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AN OVERVIEW OF SUPPLY CHAIN FLEXIBILITY USING MATHEMATICAL MODELING TECHNIQUES

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ABSTRACT:
This paper presents supply chain management flexibility and mathematical modelling with all material flow optimum level. It is well known for every manager to reduce operational costs and expenses incurred in supply chain network. Mathematical proposed to find out the optimality position which provides least cost and other expenses. This paper elaborates how supply chain flexibility can bring out and other nuances supply chain system. The optimization result brings about the following namely a). Improved approach from "Guess and Check" b). Less expensive method c). Speed approach. Present day counts on pennies, microseconds and microns matter). Supply chain management (SCM) is aimed to maximize customer value and gain competitive advantage and sustainable development [1]. It represents a conscious effort by the supply chain firms to develop and run supply chains in the most effective & efficient ways possible. Supply chain activities cover everything from product development, sourcing, production, and logistics, as well as the information systems needed to coordinate these activities. It is imminent that supply chain management is an integral part of most businesses and is essential to company success and customer satisfaction.

1.1. INTRODUCTION

IBM.com study result reveals that during 2017, SCM accessed more than 50 times within the span of five years. This brings dramatic changes in SCM field all these data are being analyzed [2]. Further the critical value, sensitive data including weather, less workers supply, political decision on unrest will be lost. (Source: -www.ibm.com)

Business world is reached with latest technology sky level and working with lot of ICT tools. Specialized software and hardware were used for the purpose. The effectiveness of SCM is going to be the order of the day. Challenge here is act optimally and thereby control cost of operations. Increasing global production and demand will alter the strategic position of the company.

According to Zandehessami et all (2011) result says that companies adopting new supply chain mantra for optimium or best possible alternative level or ideal inventory. Companies have to gear up with changes in the corporate functioning like customer choice, preference, demand, supply condition etc.

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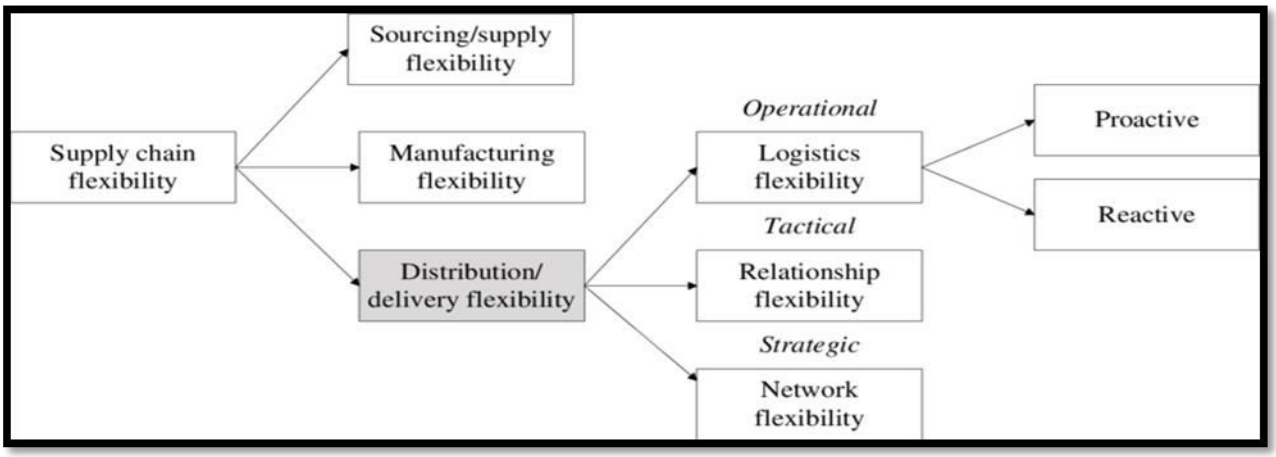
According to Ying-Hua et. al (2008), feels that the companies strategic decisions are involved in quality considerations, cost aspects, delivery level, timing etc and finally customer satisfaction can be ignored .

Recently that concept Supply Chain 4.0 - the application IOT [3], the use of advanced robotics, and the application of advanced analytics of big data in supply chain management: are will sense all thing, brings under new network, fully automated machines, through analysis to reach maximum performance and delighted customer satisfaction.

1.2. CONCEPT OF SUPPLY CHAIN FLEXIBILITY

It is measure of supply chain aspects. It acts as fine link between the actual performance and supply chain players. It incorporates the following metrics which includes a) Market position b). Demand conditions c). Marketing mix d). Product availability e). Application of technology f). Product price g). Labour cost, socio-economic, political, legal, cultural and technological business environment.

Figure No.01 Supply chain Flexibility



This concept tells about making proper supply chain without interruption. This is strategy aim for the global company to adopt managerial ability to manage supply chain. The SCM flexibility can be conveniently defined as “speed” matching demand and supply network in the change the business environment result to gain competitive advantages position.

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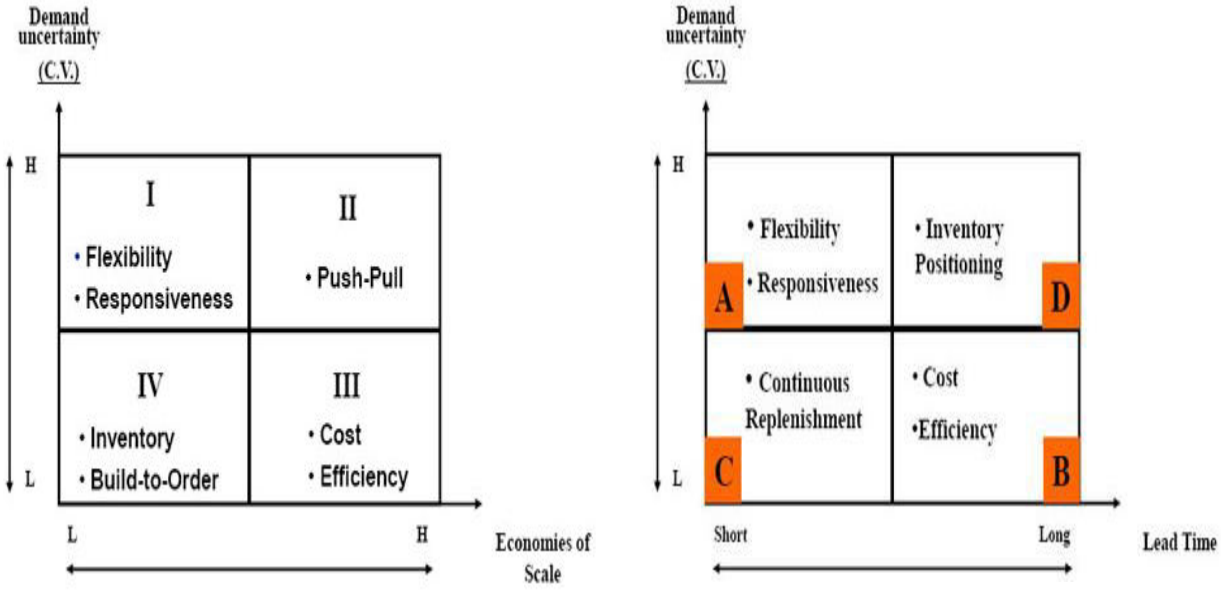
Figure No.02. Drivers of supply chain flexibility



(Source: Adopted from David Simchi-Levi)

1.3. WHAT IS A SUPPLY CHAIN?

The supply chain [4] helps to support production and distribution to the final consumer. The activities connect working people, the entities, information and resources. Typically a supply chain is defined as starting from raw materials and component procurement then manufacturing and distribution to finally delivery to customers. This encompasses vast spectrum areas that variety of company like manufacturer, retailer, and distributor, and product. Supply chain management encompasses the issues like Inventory management, Procurement and Supply contracts, Network design and planning, Routing and distribution, Warehouse planning, Risk management and Pricing.

Table No.01. The advantages of Supply Chain Management [5]

Boost Customer Service	Reduce Operating Costs	Improve Financial Position	Ensure Human Survival	Improve Quality of Life	Protect Cultural liberty and growth

(Source: www. cscmp.org)

Definition of supply chain refers that the entire process of making and selling commercial goods, including every stage from the supply of materials and the manufacture of the goods through to their distribution and sale. Successfully managing supply chains is essential to any company hoping to compete [6]. According to IDC Simon Ellis says about the thinking supply chain identifies about FIVE ‘C’s are:

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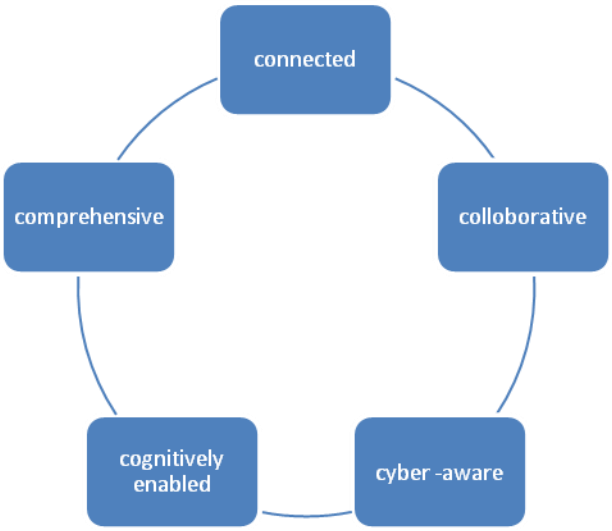
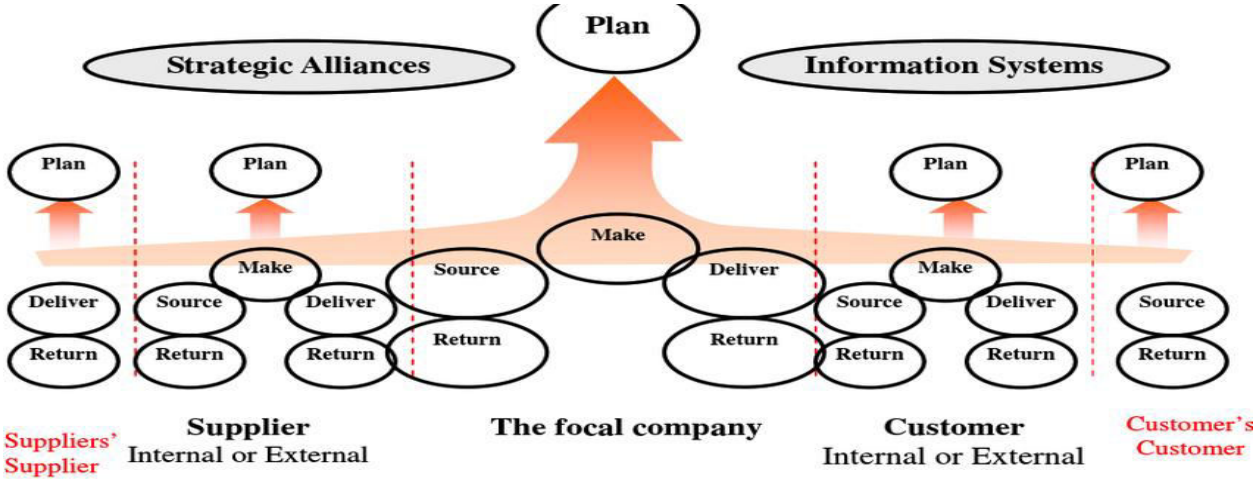


(Source: Author compilation)

1.5. SUPPLY CHAIN OPERATIONS REFERENCE MODEL

According to the SCOR model, which is a tool to analyze and improve the supply chain, supply chain flexibility metrics are: SCOR is a management tool developed by Supply chain council which is used to solve SCM decisions within a company and with suppliers and customers of a company. This model helps to improve the supply chain base. Many popular corporate giant and leading companies are using this SCOR model as strategic decision making.

Figure No.03. Application of SCOR model to Supply chain Linkage



Source: *Adapted from Supply Chain Operations Reference Model Version 7, Supply Chain Council, 2005*

- **Downside Supply Chain Adaptability:** The volume decrease of quantifies that were ordered from suppliers, can be sorted out within 30 days, with no extra cost.

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- **Upside Supply Chain Adaptability:** The volume growth of quantities can realize within 30 days.
- **Upside Supply Chain Flexibility**: reduced to increase quantities by SCM by 20%.

1.6. WAYS TO IMPROVE THE SCM FLEXIBILITY [7]:

- It can be improved by choosing the "customized Partnership" linking with supplier and contractor to improve supply chain base.
- Outsourcing and other private players
- Creating Building block and right tools and capability
- Improvement in supply chain efficiency aligning other business development
- Restructuring the existing organizational set-up and support process

1.7. CONCLUSION

Modern business organization is working with of uncertainties and forced to make choice due swift change in supply chain logistics. The business establishments can perform by understanding and predicting changing "market swings" and adjusting costs effective –response-strategies. The success strategy works out by developing supply chain flexibility, managing in global markets access and resourcefulness, single outing both financial and political issues are major key player effective business strategy.

Supply chain management presents an especially important domain where such flexibility is critical to achieving a consistently successful performance. A supply chain is an entire system of producing and delivering a product or service [8], starting from sourcing raw materials to the final deliverance of the product. Supply chain foundations can leverage the production process and its related communication to till finished product or service. The bottom line is that both macro and micro forms of flexibility are absolutely essential. Let's take a look at the inherent benefits of a flexible supply chain system.

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