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TO DISCUSS THE EFFECT OF SUPPLIERS' INVOLVEMENT, OPERATIONAL CAPABILITIES & SOURCING PRACTICES ON SUPPLY CHAIN FLEXIBILITY

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ABSTRACT

The global marketplace has become increasingly competitive in recent times and organizations are faced with the challenge of effecting continuous improvement in services for sustained user satisfaction. Today's companies are forced into functioning in a challenging business world with extensive uncertainties. The role of supply chain flexibility (SCF) has become increasingly important for firms in highly competitive markets, and also in economic downturns. A well-synchronized supply chain process is difficult to replicate for competitors since it becomes more difficult to compete on product level. Globalization and liberalization in the market place are important drivers for the growing competition together with the changing demand of the consumer. A shift arose from a more technology-oriented view (in the past) towards a point in time where collaboration and trust become important along the partners in the supply chain. Effective management of relationships in supply chain management is a necessity in order to withstand competitive pressures and economic downturns. Hence, as the importance of Supply Chain Flexibility is increasing day by day in global business market place, it is more essential to understand and stimulate various parameters having an impact on the enhancement of level of flexibility in supply chain. Various factors like suppliers' involvement, sourcing practices and operational capabilities are demonstrated and their consequence on supply chain flexibility has been formulated.

KEYWORDS

Supply Chain Flexibility, Operational Capabilities, Sourcing Practices, Suppliers' Involvement.

1. INTRODUCTION

Fierce competition in today's global markets, the introduction of products with shorter life cycles, and the heightened expectations of customers have forced business enterprises to invest in, and focus attention on, their supply chains. This, together with continuing advances in communications and transportation technologies (e.g., mobile communication, Internet, and overnight delivery), has motivated the continuous evolution of the supply chain and of the techniques to manage it effectively. Currently, changes in the environment (socio-political, changing demand etc.) are the cause for increasing uncertainty in the market place, (Kumar et. al., 2006). In order to deal with this, flexibility in the supply chain becomes more and more important. High volatility, massive swings in customer demand, and challenges in ensuring sufficient supply are the current reality for global supply chain executives, making supply chain flexibility the new imperative for growing company revenues while keeping supply chain costs under control, (Beach et. al., 2000). Supply chain flexibility is applied by companies across the globe due to its demonstrated results such as delivery time reduction, improved financial performance, greater customer satisfaction, building trust among suppliers, and others, (Henry et. al., 2008).

Supply Chain Flexibility is described as a series of units that transform raw materials into finished products and deliver the product to the customers. This is a typical 'push' approach, pushing the raw materials into the next processes of the chain, towards the end market, (Cua et. al., 2006). Supply chain flexibility is more holistically defined as managing business activities and relationships within an organization, with immediate suppliers, with first and second tier suppliers and customers along the supply chain. According to (Kumar et. al., 2006), 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.

To achieve the level of flexibility that adds value to the customers, supply chain organizations must look beyond manufacturing flexibility. From the perspective of filling customer orders, no single part of the value chain working alone can significantly reduce customer lead-time, (Cua et. al., 2006). Only cross-functional and cross-company efforts to increase flexibility and eliminate uncertainties can create the level of performance needed to create competitive advantage. By the early 1990s, business communities realized the importance of creating an alliance with their upstream and downstream activities. Today many firms have taken bold steps to break down both inter- and intra-firm barriers to form alliances, with the objective of reducing uncertainty and enhancing control of supply and distribution channels, (Hussain et. al., 2010). This concept is known as supply chain management. Moreover, according to (Fisher et. al., 1997), SCM is known the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole. Hence, Supply Chain Management is the coordination of production, inventory, location, and transportation among the participants in a supply chain to achieve the best mix of responsiveness and efficiency for the market being served (Fisher et. al., 1997).

2. LITERATURE REVIEW

In modern organizational/corporate management, the area of Supply Chain Management (SCM) has been considered as a competitive strategy for integrating suppliers and customers with the objective of improving responsiveness and flexibility of manufacturing/service organizations. The optimal design of a supply chain is therefore a crucial issue of SCM researchers and practitioners. An effective supply chain policy can reduce average holding inventory level as well as expected cost (Fisher et. al., 1997). Significant advances have recently been made in the theory and in applications under the drive of the inevitable prevailing

trend of globalization and today's competitive knowledge-based economy. Hence considering all the available databases, three factors have been selected which acts as the three pillars of a supply chain and on which the core research work is based. They are as following:

1. Suppliers Involvement
2. Operational Capabilities
3. Sourcing Practices

2.1 SUPPLIERS' INVOLVEMENT

The modern economical environment is gaining far reaching complexity and competition. Companies of all sectors are facing continuous changes in the market forces due to the liberalization of trade and the impact of new communication means, improved logistics services and electronic banking systems, and other factors, that have lead to a clear increase in global competition. Organizations had to rethink their way of doing business, based solely on their internal resources toward a more dynamic strategy, benefiting from their internal improved operations and closer communication with their business partners to overcome those challenges, (Simona Daniela Grigore, 2007). The modern information technology is making traditional borders obsolete. Not only between nations, but especially between organizations, creating a "global village". This phenomenon has created a new business environment in which companies compete no longer as a single legal entity, but as supply chains.

Consequently, supply chain management and purchasing performance are increasingly recognized as an important determinant of a firm's competitiveness. Therefore, in order to support the great variety of product and services purchasing processes and to integrate different business partners in an electronic network. Supplier relationship management systems were developed to coordinate and automate the process concerned with the supplier integration and communication, (Wolffried Stucky et. al., 2007). Supplier Relationship Management (SRM) is defined as a set of methodologies and practices needed for interacting with suppliers of products and services of varied criticality to the profitability of the enterprise, (Ferrie et. al., 2008), SRM is a means of building closer relationships with selected strategic suppliers, the purpose being to discover the added features that could enhance the relationship while improving business performance as the firms work in a network environment for mutual benefit and increase the likelihood of creating profitable new revenues together, (Wagner and Hoegl, 2006).

2.2 OPERATIONAL CAPABILITIES

Globalization has had a major impact on manufacturing, both locally and internationally. With the globalization broadening the marketplace and increasing competition, customers are placing greater demands on manufacturers to increase quality, serviceability, and flexibility while maintaining competitive costs. In order to survive in the fierce international competition of delivering quality products at lower cost, numerous manufacturers around the world have vigorously pursued programs like statistical quality control, just-in-time production, worker training, flexible manufacturing systems, design for manufacture, materials requirements planning, and many others, (Ferrie et. al., 2007).

Operational Capability is defined as the quality of being capable; to have the capacity or ability to do something, achieve specific effects or declared goals and objectives. Operational capability is the ability to align critical processes, resources and technologies according to the overall guiding vision and customer focused value propositions coupled with the ability to deliver these processes effectively and efficiently. Indicators of operational capability include process management and performance measurement. Operational capabilities revolve around the design, leadership and control of the productive assets/resources of the enterprise, which includes both people and technology and synchronizes with business strategy. Operational Capability (OC) is the business function that plans, organizes, coordinates, and controls the resources needed to produce a company's goods and services, (Spina et. al., 2002). It is a management function. It involves managing people, equipment, technology, information, and many other resources. Operational Capability is the central core function of every company. This is true whether the company is large or small, provides a physical good or a service. Every company has the capability to perform operations. Actually, all the other organizational functions are there primarily to support the operations function. Without operations, there would be no goods or services to sell, (Twig, 1998).

2.3 SOURCING PRACTICES

Sourcing and Procurement has become a critical area for companies implementing cost-cutting measures. Core procurement processes and strategic business areas have emerged as key focus areas to drive cost savings. Several companies are outsourcing tactical Sourcing and Procurement processes to third-party vendors. Outsourcing of activities traditionally performed internally by firms to third party partners has become increasingly important in recent years. While in the past outsourcing was primarily relegated to the procurement of non-core components and services, today the outsourcing trend has expanded to include virtually every activity of a firm, including core and non-core components, business processes, information technology processes, manufacturing and distribution activities, and customer support activities, (Venkatesan, 1992). Today's hyper-competitive environment, characterized by constant change, market unpredictability, and the pressure to reduce costs and cycle times, coupled with the globalization trend, has provided further impetus to the growth of outsourcing, (Venkatesan, 1992). It is also evident that manufacturing firms are now outsourcing functions and processes across the supply chain, including research and design, product development, product component manufacturing, product final assembly and distribution and logistics functions, (Petroni and Braglia, 2000). The growth of outsourcing has led outsourcing strategies to become an increasingly important component of firm's success, (Srinivas and Narasimhan, 2004).

3. RESEARCH METHODOLOGY

- a) The thesis work has been carried out in the medium scale manufacturing organizations in the north region of country (India) in order to study the impact of suppliers' involvement, operational capabilities and sourcing practices on the level of flexibility on supply chain of an organization.
- b) The report moves toward describing some new aspects of supply chain which have valuable brunt on the enrichment of flexibility for the transformation of raw materials into consumer goods.
- c) For effectively conducting the survey, the outlook of the manufacturing organizations regarding the requirement of supply chain flexibility has been explored through plant visits, interviews/discussions with managers and workers, and close analysis of the competitive advantages is done which is attained by manufacturing organizations having high level of flexibility in supply chain.
- d) To evaluate the level of flexibility in supply chain in northern region Indian manufacturing industries, a questionnaire has been specially designed and the questionnaire has mailed to industries on the lookout for response and statistical analysis of data collected through questionnaire has been done to check the height of competitive advantage attained by manufacturing organizations having high level of supply chain flexibility.
- e) In the questionnaire on SCF the inputs categories deal with the Executive Paradigms towards the enhancement of supply chain flexibility and other management related issues, while the output categories deal with the Flexibility Indicators of which signify the level of flexibility inside an organization.

4. ANALYSIS OF DATA

A suitable and optimal questionnaire is the back-bone of this entire dissertation process. Hence after designing a suitable questionnaire covering all the possible aspects relating with supply chain flexibility, it was necessary to make sure that the results obtained from those questionnaires must be accurate and suitable enough to study their impact on the flexibility of a supply chain. Hence after receiving back the questionnaires from the respondents, those answers are represented in the form of graph and compared with Likert Scale, in order to check weather our selected parameters pose any impact on the level of supply chain flexibility in an organization or not. The data collected through the questionnaire has been critically analyzed to evaluate the impact of suppliers' involvement, operational capabilities and sourcing practices on supply chain flexibility. The questionnaire has been divided into two parts, namely Executive paradigms and Flexibility Indicators. The following Inputs and Outputs have been deployed in the study:

TABLE 1: INPUTS AND OUTPUTS DEPLOYED IN THE STUDY

Inputs Variables (Executive Paradigms)	Output Variables (Flexibility Indicators)
Competitive Priorities (X1)	Supply Flexibility (Y1)
Operational Capabilities (X2)	Demand Flexibility (Y2)
Program Capabilities (X3)	Sourcing Practices (Y3)
Suppliers Involvement (X4)	

So the values of both these parameters have compared with Likert scale and the results are shown in the form of graphs.

Fig 1 depicts relation between Executive Paradigms consist of four parameters, namely Suppliers' Involvement, Program Capabilities, Operational Capabilities and Competitive Priorities. The value of these four parameters taken out of the questionnaire has compared with Likert Scale. Likert scale has five values offering the respondent to fill the most suitable answer to a particular question. Hence after calculating those values, most of the values lie towards the favorable options. Therefore, considering the results obtained from the graph, Competitive Priorities (3.5), Operational Capabilities (3.4), Program Flexibility (3.3) and Suppliers Involvement (3.6) have values ranging between Neutral and Agree scale, which is an optimal solution.

FIGURE 1: RELATIONSHIP BETWEEN EXECUTIVE PARADIGMS AND LIKERT SCALE

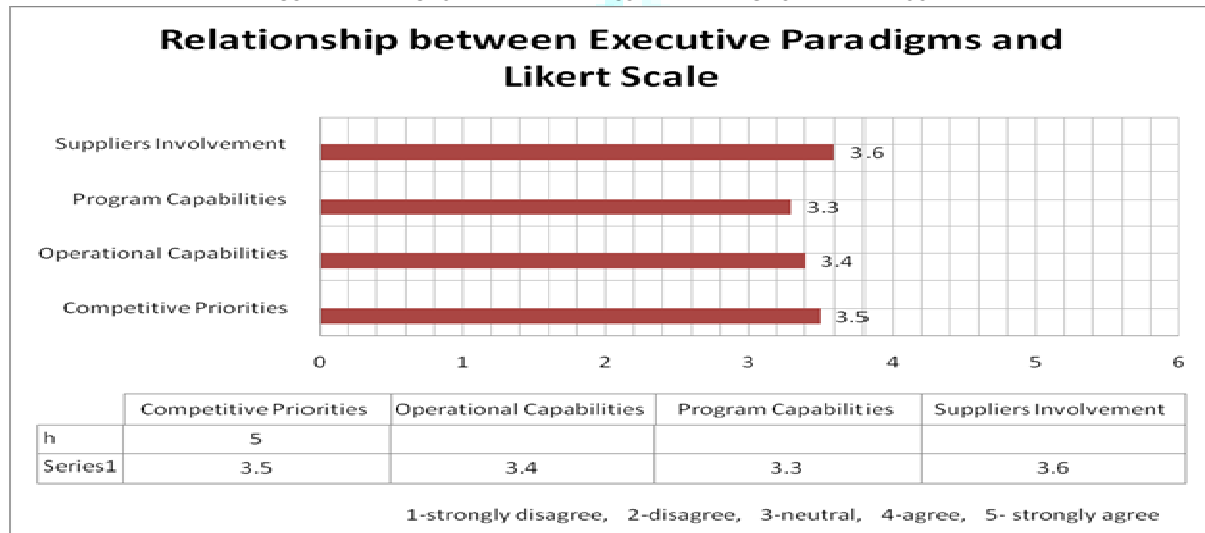


Figure 4.1.2, represents the relation between Flexibility Indicators and Likert scale. Supply Flexibility (3.5), Demand Flexibility (3.6) and Sourcing Practices (3.6) have value ranging between neutral and agree scale resulting in an optimum solution.

FIGURE 2: RELATIONSHIP BETWEEN FLEXIBILITY INDICATORS AND LIKERT SCALE

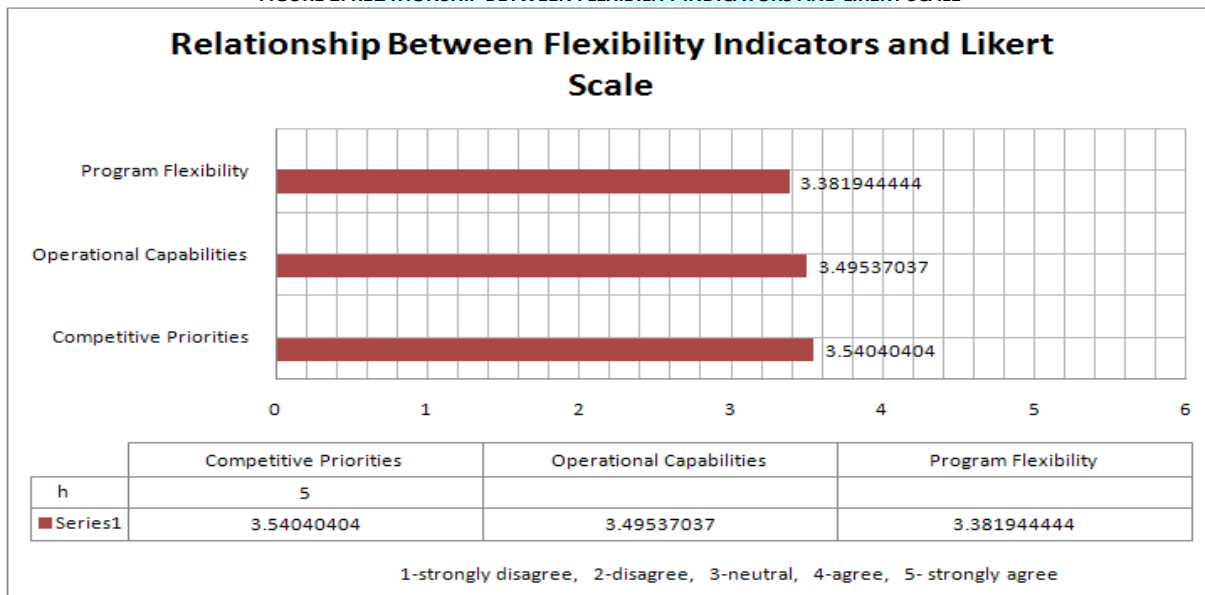
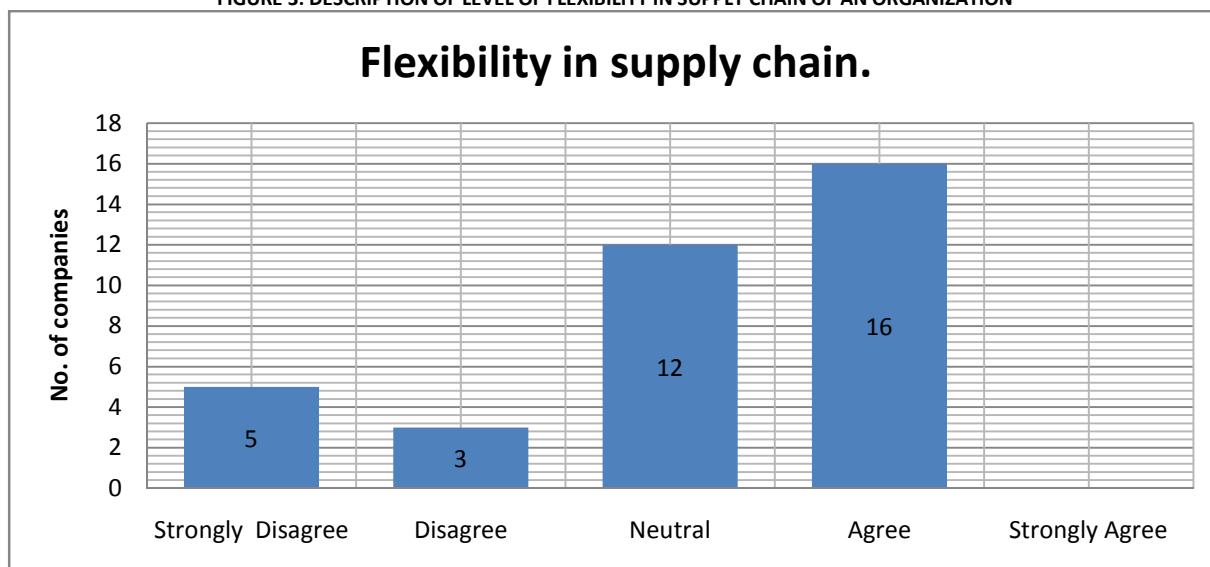


Figure 3 depicts the presence of flexibility in supply chains in various organizations. The data reveals that 5 out of 36 surveyed organizations strongly disagree with the presence of flexibility in supply chain, 3 out of 36 organizations disagree with any relationship with flexibility in their supply chain. On the other hand 12 out of 36 stands neutral on this issue and quite notably 16 out of 36 agrees with the presence of flexibility in their supply chains. Hence more organizations are shifting their base in achieving a high level of flexibility in their organizations because this is a necessity in this ever changing business dynamics.

FIGURE 3: DESCRIPTION OF LEVEL OF FLEXIBILITY IN SUPPLY CHAIN OF AN ORGANIZATION



4.1 VALIDATION OF DATA OBTAINED FROM RESPONDENTS TO QUESTIONNAIRE

Cronbach's alpha is a coefficient of reliability. It is commonly used as a measure of the internal consistency or reliability of a psychometric test score for a sample of examinees. The Cronbach's alpha for various categories of inputs and outputs has been evaluated to ascertain the reliability of the input data (Table 1) and output data (Table 2).

TABLE 2: CRONBACH'S ALPHA FOR INPUT CATEGORIES (EXECUTIVE PARADIGMS)

Category	X1	X2	X3	X4
Cronbach's alpha	.654	.646	.664	.511

TABLE 3: CRONBACH'S ALPHA FOR OUTPUT CATEGORIES (FLEXIBILITY INDICATORS)

Category	Y1	Y2	Y3
Cronbach's alpha	.824	.747	.759

The Pearson correlation coefficient is a measure of the strength of a linear association between two variables and is denoted by r. Pearson product correlation attempts to draw a line of best fit through the data of two variables. The Pearson's Correlation coefficient 'r' between executive paradigms and flexibility indicators has also been computed to study the contributions of specific executive paradigms to achieve the desired level of flexibility of supply chain to attain competitive advantage.

TABLE 4: PEARSON'S CORRELATION 'R' BETWEEN EXECUTIVE PARADIGMS AND FLEXIBILITY INDICATORS

	Y1	Y2	Y3
X1	0.653673	0.625379	0.368349
X2	0.608299	0.528712	0.47929
X3	0.754562	0.663655	0.542198
X4	0.53575	0.575345	0.336643

In order to achieve critical success factors for achieving results, the significant correlations thus obtained as a result of Pearson's Correlation are validated through 'Multiple Regression Analysis'. The general purpose of multiple regressions is to learn more about the relationship between several independent variables and a dependent variable.

TABLE 5: RESULTS OF MULTIPLE REGRESSION ANALYSIS BETWEEN EXECUTIVE PARADIGMS AND FLEXIBILITY INDICATORS

Performance Parameter	Significance Factor	Beta Value β	t Value	Significance (p Value)	R Value	F Value
Y1	X3	0.687111	6.704694	<0.0001	0.816343	32.96282
	X1	0.50565	3.098545	0.003958		
Y2	X3	0.67029	5.173186	<0.0001	0.74239	20.26005
	X1	0.598987	2.852897	0.007424		
Y3	X3	0.582207	3.7626	0.000636	0.542198	14.15716

It has been observed that Supply Flexibility (Y1) is closely associated with Competitive Priorities of an organization (X1); and Program Capabilities (X3) for the optimal enhancement of level of flexibility of an organization. The Demand Flexibility (Y2) is closely associated with Competitive Priorities of an organization (X1); and Program Capabilities (X3). Demand Flexibility can be achieved by streamlining the production facilities, improvements in equipment reliability, ensuring better upkeep of the production facilities, ensuring zero defects. Hence additional initiatives in operational capabilities of manufacturing can contribute towards quality enhancements by eliminating deteriorations in production systems, thereby improving the manufacturing performance even beyond design capability in many instances. The adoption of Sourcing Practices (Y3) has exhibited significant linkage with competitive priorities of an organization (X1). Sourcing and Procurement has become a critical area for companies implementing cost-cutting measures. Core procurement processes and strategic business areas have emerged as key focus areas to drive cost savings. Several companies are outsourcing tactical Sourcing and Procurement processes to third-party vendors. Outsourcing of activities traditionally performed internally by firms to third party partners has become increasingly important in recent years.

5. CONCLUSION

The research provides an empirical evidence of a strong relationship between executive paradigms and flexibility indicators. The critical examination of the Pearson's correlations results clearly portray that executive paradigms taken by an organization have significant impact on the supply chain flexibility in the organizations and moreover it tends to enhance the level of flexibility in supply chain. Depending upon the factors selected to check their impact on level of supply chain flexibility inside an organization, it has been clearly and well coordinately interpreted that the selected factors i.e. Suppliers' Involvement, Operational Capabilities and Sourcing Practices, leads toward the enhancement of supply chain flexibility in an organization. Suppliers' Involvement simplifies various critical elements in reaping the potential benefits of giving suppliers a greater involvement in product development and design, Sourcing Practices helps

the organizations to differentiate between developing their own facilities, technologies and staff or hiring some professionals from the outside organization, so that after competing the task, those professionals are not anymore an organizations responsibility. And Last but not the least; operational capabilities assist an organization to design a suitable layout for manufacturing a product in order to attain a best possible optimal solution.

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