firm, and manage uncertainty in the economic or political environment in different countries or regions. However, the general understanding of the business environment in most industries is that competition has increased and the conditions under which business is made are more turbulent. Many researches have mentioned a classification of supply chain integration challenges. SC integration challenges can be classified through the challenge of system relationships; the SCM system has two kinds of relationships, which are the relation between sub-systems, and the relationship between SCM system and the business strategies, This classification emphasizes the technical challenges that came from the relation between SCM system and internal business strategy, unfortunately this classification bypass the challenges that the companies may face from external environment.

### **(II) INFORMATION SHARING:**

Information sharing in a supply chain faces several hurdles. The first and foremost challenge is that of aligning incentives of different partners. It would be naïve of a partner to think that information sharing and cooperation will automatically increase his or her profit. In fact, each partner is wary of the possibility of other partners abusing information and reaping all the benefits from information sharing. For example, supply chain partners seldom share information that relates to sensitive cost data, e.g. production yield data or purchase price of parts. This is consistent with economists. Finding that a powerful monopolistic or monopsonistic partner can extract all economic profit from his or her partner, but one way of defending a

positive profit for the weaker party is to keep the cost hidden and maintain informational superiority. The profit associated with superior information is often called the informational rent. Even when each partner is guaranteed a positive gain in return for information sharing, each partner can play a non-cooperative game and haggle over how much. This may potentially lead to a failure to share information. Thus, trust and cooperation become critical ingredients in a supply chain partnership. On the other hand, trust needs to be rationalized by a relevant economic return. Cooperative game theory offers a starting point to the resolution of the problem, but reality is much more complicated with many additional factors and special considerations. Another concern associated with information sharing is the confidentiality of information shared. Suppose, for example, that a supplier supplies a critical part to two manufacturers who compete in the final product market. Either manufacturer would not share information (like sales data) with the supplier unless it is guaranteed that the information is not leaked to the other manufacturer. But the situation becomes tricky if the supplier and one of the two manufacturers are the same company. Note also that information sharing in certain settings can be a subject of antitrust regulations. Suppose that two retailers regularly share with the supplier their demand projection for the next ten weeks. The projection by one retailer may implicitly signal the plan of a sales/promotion campaign in some future week. When this information is relayed to the other retailer through the supplier, it may be potentially used as a price fixing instrument between the two retailers. For example, the two retailers may take turns lowering the price by the use of forecast signals and avoid cut-throat price competition. This practice may be a subject of scrutiny by the antitrust authorities.

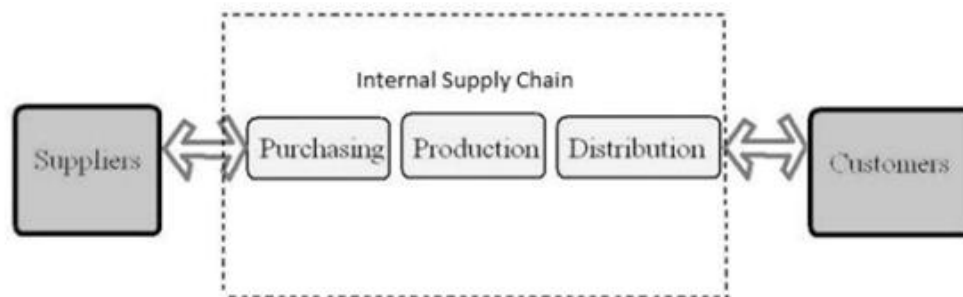
### **(III) SUPPLY CHAIN NETWORK DESIGN:**

Another aspect that requires more attention is the full integration of forward and reverse activities in SCM. As we can conclude from the surveyed literature, only a few papers attempt this integration and, again, significant simplifications are made. One aspect that has been scarcely considered in (integrated) supply chain planning concerns postponement decisions, which refer to the possibility of not filling customer demands on time. As a result, backorders are generated that incur penalty costs. This issue was explicitly integrated with strategic decisions (Wilhelm et al., 2005) Clearly, more research is needed on this aspect, whose relevance has been raised by SCM. In particular, it is important to consider the impact that it may have on strategic decisions. In addition to these findings, we note that the large majority of location models within SCM is mostly cost-oriented. This somewhat contradicts the fact that SCND decisions involve large monetary sums and investments are usually evaluated based on their return rate. One of the few models addressing this issue was (Sheu, 2003) focusing on maximizing the potential return on facility investment. Moreover, substantial investments lead to a period of time without profit. Companies may wish to invest under the constraint that a minimum return will be gradually achieved (e.g., at least a pre-defined amount should be earned within a given time limit, (Shapiro, 2004). By considering profit-oriented objective functions, it also makes sense to understand, anticipate and react to customer behaviour in order to maximize profit or revenue. This means bringing revenue management ideas into strategic supply chain planning. The contribution by Mitra, 2007 is the only example we found that considers revenue management for remanufactured products in reverse logistics. Regarding the methodology that has been developed to solve SCND problems, a rich and varied group of available solution techniques can be observed. This aspect along with the continuous development of more computing power makes it possible to handle comprehensive models. Hence, although the incorporation of the various features discussed above would naturally increase the complexity of the resulting models, the possibility of solving real-life problems seems quite promising. The main conclusion that can be drawn from this review is that we can find a growing stream of research aiming at the integration of strategic and tactical/operational decisions in supply chain planning. Moreover, the role of facility location is decisive in supply chain network planning and this role is becoming more important with the increasing need for more comprehensive models that capture simultaneously many aspects relevant to real-life problems. Nevertheless, much research is still needed in order to include in the

existing models many issues that so far have not received adequate attention in the literature. Therefore, there is still much room for the development of new models (and solution techniques) for helping the decision-making process in integrated supply chain planning.

### REVIEW OF LITERATURE:

Analytically, a typical supply chain (Figure) is simply a network of materials, information and services processing links with the characteristics of supply, transformation and demand. It is the collection and interaction of these elements that impact system-level qualities, properties, characteristics, functions, behavior, and performance (Cloutier et al., 2010). Enterprises create and deliver products and services through increasingly global and complex supply chains (Binder and Clegg, 2007 and Basole and Rouse, 2008). The hyper competitive nature of today's business environment, however, requires enterprises to continuously seek ways to decrease operational costs, provide satisfactory customer service, and minimize existing and anticipated disruption risks by designing and managing efficient supply chains.



**Fig. : Company's Supply Chain**

As pointed since nobody gets credit for fixing problems that never happened, firms do not invest in supply risk assessment exercise. If reward system rewards only those who achieve their objectives irrespective of due attention to risks, then managers will strive to achieve objectives at the cost of disproportionate risks (Manuj and Mentzer, 2008). Popular view is that since the firm has a greater control on the supplier, supply side uncertainty can be handled by choosing appropriate partners. However, certain events in the recent past have underscored the need to consider supply uncertainty (Zsidisin, 2000; Ruiz-Torres and Mahmoodi 2007). Measurement of performance of purchasing also seems to be difficult. (Tuncel and Alpan, 2010; Thun and Hoening 2011). Therefore, it appears that supply risk management is a bit under explored area. We also realize some specific challenges for suppliers in developing countries as they rely on a low cost strategy while they realize that they need to be innovative and also provide better services (Chong and Chan, 2011). The quality of the material sourced from emerging economies is at par with the world standards. But the supply chain management best practices are not followed by suppliers. The problems faced by these firms from their suppliers are common viz. product shortage, delayed delivery, supply disruptions, lack of logistics facilities, etc. (Lin and Zhou, 2011; Thakkar, Kanda, et al., 2011). Therefore there is a need to percolate the best practices to second tier or third tier suppliers. As a whole chain they need to perform better (Sutton, 2004; Soni and Kodali 2011). Indian firms and suppliers too are no different. They share the same approach of other firms in emerging economies. Indian organizations need to change the way people think. They need to change their mindset (Sahay and Mohan, 2003; (Thakkar, Kanda et al., 2011; Soni and Kodali, 2011). We realized that first hand information from the people responsible for supply chain management in Indian industries should be gathered to analyse the supply risk management perspective and practices implemented by them. This information would also reveal the degree of importance given to this area by Indian firms. A limited number of risk related surveys can be found in the area of supply chain (Thun and Hoening, 2011).

In current study lot of research has been done to understand what the Supply Chain Management is and how it is affecting organizations, what are different challenges and it can be proved as a tool for improving overall performance in today's global competitive environment.

### LOGISTICS AND SCM PRACTICES FROM SECONDARY SOURCES:

Industry and academic estimates put logistics and SCM spend in India at approximately 13% of the Gross Domestic Product (GDP). Global estimates for this vary and are around 13% of GDP in China and about 9% of GDP in the US. The transportation cost in India accounts for nearly 40% of the cost of production, with more than half the goods being moved by road. Trucking accounts for nearly 70% of transportation and accounts for 60% of all logistics cost. 67% of truck ownership is in the hands of small unorganized players. Road is followed by rail and finally coastal shipping. Rail has been steadily losing ground due to myopic government strategies and inherent inefficiencies. The freight movement of Indian railways has risen to 411354 net tonne-kilometers and the total road length is 3315231 kilometers. Though enormous maritime routes are available combination of poor government policies and lack of initiative from the private sector, water which is probably the cheapest mode of transport is barely used. Air as a mode is limited to a small percentage of courier shipments. Various SCM spend indicators such as in-bound transportation costs, inventory related costs and distribution expenses as percentage of net sales vary from industry to industry. However, as per Centre for Monitoring Indian Economy (CMIE), they are coming down over a period of years. The aggregate of the same for nine major manufacturing industries for four years are shown in Table-1. These industries spent nearly 17-18% of their net sales on various logistics activities, including distribution, warehousing, and inventory. Global averages are around 9-12%. So, there is ample scope to reduce spends on logistics. This in turn allows companies to protect operating margins during downturns and make above-normal profits during upturns.

**Table-1: SCM Spend in 9 Major Indian Manufacturing Industries**

SCM Spend Indicator	2010-11	2011-12	2012-13	2013-14
In-bound Transportation Costs as % of Net Sales	1.7%	1.5%	1.4%	1.5%
Inventory-related Costs as % of Net Sales	13.5%	13.9%	13.4%	13.4%
Distribution Expenses as % of Net Sales	3.2%	2.9%	2.0%	2.9%
Total SCM Spend as % of Net Sales	17.9%	18.4%	17.5%	17.5%
Source: <i>CMIE</i>				

The focus on costs and ICT-enabled services is leading to electronic procurement that cuts time and costs (including transaction costs) and brings in transparency and speed. The ERP industry in India is worth US\$ 300 million and is growing at over 15% a year. 52% of the respondents in ETIG (Economic Times Intelligence Group) SCM 2014 survey have implemented ERP and three-fourths of these find ERP to be extremely effective in business. 44% of the companies surveyed had already implemented data warehousing and mining applications, and another 26% had plans to do so. Almost every firm found this practice to yield good results in revealing consumer trends, patterns and potential segments.

For supply chain tracking, the most preferred method is the truck driver reporting his location. Another method gaining popularity is the use of SMS (Short Messaging Service). Time lags here can be pre-determined. Depending on the number of times the SMS signal is polled and sent by to the base station, the location of the vehicle can be accurately determined. With Global Positioning Systems (GPS), this is no longer the issue. However, the use of GPS for supply chain management in India is relatively low.

**LOGISTICS AND SCM PRACTICES OBSERVED ON-SITE IN 25 FIRMS:**

In our on-site observations, we find that the primary focus is on quality, cost and service. Recently, responsiveness (delivery speed, volume flexibility and innovation) is also catching up management attention. Correspondingly, the major concerns in all these firms and their supply chains are related to costs, clarity of demand, reliability of partners, shortening delivery cycle, production and logistics flexibility and innovation in supply chain practices. Sharing of benefits within the supply chains has not yet gained much attention. Firms show relatively high awareness of modern supply chain planning and control tools, including software and mathematical models. However, the utilization of such tools is still at a relatively low level. Relationships are messy and partnerships are short of true strategic alliances. Still, some benefits are being derived. Firms, especially in the automotive, retail, manufacturing and FMCG sectors, are increasingly opting to outsource their logistic requirements to specialized service providers. The positive business atmosphere and a burgeoning consumer market are making the shipper community push the logistic service providers hard for efficient supply chain value propositions. Many firms in our study have gone for spend management outsourcing instead of procurement management. In firms with manufacturing as the core process, primary focus is still on in-house manufacturing though trend towards contract manufacturing is on the upswing. Quality assurance has become an order qualifier rather than being an order winner. The emergence of Service Level Agreements (SLAs) with internal customers can be seen in most of the firms. Presently, they are still informal in nature and not strictly binding. Firms have few manufacturing facilities with 20-24 warehouses and many dealers. This number of warehouses is a direct consequence of the tax-holidays and the erstwhile excise and custom duty structure in India. High collaboration and partnerships with vendors is strongly evident in this sector.

There is big focus on vendor development. Firms focus on developing vendors in geographical proximity. Another discernible trend is the gradual shifting of responsibilities and risks to vendors. In automobiles sector, there is collaboration and partnerships downstream with the dealers as well. Transportation and logistics being non-core activities are generally outsourced. As regards implementation and utilization of ICT, 6 out of 8 firms use standard ERP software, while one uses in-house developed legacy software. The firms appreciate the importance of inventory and order tracking for which they use Wide Area Network (WAN), Extranet and Internet. They seem to be catching up fast with their counterparts in the developed world. However, forecasting is still based on targets from dealers/ sales force. This is an area where they are much behind.

The focus of most of the service firms is on express deliveries and logistics solutions. They focus on efficient and effective service and better customer reach. Most of the firms have established highly responsive call centers with stringent performance metrics. High collaboration and partnerships with partners can be seen. The firms are generally going for global procurement and long-term strategic deals. They have multiple channels downstream so as to achieve door-step reach to the ever-increasing customer base in India. Transportation and logistics is generally through their own fleet. In some cases, it is outsourced. Routing and scheduling software are increasingly being used for these activities. 5 out of 6 firms use standard ERP software. There is high focus on tracking of customer orders and and technologies like bar codes and GPS are being employed. Production process is mainly “pull” system.

In FMCG and perishables sector, the primary focus is on product availability (refilling the shelves). The companies have few manufacturing facilities with complex distribution channels. Packaging is generally outsourced. Mostly, the goods are packaged near the markets. There is a very high collaboration with suppliers and firms are going for global procurement. E-procurement is on the rise. At the same time, firms are negotiating long-term strategic deals. There are multiple channels downstream so as to meet the objective of next-door reach. Transportation and logistics services are generally outsourced to third parties. Transportation is mainly by road and the lead-time of these supply chains is still as high as 9-12 weeks. This is quite understandable, given the size of India and the state of its infra-structural facilities. Here too, most of the firms use ERP and forecasting is based on data from dealers/ sales force.

In retail chains, primary focus is on expansion and reaching the consumer. The sector is witnessing tremendous growth with increasing acceptability by the growing Indian middle class. Two of the retail chains in our study are low cost mass market players, while the third one is mainly into branded apparel. Their facilities are expanding to meet the increasing demands. These firms have their own warehouses and retail outlets. The layouts of these facilities are still evolving. Most of them are smaller replica of retail chains in the developed countries or famous shopping cities like Singapore and Dubai. The firms have high collaboration and partnerships with their suppliers who are generally located in close proximity. Transportation and Logistics is outsourced. The implementation and utilization of ICT though limited, is growing rapidly. One firm uses ERP and another uses in-house developed Resource Enterprise Management (REM). These firms have not only gone for bar coding of items, but are pilot testing RFID and other smart card technologies as well. Forecasting is based on historical data which is tinkered by management intervention.

## CONCLUSIONS:

Logistics and supply chain practices in India show that visibility is still limited. The companies have a realistic view on the advantages and risks of information sharing and so information is shared only selectively. Our study reveals that most Indian firms have aligned their logistics and supply chain objectives with their business objectives. However, due to some aberrations and diseconomies of scale/ scope most of them are not able to reap full potential benefits. Action is required by the Indian government to improve the infrastructure for better functioning of various supply chains. Firms and their supply chains need to closely integrate themselves into a network, carefully manage the complexity that ensues, align their business strategy with logistics and supply chain operations, and leverage information and communication technology with process improvement and pioneer operational innovation for superior performance. They also need to rigorously measure and monitor critical operational performance metrics such as customer service, responsiveness, supply chain costs, asset utilization, product quality and operational flexibility in order to achieve overall business success.

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