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ABSTRACT

Globalisation has brought about drastic shifts in industrial organizations due to being driven by the compulsions of the search for profitable avenues of investment, the policies of openness promoted by multilateral financial institutions and the readiness of the national governments to embrace these policies in their eagerness to attract investments. These changes are facilitated by the revolutionary beginning in information and communication technologies.

There has been a perceptible paradigm shift in the policies in the area of production planning and employment avenues in the wake of globalisation and the Supply Chain Management is an innovation in this direction to outsource the facilities for procurement of various components of production. In fact, Supply Chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

KEY WORDS : Globalisation, Paradigm Shift, Supply Chain Management, Risk Management.

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The views expressed in this paper are of the authors and have got no bearing on the organizations in which they are working

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SUPPLY CHAIN is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

DEFINITION : Supply Chain Management may be defined as the process of planning, implementing and controlling efficient cost effective flow and storage of goods, services and related information from the point of origin to point of consumption for the purpose of comforting to customer requirements.

Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently. These organizations have their own objectives and these are often conflicting. Marketing's objective of high customer service and maximum sales dollars conflict with manufacturing and distribution goals. Many manufacturing operations are designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities. Purchasing contracts are often negotiated with very little information beyond historical buying patterns. The result of these factors is that there is not a single, integrated plan for the organization--- there were as many plans as businesses. Clearly, there is a need for a mechanism through which these different functions can be integrated together. Supply chain management is a strategy through which such an integration can be achieved.

Supply chain management is typically viewed to lie between fully vertically integrated firms, where the entire material flow is owned by a single firm, and those where each channel member operates independently. Therefore coordination between the various players in the chain is key in its effective management. We may compare supply chain management to a well-balanced and well-practiced relay team. Such a team is more competitive when each player knows how to be positioned for the hand-off.

The relationships are the strongest between players who directly pass the baton, but the entire team needs to make a coordinated effort to win the race.

SUPPLY CHAIN STRATEGIES : There is a great need for making out clear cut strategies for managing Supply Chain and some of these listed as under :

1. Negotiating with many suppliers, playing one supplier against another,
2. Developing long term partnering arrangements with a few suppliers who intend to work and satisfying the end customer,
3. vertical integration, buying actual suppliers,
4. Making suppliers to become part of organization's coalition,
5. Creating a virtual company that uses suppliers on need based basis.

SUPPLY CHAIN DECISIONS

The decisions for supply chain management may be classified into two broad categories -- strategic and operational. As the term implies, strategic decisions are made typically over a longer time horizon. These are closely linked to the corporate strategy (they sometimes suit the corporate strategy), and guide supply chain policies from a design perspective. On the other hand, operational decisions are short term, and focus on activities over a day-to-day basis. The effort in these type of decisions is to effectively and efficiently manage the product flow in the "strategically" planned supply chain.

There are four major decision areas in supply chain management and there are both strategic and operational elements in each of these decision areas, viz., Location, Operations Decisions, Production, Inventory and Transportation (distribution).

Location Decisions

The geographic placement of production facilities, stocking points, and sourcing points is the natural first step in creating a supply chain. The location of facilities involves a commitment of resources to a long-term plan. Once the size, number, and location of these are determined, so are the possible paths by which the product flows through to the final customer. These decisions are of great significance to a firm since they represent the basic strategy for accessing customer markets, and will have a considerable impact on revenue, cost, and level of service. These decisions should be determined by an optimization routine that considers production costs, taxes, duties and duty drawback, tariffs, local content, distribution costs, production limitations, etc. Although location decisions are primarily strategic, they also have implications on an operational level.

Operations Decision : The operations decisions involve the following areas :

- 1. Demand Forecasting,**
- 2. Procurement Planning & Control,**
- 3. Production Planning & Control,**
- 4. Distribution Planning & Control,**
- 5. Inventory Management,**
- 6. Customer Order Processing,**
- 7. Relationship Management with partners in the Chain**

Production Decisions

The strategic decisions include what products to produce, and which plants to produce them in, allocation of suppliers to plants, plants to DC's, and DC's to customer markets. These decisions have a big impact on the revenues, costs and customer service levels of the firm. These decisions assume the existence of the facilities, but determine the exact path(s) through which a product flows to and from these facilities. Another critical issue is the capacity of the manufacturing facilities--and this largely depends the degree of vertical integration within the firm. Operational decisions focus on detailed production scheduling. These decisions include the construction of the master production schedules, scheduling production on machines, and equipment maintenance. Other considerations include workload balancing, and quality control measures at a production facility.

Inventory Decisions

These refer to means by which inventories are managed. Inventories exist at every stage of the supply chain as either raw materials, semi-finished or finished goods. They can also be in-process between locations. Their primary purpose to buffer against any uncertainty that might exist in the supply chain. Since holding of inventories can cost anywhere between 20 to 40 percent of their value, their efficient management is critical in supply chain operations. It is strategic in the sense that top management sets goals. However, most researchers have approached the management of inventory from an operational perspective. These include

deployment strategies (push versus pull), control policies --- the determination of the optimal levels of order quantities and reorder points, and setting safety stock levels, at each stocking location. These levels are critical, since they are primary determinants of customer service levels.

Transportation Decisions

The mode choice aspect of these decisions are the more strategic ones. These are closely linked to the inventory decisions, since the best choice of mode is often found by trading-off the cost of using the particular mode of transport with the indirect cost of inventory associated with that mode. While air shipments may be fast, reliable, and warrant lesser safety stocks, they are expensive. Meanwhile shipping by sea or rail may be much cheaper, but they necessitate holding relatively large amounts of inventory to buffer against the inherent uncertainty associated with them. Therefore customer service levels, and geographic location play vital roles in such decisions. Since transportation is more than 30 percent of the logistics costs, operating efficiently makes good economic sense. Shipment sizes (consolidated bulk shipments versus Lot-for-Lot), routing and scheduling of equipment are key in effective management of the firm's transport strategy.

There are various available choices for modes of transportations, viz. Rail, Road, Water, Air and Pipeline.

The particular type of transportation has got its merits and demerits and their performance compared on the following performance measures :

- Freight Cost,
- Lot Size,
- Delivery Time,
- Delivery Time Variability,
- Losses & Damages.

GLOBAL SUPPLY CHAIN ISSUES :

Supply chain in a global environment must be flexible enough to react to sudden changes in parts availability, distribution or shipping channels, import duties and currency rates, able to use the latest computer and transmission technologies to manage the shipment of parts in and finished products out, staffed with local specialists to handle duties, trade, freight, customs and political issues.

Supply Chain Modeling Approaches

Clearly, each of the above two levels of decisions require a different perspective. The strategic decisions are, for the most part, global or "all encompassing" in that they try to integrate various aspects of the supply chain. Consequently, the models that describe these decisions are huge, and require a considerable amount of data. Often due to the enormity of data requirements, and the broad scope of decisions, these models provide approximate solutions to the decisions they describe. The operational decisions, meanwhile, address the day to day operation of the supply chain. Therefore the models that describe them are often very specific in nature. Due to their narrow perspective, these models often consider great detail and provide very good, if not optimal, solutions to the operational decisions.

To facilitate a concise review of the literature, and at the same time attempting to accommodate the above polarity in modeling, we divide the modeling approaches into three areas --- Network Design, "Rough Cut" methods, and simulation based methods. The network design methods, for the most part, provide normative models for the more strategic decisions. These models typically cover the four major decision areas described earlier, and focus more on the design aspect of the supply chain; the establishment of the network and the associated flows on them. "Rough cut" methods, on the other hand, give guiding policies for the operational decisions. These models typically assume a "single site" (i.e., ignore the network) and add supply chain characteristics to it, such as explicitly considering the site's relation to the others in the network. Simulation methods is a method by which a comprehensive supply chain model can be analyzed, considering both strategic and operational elements. However, as with all simulation models, one can only evaluate the effectiveness of a pre-specified policy rather than develop new ones. It is the traditional question of "What If?" versus "What's Best".

Suppliers form the starting point of integrated supply chain management. Hence their role and responsibilities in achieving the ultimate objectives of the supply chain becomes extremely significant. The organization should ensure that the suppliers carry the same understanding of the customer requirements and accord the same amount of customer responsiveness to the organization as organization accords to its own customers and end users. The only way supplier can achieve this is by being as close as possible to customers. The organizations should also provide necessary resources and inputs so that supplier is able to work as an extended arm of the organization within the integrated supply chain.

Restructuring of Supply Chain Management

For restructuring of supply chain managements, undernoted steps of immense importance :

1. Integrating purchasing into total operations of the organization,
2. Developing purchasing professionals into knowledge specialists,
3. Reaping the benefits of e-procurement,
4. Ensuring supplier involvement,
5. Ensuring Cost Effectiveness,

Three Important Element of Supply Chain Strategy:

The three key elements of this supply chain management strategy are:

- Cycle-time management
- Relationship management.
- Sustainability.

Problems & Risks

The various problems coming in way in case supply chains are discussed below :

1. Supply Disruption

Supply Chain disruption poses technical or behavioral problems for manufacturers. Since there are strong connections among components of the Supply Chain itself, the effect of a Supply Chain disruption will have differing levels of impact on each element of the Supply Chain. If the interruption cannot be addressed immediately, it will lead to some malfunctions of manufacturing activities. Interruptions take place at any stage of the chain will eventually affect the distribution function. Specially tier1 and tier 2 suppliers has bad impact on overall business and market reputation like :

First, the market position of the manufacturer who suffers from the disruption risk will change due to the loss of market share and inventory. Secondly, the economic value to customer (EVC) of the manufacturer's product might be reduced due to attacks of competitors.

2. Information Integrity

As e-commerce increasingly becomes a crucial tool for information sharing and SC integration a major problem for any organizations is the risk that information becomes, inaccurate, incomplete and unsynchronized. Wrong information flow between different links of

a Supply Chain can lead to following problems:

- **A products resource consumption**
- **The effectiveness of deployed capital;**
- **The economic contributions of entities within the Supply Chain,**

There are various ways in which a particular supplier or customer can be integrated in supply chain by:

- **CPFR (Collaborative Planning, Forecasting and Replenishment)**
- **Web/Classical EDI**

3. Planning Supply and Demand

Forecasting and adapting to changes in demand and supply is applicable to the entire Supply Chain affecting upstream, manufacturing and downstream processes and arises from factors within and external to the organization. Manufacturing firms are often departmentalized into ‘functional silos’ resulting in a lack of collaboration, information flows and accountability among internal functions which in turn distorts effective decision making. The result is material and product shortages, excessive on- hand inventories, lack of labor utilization and on time delivery issues. Externally, lack of Supply Chain agility affects the ability of firms to respond rapidly to unpredictable changes in demand and supply. Supply Chain agility has two aspects – visibility and velocity, both of which prevent the firm from gauging the demand for its products which in turn manifests errors in forecasting supply of raw materials Most manufacturers that fail to achieve sufficient visibility don’t have a clear view of upstream, production and downstream inventories not only because of the lack of internal communications mentioned above, but also a lack of integration between suppliers and customers. The lack of visibility and velocity results in the bullwhip effect. Even a small amount of unplanned demand from any one customer oscillates back through the Supply Chain often resulting in costly disturbances to manufacturers who need to quickly acquire and process more raw materials and reschedule production which negatively resounds on business performance through excess inventories, overtime expenses and shipping costs.

4. Lack of Standardization and IT Support

Lack of standardization leads to abrupt stoppage of entire system. In manufacturing industry, to achieve the final objective either they do not define process flow properly or they overrule it. Standardization provides an economical and effective method of ensuring that information exchanged within the Supply Chain is communicated with consistency. It also creates a prevention mechanism for misinterpreting information and can identify when data is

entered incorrectly. Embracement of new technology enables automation to Supply Chain activities and eliminates the need for manual processes. The cultural bias toward current system and processes caused by IT illiteracy and acting an impediment for choosing the next information system. The continuing pursuit to an efficient and effective Supply Chain is not without its set-backs and obstacles.

There are a range of problems which are prevailing in Supply Chain and can be summarized as supply disruption, information integrity, planning supply and demand, regulatory compliance, several suppliers, global outsourcing , standardization of information format, embracement of new technology, organizational leadership, Supply Chain and value reengineering and risk management culture. Before presenting any solutions an Supply Chain manager should heed the social ramifications which each solution presents. The matter of bargaining power wielded by large suppliers over smaller participants can breed conflicts of interest within the Supply Chain and disengage entities from working towards a unified goal. Moreover the conflict between the human relation schools and management accounting regarding whether control mechanisms play a productive role within the organization still remains unresolved. In addition, global outsourcing solutions breed process inefficiency through extended lead-times. The Supply Chain manager must therefore use sound judgment and knowledge in deciding which solution will best suite both the organization and the supply chain.

The various risk factors involved in the process of global supply chain management include impact of currency fluctuations, socio – economic, political and cultural dimensions and these issues are important to be taken into account while managing the risks and supply chain disruptions. All supply chain carry some degree of risk. The global dimension introduces three forms of risks into the supply chain structure : political, capital and foreign risks. This is in addition to the normal hazards of capital investment.

Political risk requires assessment of host government stability, foreign policies and trade relations. The degree of risk can range from minimal to extreme.

Exchange risk affects both investment decisions and operations (Lessard & Lightstone 1986). This risk is measured by the real exchange rates : the normal exchange rates less the difference in inflation rates between countries. Exchange rates have become volatile, leading to the strategies to reduce this risk. One strategy would carefully select manufacturing sites to avoid unnecessary exposure. A multiple strategy may also be useful, recognising that there may be trade-off between economies of scale in manufacturing through smaller plants and the ability to hedge this risk through diversified location.

Locating a factory or workplace in a given country creates operating exposure : changes in the exchange value of assets and liabilities. It locks in the prevailing exchange relationships. With the volatility of currency exchange in current markets, a potentially profitable decision can suddenly become unprofitable, despite unchanged markets or relative factor costs in the host country.

In the context of facility location, global corporation can hedge risk by locating plants in different areas of the world in order to balance swings in the exchange rate. The presence of exchange risk suggests another role for logistics in the supply chain in planning flexible supply networks. Logistics management establishes networks between facilities, some actively used and the others on standby status. Once the arrangements are in place, they can be activated or discontinued as exchange rate fluctuates, depending on the profitability of the product movement. Sourcing and production would take place in countries with undervalued currencies. As exchange rates fluctuate, the flexible plan will switch these locations as necessary to keep operating costs low.

Operating risk is the hazard of doing business against competitors who source, produce or sell in other currencies. It extends beyond contractual terms to include all revenues, costs and profits. It affects exporters, firms that source overseas and those that produce in other countries. It may even affect wholly domestic firms in both sourcing and sales who compete with firms from other countries solely in domestic market. The risk comes from the relative differences in prices between competitors, costs of operation and profits. Solution to this problem are fairly obvious : sourcing in those countries, countering with increase productivity or providing other offsetting advantages such as flexibility.

These risk factors and the ways of their mitigation are discussed as under :-

1. **IMPACT OF CURRENCY FLUCTUATIONS** : Due to the globalization and liberalization in the economy, there has been vast fluctuations in the exchange rates of various currencies, specially the US Dollars which has caused the operators huge losses. This risk can be mitigated through hedging and prudent handling of operations.
2. **SOCIO – ECONOMIC IMPACTS** : The various forces operating in the country on socio – economic front makes the operations under supply chain management tedious and the operators have to suffer huge losses on this count. This risk could be mitigated by having adequate knowledge about the customs and human life styles in both the countries.

3. **POLITICAL RISKS** : The political movements in the countries have made havocs and turmoil in the economic fields. The instability in the political system causes the uncertainty in the countries and the supply chain management can not remain unaffected with it. The operators need to have adequate knowledge of the political situations prevailing in the countries of their operations.

The various categories of risks and the drivers of risk are given as under :

CATEGORY OF RISKS

DRIVERS OF RISKS

Disruptions

Natural Disaster,
Labour Disputes,
Supplier's Bankruptcy,
War & Terrorism,
Dependence on a single source of supply as well as capacity & responsiveness of the alternate supplier,

Delays

High capacity utilization of supply source,
Inflexibility of supply source,
Poor quality or yield at supply source,
Excessive handling due to border crossing or change to transportation modes,

Systems

Information infrastructure breakdown,
System integration or extensive system networking,
E-commerce.

Forecast

Inaccurate forecasts due to long lead times, seasonality, product variety, short life cycle, small customer base,
"Bull –whip Effect" or information distortions due to sales promotions, incentives, lack of supply chain visibility and exaggeration in demand in times of product shortage.

Intellectual Property

Vertical integration of supply chain,
Global outsourcing and markets.

Procurement

Exchange rate risk,
Percentage of a key component or raw material procured from a single source,
Industry wide capacity utilisation,
Long term versus short term contracts.

Receivables

Number of customers,
Financial strength of customers.

Inventory

Rate of product obsolescence,
Inventory holding cost,
Product,
Demand and supply uncertainty.

Capacity

Cost of capacity,
Capacity flexibility.

CONCLUSION:

A supply chain is a network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

As global supply chain management usually involves a plethora of countries, it also usually comes with matching number of difficulties which need to be dealt with appropriately.

One, that companies need to consider the overall costs. While local labour costs may be significantly lower, companies must also focus on the costs of space, tariffs and expenses related to doing business outside country and additionally, companies need to factor in the exchange rate. Obviously, the companies need to make research and give serious consideration to all these factors as part of their strategy to their global supply chain management approach.

Time is a also an issue which needs to be addressed while dealing with the issue. The productivity of overseas employees and the extended shipping time can either positively or negatively affect the company's lead time but either way, it needs to be figured into the overall procurement plan. The weather conditions and also the delays in customer clearance time play an important role.

The company resorting to global supply chain management must also evolve the overall outsourcing plan and selection of suppliers and take decision on the number of these suppliers.

Finally, the companies which choose to ship their manufacturing overseas, may should also be considered while taking a decision for resorting to global chain management. A proper and pertinent decision in this regard not only reduces the employee costs but also overall shipping and tariff expenses to a great extent resulting in cost cutting.

