

A STUDY ON “IMPACT OF SUPPLY CHAIN MANAGEMENT ON PROBLEMS FACED AND PROSPECTS OF EMPLOYEES IN FREIGHT LOGISTICS COMPANIES”

Submitted in partial fulfillment of the requirements for the award of

MASTER OF BUSINESS ADMINISTRATION

by

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SCHOOL OF MANAGEMENT STUDIES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

**Accredited with Grade “A” by NAAC I 12B Status by UGC I Approved by AICTE
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119**

NOVEMBER 2022



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BONAFIDE CERTIFICATE

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ON PROBLEMS FACED AND PROSPECTS OF EMPLOYEES IN FREIGHT
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Submitted for Viva-voce Examination held on 05/05/2023
Under my supervision from September 2022 to October 2022.

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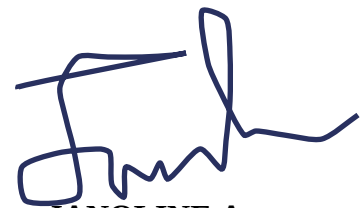
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DECLARATION

I **JANOLINE.A (41410132)** hereby declare that the Project Report entitled “**IMPACT OF SUPPLY CHAIN MANAGEMENT ON PROBLEMS FACED AND PROSPECTS OF EMPLOYEES IN FREIGHT LOGISTICS COMPANIES**”

done by me under the guidance of **DR.S.UMAMAHESHWARI** is submitted in partial fulfillment of the requirements for the award of Master of Business Administration degree.

PLACE: Chennai
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ABSTRACT

The term “Supply Chain Management” was coined in 1982 by Keith Oliver of Booz, Allen and Hamilton Inc. But the discipline and practice has been in existence for centuries.

The terms Logistics and Supply Chain Management are used interchangeably these days, but there is a subtle difference that exists between the two.

‘Logistics’ has a military origin, and used to be associated with the movement of troops and their supplies in the battlefield. But like so many other technologies and terminologies, it entered into the business lexicon gradually and has now become synonymous with the set of activities ranging from procurement of raw materials, to the delivery of the final polished good to the end consumer.

In a typical business scenario, many organizations work in tandem (knowingly or unknowingly) to get the final product in hand of the end consumer. The supply chain is a network of these organizations that coalesce with each other (downstream or upstream) to make the final shipment successful.

A group of farmers, a cotton mill, a designer and a tailor is the least number of stakeholders you can expect from a regular shirt you wear every day.

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INTRODUCTION

CHAPTER-1

1.1.INTRODUCTION

Competitive pressure has led to rethinking of the traditional structures and ways of working of manufacturing companies. The system of purchasing, however, also has created new demands on the competence of the companies as well as the type and form of cooperation among the manufacturers and their parts suppliers. The parts suppliers are integrated into the product development and must be developed which ensure just-in-sequence delivery. The manufacturer obtains higher-quality, innovative products at lower prices and lower risk. The supplier benefits from an increased sales volume, a stable business relationship, and greater competitiveness. It generates numerous advantages for all these involved, especially related to costs, quality, delivery and development time (Ralf Landmann and others, 2001).

For Manufacturers and suppliers, there are various options available in Supply chain management factors, production and production planning, policies systems, procedures and methods. They are formulated at strategic level. The information is passed on to company level and ultimately to operating level at shop Door

The study is carried out in Manufacturing Industry with their T1 and T2 suppliers in Chennai, India. The areas of Manufacturing Industry are limited. The study examines various production planning factors practiced in supply chain management. It analyses production elements and their ranking. It examines the applications of identified and ranked production planning factors to meet the challenges of economic changes and to achieve business economic goals. It enables judicious allocation of resources available to the Manufacturing Industry.

The supply chain encompasses all activities associated with the flow and transportation of goods from the raw materials stage (extraction) through to the end user as well as the associated information flows. Materials and information flow both up and down the supply chain.

The Production Planning decides (after Aggregate Planning, MRP and MRP II) the movement of materials and value addition. Each component or group of components, beginning from raw material stage, undergo various production processes, sub-assemblies, assemblies at various stages and at places until it is delivered to the customer. The flow of information, materials/products/services and finance, from raw materials to customers, are being done through "Supply Chains. Supply chains take care of "Reverse Manufacturing activities also

Supply Chain Management is the integration of the activities of the supply chain through improved supply chain relationship to achieve a sustainable competitive advantage.

Supply chain Management has been a major component of competitive strategy to enhance organizational productivity and profitability. At strategic level, SCM is a rapidly

expanding discipline that is transforming the way manufacturing and non-manufacturing operations meet the needs of their customers. Development of cross-functional teams aligns, organizations with process oriented structure, which is much needed to realize a smooth flow of resources in a supply chain. Supply Chain Activities/Processes are explained in terms of "Plan, Source, Make/Assemble, Deliver". These activities are analyzed under Strategic Level, Tactical Level and Operational Level (Gunasekaran and others, 2004).

The topic which the researcher has chosen for the study is "Impact of Supply Chain Management on problems and prospects of Customers Service in Manufacturing Industry A study with reference to Chennai city". Types of operational supply chain strategies under this scope of research:

1. Purchasing and Inventory of Supply chain
2. ERP on Supply Chain
3. Influences of various human behaviours on Supply Chain
4. Logistics (transportation) with respect to customer service

The researcher has focused more on the manufacturing Industry. Amidst a lot of researches conducted under the purview of supply chain, the major drive that made the researcher choose this topic is because of the impact of this industry on GDP., The contribution of manufacturing sector to GDP is expected to raise from 1.8 per cent in 2005 to 12 per cent by the year 2015 of the GDP. As the government is working on taking proper measures to boost the production industry, India is likely to meet the projected target of US \$125 billion by 2014 and US \$400 billion by 2020 (ISA Vision Summit, 2010)

The researcher aims at customising the supply chain strategies for effective and efficient utilisation of available resources, which in turn reduces cost and maximises customer services.

Customising the supply chain strategies refers to the Mass Customization that requires an agile supply chain to function optimally. Supply chain agility is the extent of network- capability that the organization possesses. Key to the success of an agile supply chain is the speed and flexibility with which these activities can be accomplished and the realization that customer needs and customer-satisfaction are the very reasons for the network.

Customer satisfaction is paramount. Achieving this capability requires all physical (materials-movement) and logical events (Information flow) within the supply chain to be enacted swiftly, accurately, and effectively. The faster the information, and decisions-flow through an organization, the faster it can respond to customer needs.

Therefore the benefits of customising supply chain strategy are lowering supply chain costs and effective customer service.

Supply chain strategies define how the supply chain should operate in order to compete. It is an iterative process that evaluates the cost benefit trade-offs of operational components.

SCM Customization

Companies implement a customization-strategy when trying to gain a competitive advantage through a supply chain strategy, whereby they deliver a product or service, customized for a particular target market by, firstly, being able to detect trends in the market and, secondly, to quickly respond to a particular trend so that the product actually is available to the specific group of customers in a competitively reasonable space of time. The goal is to compete for a market using more than just price and compete by providing product specific value or service- experience itself.

SCM in Cost reduction and customer service

The aim of any manufacturing/services firm is to produce goods to meet the end-customer requirements. One of the key differentiators which influence a customer's buying-behaviour is the price of the product. This is especially true for a mass market like India, where volumes are more important. Another reason for this is the increasing maturity of many industries and the mass commoditization of products. In such a case, the product-price and on-time-delivery becomes a very critical factor. With the cut-throat competition and increasing input- prices, cost- reduction is a must to help maintain/increase margins. The competition is so intense that a small price-rise of a product might cause huge reduction in demand for that product. Secondly, there is always a push from the shareholders to maximize their return on investments.

As operations cost for a major part of the cost that goes into the product, supply chain- cost is the single most important area for cost-reduction. However supply chain cost-reduction needs to be followed with the customer in focus i.e. there should be no compromise on either the quality of the product or technology or customer-service. Also cost reduction has to be a continuous improvement programme rather than a one-time attempt, keeping in mind the ever demanding customers who want a better-quality- product at a lower price. Thus supply chain cost reduction is one of the most critical tasks facing the Indian companies. When the competition is no longer among individual companies but among entire supply chains, every area of end to-end cost reduction needs to be looked into.

Therefore, this research focuses on the subject of being able to be most cost-effective and do better customer services, by customising the supply chain strategies.

1.2.NEED FOR THE STUDY

Supply chain management (SCM) is the management of a network of inter-connected businesses involved in the ultimate provision of product and service- packages required by end-customers (Harland, 1996).

Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished-goods from the point of origin to the point of consumption (supply chain)

Another definition is provided by the APICS Dictionary when it defines SCM as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net-value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally."

This study aims at identifying the effects of Inventory, Information technology, Human behaviour and Logistics on Supply Chain performance and thereby evolving a better-customized process to reduce cost and improve customer- service. Supply chain being one of the cost-drivers in the overall business and any delta change in the efficiency will add to the bottom-line of the business. As the competition is very high nowadays, customer service becomes the prime focus.

The first and foremost reason for the researcher to choose this topic is to identify whether the customisation of supply chain-strategies has an impact on service levels to the customers and cost of operating.

Traditional supply chain management utilized traditional media and channels to link firms in linear, inefficient relationships. The advent of electronic commerce over the Internet has facilitated new relationships for connecting with new supply chain partners, thereby significantly increasing the quantity and quality of inter organizational information-flows. These information-flows are theoretically evaluated using the principles of information quality dimensions. In addition, a new breed of market makers, or information intermediaries, is defining new functional relationships between the different players. The direct channel between manufacturers for digital content providers) and consumers is enabling mass customization, and is influencing the demand forecasting and inventory management Functions. Mass customization is discussed in the context of both digital and physical goods, along with an analysis of information quality dimensions. Finally, the impact of these new supply chain information-flows on industries and macroeconomic conditions is discussed.

The Supply Chain Operations Reference (SCOR) model defined by Supply Chain Council is the major cross-industry standard for supply chain management (Supply Chain Council, 2005). The 1st level of SCOR describes the process types in supply chains. The Source - Make - Deliver processes of the companies are linked for successive steps in a supply chain.

In order to improve the customer service in an organization, it is important to understand who influences leaders and what has the biggest impact on developing leaders, impact of HR. With regard to logistics industry, many researchers have attempted an independent study on the project- oriented leaders, as the logistics- oriented aspects play a major role in this department. The researcher has undertaken a detailed study on the leadership-behaviour in the logistics and supply chain industry, at the level of Middle and

Top managers (those are empowered to decision-making) and how it creates an impact on organizational effectiveness

1.3.RESEARCH GAP

The Review of Literature identifies the gap in the Literature. There are few studies about the SCM implications in manufacturing Industry and supply chain management in India. The Literature covers only a part of the SCM and its implications over profitability of the company. A comprehensive list of all SCM Functions at Operating, tactical and Strategic Levels is not available. Most of the Literature studies are originated from developed countries. The marketing demand, systems, practices, procedures, standards, cultures and labour content and labour relations are different. Hence their suitability and adoptability are limited.

1.4.STATEMENT OF THE PROBLEM

This research will contribute significantly to the manufacturing industry, as that forms a significant portion in the GDP of India. Growth of GDP at healthy rate and robust growth-rate of manufacturing-sector has helped the Indian Supply Chain and logistics industry to reach at market size of \$125-130 billion. Since India spends around 13 per cent of its GDP on logistics, higher than USA (9.9 per cent), Europe (7.5 per cent) and Japan (11.4 per cent), there is a need to shift the emphasis to reducing costs and improving the efficiency of supply chain (Council of Supply Chain Management Professionals, 2011). Industry-wise, the effects of Customisation of Supply Chain on costs and customer service will become evident

A comprehensive list of production elements of SCM. benefits of SCM. problem in implementing SCM and impact of SCM factors are hardly available.

Identification of factors having better influences to meet the challenges of economic changes is to be done. For achieving the business economic goals, proper priority lists are to be prepared. These are useful to channelize the available resources. The study is required to address the requirements raised in the Research Question. The available literature has not thrown much light on the identified Research Question. To help the manufacturing Industry to sustain the economic challenges, there must be continuous studies on the following dimensions Providing comprehensive list of SCM planning and benefit factors.

- The problems in implementing the SCM and available resources to face the economic fluctuations.
- Identification of elements to achieve the effective supply chain management in production planning..

Hence, the present study is undertaken to fill the gaps in the existing literature and add to the quality of the functioning of the manufacturing Industry in its planning and execution of SCM to achieve the targeted goals.

1.5.OBJECTIVES OF THE STUDY

- To study the organizational details of executives responsible for SCM practices and the various elements of supply chain management practices
- To analyse supply chain systems and their benefits in the study domain
- To ascertain the problems in implementing the supply chain management in manufacturing companies
- To identify the impact of supply chain management organisational efficiency.
- To examine the influence of organisational details of respondents and various suitability of the SCM systems on benefits and problems in manufacturing sectors.
- To analyse the influence of benefits and problems of SCM on the manufacturing companies

1.6.SCOPE OF THE STUDY

The benefits of this can go to industries, especially the manufacturing companies at large, if the suggestions would get implemented. The researchers comes out with recommendations which are sustainable in the areas of Supply Chain with customized-strategies.

This study gives ample scope for the application of supply chain and logistics. The study also covers SCM supporting factors specific Customisation in ERP, Warehouse Management software (WMS). Transport Management Software(TMS), Human aspects in supply chain, Inventory planning and execution like Material requirement planning (MRP), JIT, Kanban etc. The supply chain also creates the scope on the following areas

- Optimum utilization of available resources will take place.
- Better customer service. Reduction of waste at various stages of supply chain.
- Increasing reputation in the market.
- Higher output and superior Turn Around Time (TAT) to market.

- Reduced overheads, and increased profitability.
- Enhanced communication and hence good team building
- Well-executed supply Chain strategy results in value creation for the organization.

1.7.LIMITATIONS

- 1) The Study is limited to manufacturers who operate in Chennai region for more than 15 years.
- 2) The manufacturing companies are located at a 50km radial distance with Chennai as central point. Hence co-ordination is difficult.
- 3) Many of the executives in Supply chain management area are hesitant to discuss about inventory, Business volume, employee welfare and their cooperation
- 4) Commercial vehicles, passenger cars are considered on the same platform.
- 5) The supply chain management, benefits and problems of implementing SCM factors are considered to exert the same influence on manufacturers and suppliers.
- 6) The suppliers supply items more than one Manufacturer at a time. Very few dedicated supply chains exist.

1.8.METHODOLOGY

In line with the research objectives, the following methodology is adopted. It is explained under six headings namely. Sources of data, Sample size, Questionnaire design. Scale development Pilot study and Data analysis and Statistical Tools companies in Chennai and their T1 and T2 suppliers. The secondary data is collected from books, journals and web sites etc.

SAMPLE SIZE

The respondents are selected from Production Planning and Supply Chain Management Departments of companies and suppliers. The population of manufacturing company is unknown. At the first stage 655 questionnaires are circulated to above said respondents by following convenient sampling method. Only 398 respondents returned their responses. Out of the 398, 17 responses are found to be incomplete and cannot be used for Research. The remaining 381 are completely filled and used for the Research. Hence the sample size of the Research is 381. Care is taken while selecting the respondents to see that the selected sample represents the universe.

1.9.QUESTIONNAIRE DESIGN

Since the study is based on both primary and secondary data, the researcher has obtained primary data through a well structured Questionnaire which is framed in the basis of the gaps in the literature. The Questionnaires (Research Instrument) comprises of six major parts.

The first part aims at ascertaining Organizational details of the executives of OEM, T1 and T2 suppliers and the remaining five parts are prepared to ascertain the managers and executives perception on supply chain Management Strategic Activities and effectiveness of supply chain on shop Floor production activities. The first part of the Questionnaire is purely given in the optional type so that the employees mark the suitable options.

The second part is the composition of elements of supply chain management Strategic activities and methods of supply chain management. It is designed to reveal the supply chain changes and respective business transformation. The researcher focuses on two economic situations, namely, economic upswing and economic recession. The third part of the Questionnaire focuses on different supply chain management system and benefits to OEMs, T1 and T2 suppliers. The system supporting supply chains are also ascertained on the basis of convenient and standard approach in the fourth part of the Questionnaire, the researcher ascertained and evaluated the complete benefits of SCM on shop floor production activities regarding Productivity of OEMs, TI and T2 suppliers. Except part 1, all the remaining three parts, consist of Likert 5 point Scale which ranges from strongly agree to strongly disagree. In fifth and sixth part of the questionnaire the researcher focussed on the information pertaining to problem in implementing SCM and impact of SCM through Likerts five point scale The statements are based on Supply chain management Strategic activities and implications over Shop floor production activities are ascertained at various situations like economic changes, Productivity and Profitability.

PILOT STUDY

A pilot study was conducted to validate the questionnaire and to confirm the feasibility of the study. The filled up Questionnaires are collected from 60 respondents and Cronbach's Alpha Criterion was applied to test the reliability. The value determined is 0.914 proving the reliability of the instrument. The quality of the questionnaire was ascertained and the test showed high reliability. The variables considered for the analysis are satisfying the normal probability distribution. Based on the pilot study, the questionnaire was modified suitably to elicit response from the sample group.

1.10.SCALING TECHNIQUE IN THE QUESTIONNAIRE

The questionnaire used comprises both optional type and Statements in Likert's 5 point scale. The responses of these sections are obtained from the executives of manufacturing companies in the 5 point scale, which ranges as follows:

5- Strongly agree 4-Agree 3-Neutral 2-Disagree 1-Strongly Disagree

SECONDARY DATA

The Secondary data are collected from Journals, Magazines, Publications, Reports, Books, Dailies. Periodicals, Articles, Research Papers, Websites, Company Publications, Manuals and Booklets.

DATA ANALYSIS

The Primary data collected are analysed using the SPSS (Statistical Package for Social Sciences) computer packages.

The Statistical tools used for obtaining results are as follows:

t test and Paired t test are applied to ascertain the nature of responses of executives about the SCM Practices and significant difference among the various factors of SCM.

Factor Analysis by Principal Component Method is used to identify the factors of SCM elements, SCM benefits, problems of SCM and effectiveness of SCM

K-means Cluster Analysis is exploited to classify the executives of manufacturing companies based on their perception Discriminant Analysis is brought to bear upon the problem of identifying the discrimination of factors of various SCM sub systems. Karl Pearson's Co-efficient of Correlation is brought into the context to explore the parametric relationship among the various factors of SCM practices and consequences

One way Analysis of Variance (ANOVA) is applied to ascertain the significant relationship between various SCM practices and their effects with respect to the organisational and SCM details of manufacturing companies. Structural equation model is used to construct a model of SCM

1.11.CHAPTERISATION

Chapter I - Introduction deals with the concept of supply chain management, Statement of the Problem, Objectives of the Study, Methodology, Scope and Limitations of the Study.

Chapter II - Sketches the review of related literature relevant to the present

Chapter III - Deals with the plethora of conceptual frame work of SCM practices followed in manufacturing Companies

Chapter IV - Elements of Supply chain management- An empirical evidence-presents different Elements of SCM, areas covered in the SCM practices and Organisational Objectives achieved through SCM

Chapter V- Effectiveness of supply chain management practices-An empirical analysis - provides details regarding Evaluation of SCM process, Design, Problems in the implementation and effectiveness of SCM

Chapter VI-Summary of Findings, Suggestions and Conclusion-Scope for further Study Summarises all the results obtained through statistical analysis to arrive at conclusions and to offer suggestions.

REVIEW OF LITERATURE

CHAPTER-II

2.1.REVIEW OF LITERATURE

The review of literature is an essential component of any research investigation which gives necessary input for the researcher to frame the research study on selected topic. It provides the researcher with new ideas and assists him in the evaluation of research efforts. This chapter helps in identifying the research gaps and provides an overview of the different constructs of SCM in customer services in manufacturing companies.

SCM AN OVERVIEW

Increasingly, the management of multiple relationships across the supply chain is being referred to as supply chain management (SCM) Strictly speaking, the supply chain is not a chain of businesses with one-to-eer, business-to-business relationships, but a network of multiple businesses and relationships (Peter F. Drucker, 1998), SCM offers the opportunity sa capture the synergy of intra- and Intercompany integration and management. In that sense, SCM deals with total business-process excellence and represents a new way of managing the business and relationships with other members of the supply chain (Bowers, 1997)

One of the most significant paradigm shifts of modern business management is that individual businesses no longer competes as solely autonomous entities, but rather as supply chains. Business management has entered the era of internetwork competition. Instead of brand versus brand or store versus store, it is now suppliers brand-store versus suppliers-brand-store, or supply chain versus supply chain (Peter F. Drucker, 1998). In this emerging competitive environment, the ultimate success of the single business will depend on management's ability to integrate the company's intricate network of business relationships (Christopher, 1992).

This review of literature helps presenting arguments based on the current research work. The gap findings of this review of literature are a stepping stone towards establishment of a research effort to develop a normative model to guide research.

Starts with defining supply chain management and establishing the antecedents, consequences of supply chain management. Subsequently arranged based on the objectives and in each of the following objectives, research is done whether customised strategies will help managing supply chain better (reducing the cost and increasing customer service level).In each of those clusters of reviews, gaps have been identified and presented.

2.2.To find the effectiveness of supply chain on organization:

According to

Jones and Riley (1985) - "Supply chain management deals with the total flow of materials from suppliers through end-users..."

Houlihan (1988) - Differences between supply chain management and classical materials and manufacturing control

1) The supply chain is viewed as a single process. Responsibility for the various segments in the chain is not fragmented and relegated to functional areas such as manufacturing, purchasing, distribution, and sales.

2) Supply chain management calls for, and in the end depends on, strategic decision-making. "Supply" is a shared objective of practically every function in the chain and is of particular strategic significance because of its effectiveness on overall costs and market share.

3) Supply chain management calls for a different perspective on inventories which are used as a balancing mechanism of last, not first, resort.

2.3.A new approach to systems is required-integration rather than interfacing.

Stevens (1989) - "The objective of managing the supply chain is to synchronize the requirements of the customer with the flow of materials from suppliers in order to effect a balance between what are often seen as conflicting goals of high customer service, low inventory management, and low unit cost.

La Londe and Masters (1994) - Supply chain strategy includes: two or more firms in a supply chain entering into a long-term agreement; development of trust and commitment to the relationship. the the integration of logistics activities involving the sharing of demand and sales data; ... the potential for a shift in the locus of control of the logistics process."

Cooper et al. (1997) - Supply chain management is "... an integrative philosophy to manage the total flow of a distribution- channel from supplier to the ultimate user."

Monczka, Trent, and Handfield (1998) - SCM requires traditionally separate materials functions to report to an executive responsible for co-ordinating the entire materials process, and also requires joint relationships with suppliers across multiple tiers. SCM is a concept, "whose primary objective is to integrate and manage the sourcing, flow, and control of materials using a total systems perspective across multiple functions and multiple tiers of suppliers."

2.3.a Elements of Supply Chain Management in Customer Service

The definition of "Supply Chain" seems to be more common across authors than the definition of "supply chain management" (Cooper and Ellram, 1993; La Londe and Masters, 1994; Lambert, James R. Stock, and Lisa M. Ellram, 1998). La Londe and

Masters proposed that a supply chain is a set of firms that passes materials forward. Normally, several independent firms are involved in manufacturing a product and placing it in the hands of the end-user in a supply chain raw material and component producers, product- assemblers, wholesalers, retailer-merchants and transportation-companies are all members of a supply chain (La Londe and Masters, 1994). By the same token, Lambert, Stock, and Ellram define a supply chain as the alignment of firms that brings products or services to market. It is noted that these concepts of supply chain include the final consumer as part of the supply chain.

Another definition notes a supply chain is the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services delivered to the ultimate consumer (Christopher, 1998). In other words, a supply chain consists of multiple firms, both upstream (ie., supply) and downstream (ie, distribution), and the ultimate consumer.

Although definitions of Supply chain management seem to differ across authors, a representative of which has been gathered by the researcher and denoted in Table 1, it is to be noted that (Mentzer et al, 2001) these different definitions can be classified into three categories: a management philosophy, implementation of a management philosophy, and a set of management processes. The alternative definitions and the categories which are represented by other authors suggest that the term "supply chain management" presents a source of confusion for those involved in researching the phenomena, as well as those attempting to establish a supply chain approach to management.

Bowon Kim (2005), explains a 3C Model for building Supply chain management with sustainable competitive capability. Competitive priorities for supply chains are low cost, consistent quality, and on-time delivery. The 3C's are Calculus, Creativity and Commitment. Calculus represents in-depth, fundamental analysis before making any resource/strategic commitment to particular choices or actions. The levels of calculus (analysis is logical, robust and /or thorough enough) will affect the competitive strategy. Sunil Chopra and others (2008) describes the Supply chain management strategies, network design, cross functional and logistical drivers and metrics,

Effectiveness of Information Technology and coordination.

Poirier C.C. (2002), advocates the four levels of supply chain optimization. The level one, Sourcing and Logistics' and level two, 'Internal Excellence' come under "Internal control". The level, three, Network Construction and level four, "Industry Leadership' come under "External control". Every Organization can assess their status level and strive to the next level.

Forrester J.W.(1999) indicates systems approach to Supply chain members and their supply chain management. Each member is an Entity with system elements of Input, Processes, output, control, feedback and boundary conditions. It explains the ramifications

created by internal and boundary conditions. It also deals with outside or environmental pressures on the system elements

Melnyk S.A., Lummus R.R., Vokurka R.J., Burns L.J., and Sander J. (2009) point out that SCM is changing from tactical in nature (where the major focus is on cost and delivery) to a field that is strategic in nature. The authors report the future issues and challenges by drawing on the findings generated by a three-phase study (a two-round Delphi study and a workshop). Unique in this Delphi study is that it brings together leading practitioners in the supply chain management with leading supply chain management researchers. The authors explain the process of selection of 29 potential participants. The authors have shortlisted 26 questions, each question focusing on a major SCM issue. All items in the Delphi survey are evaluated by the respondents using a five point Likert scale. Consistent with the theme of this study, the experts are to assess each trait at two time periods: importance today (2006) and importance five years from today (2011). Two rounds of Delphi study are conducted and summarized for presentation after statistical analysis. The analysis includes the effectiveness of each round on the respondents and the differences between the respondents (academic researchers versus supply chain practitioners) on the 26 items in the Delphi study, a series of Chi-square tests are used. The goal of the third-stage research, an on-site workshop, is to bring together the participants to review the findings of the Delphi study.

The findings show that while the focus of the current tactical supply chain view is relatively limited to issues of delivery, risk, and leadership, the supply chain view of the future (ie., five years from now) is more complex and demanding.

The results of the study show the following five issues to be most important in the future. 1) Supply chain disruptions and supply chain risk, 2) Leadership within the supply chain, 3) Managing the timely delivery of goods and services, 4) Managing production innovation by drawing on the capabilities of the supply chain, 5) Implementing appropriate technology to allow seamless exchange of information within the supply chain. The difference between what is important now and what is important five years from now illustrates the differences between the price driven/strategically-decoupled supply chain of today and the value- driven/strategically coupled supply chain of tomorrow,

Hsu C.C., Tan K.C., Kannan V.R. and Leong G.K. (2009) use mediated regression analysis and structural equation modeling to test the proposition that supply chain management practices mediate the relationship between operations capability and firm performance. Operations capability is defined in terms of a firm's new product design and development, total quality management and just-in- time capabilities. Results support the research model and also suggest the existence of a direct relationship between operations capability and performance. It enables seamless integration of value-creating activities across organizational boundaries. It also enables firms in a supply chain to eliminate waste, leverage synergies and compete more effectively in an intensely competitive global market. The research instrument is Questionnaires, pretested and modified, for the comprehensiveness, clarity, face validity, readability of the scales and survey instructions.

From the lists of members of Institute for Supply Management (ISM) and the Association for Operations Management (APICS), pre-screening is done to identify only respondents likely to be familiar with their firm's supply chain and Operations strategy practices. Questionnaires are sent to 4500 likely respondents followed by a reminder postcard and a second mailing of the survey yielded 455 usable observations. A three phase statistical analysis is adopted. The findings show that the new product design and development, has both direct and indirect effects on firm performance. The direct effectiveness of just-in-time capability on firm performance is not confirmed. The results do not indicate a significant relationship between total quality management capability and supply chain management practices, but suggest that quality capability affects firm performance directly. The study provides support that supply chain management practices mediate the effectiveness of operations capability on performance. This is consistent with resource-based and competence based views of the firm, and for resource-advantage theory as it relates to manufacturing success. Supply chain management practices allow firms to take advantage of their manufacturing capabilities by leveraging the expertise and cooperation of key members of their supply chains.

Yinan Qi, Boyer KK and Zhao X (2009) declare that Supply chain management is the most popular approach as the Firms must have clear strategic thinking in order to effectively organize such complicated activities, resources, communications and processes. This is essential to enhance the global competitiveness of business corporations today. The authors explain a framework that identifies three kinds of supply chain strategies: lean strategy, agile strategy and lean/agile strategy on in-depth case studies. Extant research also suggests that supply chain strategies must be matched with product characteristics in order for forms to achieve better performance

This article investigates supply chain strategies and empirically tests the supply chain strategy model that posts lean, agile and lean/agile approaches using data collected from 604 manufacturing firms in China. Cluster Analyses of the data. indicate that Chinese firms adopting a variation of lean, agile and lean/agile supply chain strategies identified in the western literature. However, the data reveal that some firms have a traditional strategy that does not emphasize either lean or agile principles. These firms perform worse than firms that have a strategy focused on lean, agile and lean agile supply chain. The strategies are examined with respect to product characteristics and financial and operational performance. The study includes correlating lean or agile supply chain strategy with higher value of functional product characteristics, innovative product characteristics, firm's financial performance, customer service performance and firm's operating cost performance.

The strategies are examined with respect to product characteristics and financial and operational performance. The work empirically tests the applicability of supply chain strategy models that have not been rigorously tested empirically or in the fast-growing Chinese economy. The Research Methodology include that the data are collected via mail survey using Questionnaires having 7 point Likert scale, Questionnaire translation. With

three target cities, 2724 companies, 604 completed and useful responses are taken for the analysis. The results and findings discuss the taxonomy of supply chain strategies and their implications on the performances of operating Firms.

Kearney AT Inc. (2006) describes a framework to identify a supply chain, and offers a how-to approach for the development of strategies within the supply chain. It discusses the issues, complications and prospects related to the supply chain. Every company should understand its needs and operations before it makes a choice of the supply chain. The key to a supply chain is its dynamic management- matching the right strategy with the right situation. It aims to develop a supply chain strategy, by 1) Identifying relevant supply chain segment (Customer segmentation and Product segmentation). 2) Constructing logically distinct supply chains, 3) Matching strategies to supply chains and 4) Defining reconfiguration plan, with Gujar, Mophare, Deomore and Khodke (2007) discuss how the long-term profitability of a supply chain is affected by strategic decision making tools like determination of optimal network configuration, inventory management policies, supply contracts, distribution strategies, supply chain integration, outsourcing and procurement strategies, product design and information technology. Strategic decision-makers are guided by comprehensive models for efficient decision-making which increases the profitability of the entire chain. This paper presents the guidelines for the methodology and the development for the strategic modeling of single and multi-echelon supply chains.

Rajkumar Ohdar and Pradip Kumar Ray (2006) assess the present status and scope of SCM practices through extensive survey conducted among the Indian manufacturing companies. In this survey, the first of its kind India, opinions of Indian Manufacturers from across the country have been sought. A number of issues such as role of Information Technology, areas of IT applications, prospects of employing SCM. Supply chain performance measures, issues hindering practices have been addressed in the context of the Manufacturing companies. The paper presents a detailed statistical analysis of the survey responses indicating the usefulness of the survey results to the companies contemplating implementation of SCM practices in the near future.

The findings of the survey also suggest several directions of research in SCM, including important performance measures for the development of a comprehensive performance measurement system

Hartmut Stadler (2005) aims at extracting the essence of Supply chain management and advanced planning in the form of two conceptual frameworks: the house of SCM and the supply chain planning matrix. The contributions to this feature issue are assigned to the building blocks of the house of SCM or to the modules covering the supply chain planning matrix. The author focuses on the software for advanced planning and outline the main shortcomings and present latest research results for their resolution. The advanced planning is not an isolated building block of SCM; instead it should be used for decision support within other building blocks; e.g. the choice of partners in different geographical regions can be evaluated by strategic network planning.

Walker W.T.(2005) lists out various significant threads of developments in production and inventory planning and control. The supply chain networks involve five principles (velocity, variability, vocalize, visualize and value) to analyze a competitor's network, to rationalize an existing network and to design, operate and optimize a new network.

Gregor Dudek and Hartmut Stadtler (2005) proposes a non-hierarchical, negotiation-based scheme which can be used to synchronize the plans between two independent supply chain partners linked by material flows. The author attempts to link and coordinate planning between isolated parts of Supply Chain through Supply Chain planning matrix. He advocates Collaborative planning between adjacent lanning domains.

Mehra (2005) discusses various views and contributions of various authors writing on the critical issues of managing supply chains, specifically, topics, such as relationship, quality, performance, integration, responsiveness, risk management strategies, agility and incentive systems in the supply chains are addressed.

2.3. b Supply Chain Management and Customer Service

Many organizations today are forced to increase their global market-share in order to survive and sustain growth objectives. At the same time, these same organizations must defend their domestic market- share from international competitors. The challenge is how to expand the global logistics and distribution- network, in order to ship products to customers who demand them in a dynamic and rapidly-changing set of channels (Eric Astrom, 2010). Strategic positioning of inventories is essential, so that the products are available when the customer wants those (Handfield et al, 2002).

Efficiency is measured by delivery-performance, product-quality, backorders and inventory level, whereas effectiveness is measured by service-quality and the service needs (Peterson. A. 2008).

Supply chain (Domenica, 2003) should actually be efficient and effective. In this case, efficient means to minimize resource-use to accomplish specific outcomes; and effective, in terms of increasing customer service and reducing cost.

Long-term competitiveness, therefore, depends on how well the company meets customer preferences in terms of service, cost, quality, and flexibility, by designing the supply chain, which will be more effective and efficient than the competitors. Optimisation of this equilibrium is a constant challenge for the companies, which are part of the supply chain network.

To be able to optimise this equilibrium, many strategic decisions must be taken and many activities co-ordinated. This requires careful management and design of the supply chain. The design of supply chains represents a distinct means by which companies innovate, differentiate, and create value (Longitudes 04, 2004, p. 8). The challenge of supply chain design and management is in the capability to design and assemble assets,

organizations, skills, and competences. It encompasses the team, partners, products, and processes.

Supply chain is defined as a set of three or more entities (organizations or individuals) directly involved in the upstream and downstream flows of products, services, finances, and/or information from a source to a customer (Xavier, 2009)

Encompassed within this definition, we can identify three degrees of supply chain complexity:

- Direct supply chain
- Extended supply chain
- Ultimate supply chain

A direct supply chain" consists of a company, a supplier, and a customer involved in the upstream and/or downstream-flows of products, services, finances, and or information (Mentzer et al, 2001) as represented An "extended supply chain" includes suppliers of the immediate supplier and customers of the immediate customer, all involved in the upstream and/or downstream-flows of products, services, finances, and/or information

An "ultimate supply chain" includes all the organizations involved in all the upstream and downstream-flows of products, services, finances, and information from the ultimate supplier to the ultimate customer. A third party financial provider may be providing financing, assuming some of the risk, and offering financial advice; a third party logistics-provider is performing the logistics- activities between two of the companies; and a market-research firm is providing information about the ultimate customer to a company well back-up the supply chain.

2.4. ANTECEDENTS TO SUPPLY CHAIN MANAGEMENT

Lambert, Stock, and Ellram also point out that the necessary commitment of resources and empowerment to achieve stated goals is important to implement SCM. Putting together the effects of trust and commitment, Morgan and Hunt state, "Commitment and trust are 'key' because they encourage marketers to Work at preserving relationship investments by co-operating with exchange-partners. As such, trust and commitment lead directly to co-operative behaviours in the implementation of a supply chain orientation across several companies to achieve SCM-objectives of a firm. This is human element of supply chain.

Antecedents to supply chain management are defined as different factors which have a role in enhancing or impeding the implementation of a supply chain management philosophy. Morgan and Hunt (1994) propose that co-operation arises directly from both relationship-trust and commitment (Human aspect). Moorman, Deshpande, and Zaltman (2002) define trust as a willingness to rely on an exchange- partner in whom one has

confidence. Though both trust and commitment are essential to make co-operation work, trust is a major determinant of relationship commitment (Achrol, 2001).

Thus, trust has both direct and indirect relationships with co-operation. Dwyer, Schurr, and Oh (2007) emphasize the role of trust to overcome mutual difficulties such as power, conflict, and lower profitability. Therefore, it is proposed that trust has an effect on the sharing of risks and rewards. Dwyer, Schurr, and Oh define commitment as "an implicit or explicit pledge of relational continuity between exchange-partners. Commitment is an essential ingredient for the successful long-term relationships that are a component of the implementation of SCM (Gundlach, Achrol, and Mentzer, 1995).

PROSPECTS OF SCM IN CUSTOMER SERVICE

La Londe (1997) proposed that SCM aims at delivering enhanced customer- service and economic value through synchronized management of the flow of physical goods and associated information from sourcing to consumption. According to Porter, competitive advantage grows fundamentally out of the customer value, a firm creates, and aims to establish a profitable and sustainable position against the forces that determine industry-competition. Thus, it is proposed that the implementation of SCM enhances customer value and satisfaction, which in turn, leads to enhanced competitive advantage for the supply chain, as well as each member firm (Mentzer et al., 2001). This, ultimately, improves the profitability of the supply chain and its members.

Specific objectives to improve profitability, competitive advantage, and customer value/satisfaction of a supply chain, as well as its participants, are suggested by several researchers. A number of researchers have indicated that a key objective of SCM is to lower the costs required to provide the necessary level of customer-service to a specific segment (Houlihan 1988; Jones and Riley 1985; Stevens 1989).

The motive behind the formation of a supply chain arrangement is to increase supply chain competitive advantage (Global Logistics Research Team, Michigan State University, 2007; Monezka. Trent, and Handfield 1998). Porter (2004) defines three types of generic competitive strategies: cost leadership, differentiation and focus. According to Giunipero and Brand (1996), improving a firm's competitive advantage and profitability through SCM, can be accomplished by enhancing overall customer-satisfaction.

The other key objective is to improve customer-service through increased stock availability and reduced order-cycle time (Cooper and Ellram, 1993). Customer service objectives are also accomplished through a customer-enriching supply system focused on developing innovative solutions and synchronizing the flow of products services, and information to create unique, individualized sources of customer-service value (Ross, 1998)

Finally, low cost and differentiated service help build a competitive advantage for the supply chain (Cavinato, 2002; Cooper et al, 2006; Cooper and Ellram, 2003; Cooper,

Lambert, and Pagh, 2000; Ellram and Cooper, 2001; Lee and Billington, 2002; Novack, Langley, and Rinehart, 1995; Tyndall et al, 1998). See Fig 2 below.

SCM is concerned with improving both efficiency (i.e., cost-reduction) and effectiveness (i.e., customer service) in a strategic context (i.e., creating customer- value and satisfaction through integrated supply chain management) to obtain competitive advantage that ultimately brings profitability. If distinguished between the operational function of customer-service and the resultant goal of customer- value and satisfaction, this discussion leads to conclude that the consequences of SCM are lower costs and improved customer value and satisfaction to achieve competitive advantage.

2.5.PROBLEMS IN IMPLEMENTING SCM IN CUSTOMER SERVICE

According to Webster (2002), networks are the complex, multifaceted organizational structures that result from multiple strategic alliances. Thus, it is proposed that a network is a well-recognized organization for SCM. The basic characteristic of a network- organization is a confederation a loose and flexible coalition guided from a hub where the key functions include development and management of the alliances themselves coordination of financial resources and technology, definition and management of core competencies and strategies, development of relationships with customers, and management of information

According to Christopher (1998), leading-edge companies have realized that the real competition is not company against company, but rather supply chain against supply chain. Cooper, Lambert, and Pagh (1994) argue that organizational relationships tie firms to each other and may tie their success to the supply chain as a whole. In this context, a supply chain as a whole may have its own identity and function like an independent firm. However, to accomplish this ultimate supply chain, all companies in the supply chain must have a supply chain orientation. The result is a fully-managed supply chain.

From this discussion, and given the earlier definition of supply chains, from a logistic point of view, there is a need for looking at the functional as well as the organizational scope of SCM, as the implementation and process of SCM across companies, must have a Supply chain oriented strategy.

2.6.EFFECTIVENESS OF SCM IN CUSTOMER SERVICE

It is essential to understand how the customer's demand chain and supply chain are linked to improve a customer's performance and the company's efficiency. There are two points linking the chains, the order penetration point (OPP) and value- offering point (VOP) (Hoover et al, 2001 and Eckhardt, 2002)

The order penetration point is the point in the supply chain where customer's demand or an order is directed to the product (see Figure 3). Costs and prospects for both parties, supplier and customer, depend on the allocation of the OPP. The order can be

allocated from the supplier's warehouse, which means rapid delivery and prospects for the customer

Large inventory involves high costs for a supplier, especially if the product-range is large. If the OPP is moved back to packaging or assembly, the supplier will benefit from reduced inventory-costs, but the customer needs to wait longer for delivery. These are discussed in the light of customisation of inventory strategies for customer service.

One way to shorten delivery time is customization by postponing the process steps that create variants. Moving the OPP back further to manufacturing, a supplier's inventory-costs get even lower and make it possible to meet individual customer-needs. This, however, means longer delivery-times that a customer may not be willing to wait for. (Hoover et al, 2001 and Eckhardt, 2002)

The second point linking the demand and supply chains, the value-offering point (VOP), describes the point in the demand-chain where the supplier receives the customer's purchase decision (see Figure 3). An offer to purchase is the traditional buyer / seller-relationship where the customer's buying-department decides who supplies and when. Both the buyer and seller try to optimize their own operations. An offer for inventory-management moves the VOP back in the demand-chain, meaning, that the supplier controls the customer's inventory-levels and can respond better to their needs.

But now the supplier has to separately control each customer's inventory. An offer for planning moves the VOP to production or to sales-promotion in retailing. The supplier and retailer collaborate as given in Fig 4, for example in a way that the supplier gets information on consumer-demand. The VOP can also be an offer to the end-user. This model is still unknown, but there is an example in the PC industry. Dell delivers customized PCs directly to the end-customer with the necessary network configuration and software. (Hoover et al, 2001 and Eckhardt, 2002)

In a pull-based supply chain, production and distribution are co-ordinated with true customer-demand. Efficient information-flow about customer-demand decreases inventories. This system enables lead-time reduction due to better anticipation and decrease in variability. (Simchi-Levi et al, 2008).

Thus, pull-system reduces inventories, enhances the ability to manage resources, and reduces system-costs compared to equivalent push-system. Pull-system is difficult to implement when lead-times are long, making reaction to demand information impractical. In pull-based system, it is often more difficult to take economic advantage in manufacturing and transportation, since they are not planned far ahead in time. (Simchi-Levi et al, 2008).

Push-based supply chain makes production and distribution -decisions according to long-term forecasts based on orders. It has a long react-time which can lead to the inability to meet changing demand-patterns and the product-obsolescence or excessive inventories. (Simchi-Levi et al, 2008)

Push-pull supply chain-strategy takes advantages of both push and pulls systems. The interface between push-based stages and pull-based stages is called push-pull

boundary. Placing the order penetration-point is balancing between supplier costs and customer- prospects. Moving the value-offering point largely back in the demand-chain, prospects the customer and causes more work for the supplier. To find out a win-win situation, the interaction of both links has to be understood. Moving both the OPP and VOP back simultaneously, increases the time needed to respond to customer-demand, but also the time available to respond. The time-advantage makes this a win-win configuration. The supplier can respond to demand earlier, because of better information and more time to act and the customer receives products reliably. The supplier can also reduce its inventory-costs.

The idea of Just-in-Time (JIT) is that no activity should take place in a system unless and until there is a need for it. This requires synchronization of all elements in the chain and the highest level of planning-discipline. JIT-logistics avoids excessive inventory-holding by the supplier, making the management of inbound materials-flow a crucial issue, Small JTT-deliveries are often combined into a single delivery of several suppliers. Thus, it is not a surprise that JIT-philosophy has coincided with the growth of third-party distribution. (Christopher, 1998).

JIT-deliveries are not always appropriate IIT-deliveries are typically justified when the demand for variety and the value of the product are higher. (Christopher, 1998). One time-based method is vendor-managed inventory (VMI), which may be the most successful supplier-collaboration concept. The VMI principle is sometimes called supplier-managed inventory (SMI), jointly-managed inventory (IMI), or co- managed inventory (CMI) The idea of VMI is that customers do not place orders to suppliers. The supplier takes the responsibility for replenishment of the customer's inventory on the basis of demand and inventory information. (Christopher. 1998, Hoover et al, 2001 and Eckhardt, 2002)

The bullwhip-effect is one of the main reasons for inefficiencies in supply chains. Since Forrester discovered around 45 years ago that variations of demand (and based on that of orders and stocks) increase up the supply chain from customer to supplier, researchers look for reasons and try to find countermeasures. Nevertheless the role that human behaviour plays in the bullwhip-effect is still overlooked (Joerg Nienhaus, Ame Ziegenbein and Christoph Duijts, 2007)

Even though the VMI system can be realized in different ways, there is a common characteristic that differentiates VMI from other techniques - the supplier's responsibility. The supplier determines the replenishment quantity. frequency, and regularity. This means that a supplier's performance can be measured in terms of availability and inventory-turnover, instead of delivery time and accuracy. (James et al. 2000, Kaipia et al. 2002 and Eckhardt, 2002).

The bullwhip-effect describes the phenomenon that the variation of demand increases up the supply chain from customer to supplier. The further away a company from the end customer (in terms of lead time), the larger is this variation. Considering a supply chain that consists of an OEM (original equipment manufacturer) and a 1st, 2nd- and 3rd-

tier supplier, the OEM faces the lowest and the 3rd-tier supplier the largest variation of Demand (see fig 6).

This effect leads to inefficiencies in supply chains, since it increases the cost for logistics and lowers its competitive ability. Particularly, the bullwhip-effect negatively affects a supply chain in three respects

Dimensioning of capacities: A variation in demand can variation in the usage of capacities. Here companies face a dilemma: If they dimension their capacities according to the average demand, they will regularly have delivery-difficulties in case of demand-peaks. Adjusting their capacities to the maximum demand leads to poorly-used resources.

Variation in inventory level: The varying demand leads to variation in inventory levels at each tier of the supply chain. If a company delivers more than the next tier passes on, the inventory level increases Vice versa, the inventory is reduced in case a company delivers less than the next tier passes on. A high level of inventory causes costs for capital employed while a low level of inventory puts the delivery reliability at risk.

High level of safety-stock: The safety-stock, that is required to assure sufficient service-level, increases with the variation of demand. Hence, an important issue for supply chain is to cope up with the bullwhip-effect For that purpose, the reasons for the amplification of the demand-variation need to be identified.

A well-engineered VMI system offers several prospects for both the supplier and customer. It also prospects the entire demand-supply chain by reducing costs and improving responsiveness. Well engineered here refers to customisation which is missing in the previously done researches and the articles referred. Study of influences of experience of employees (HR aspect) and their designation in the company on the inventory strategy is missing.

2.7.EFFECTIVE CUSTOMER SERVICE AND SCM

There are many supply chain-initiatives for time-based purchasing-strategies inspired by JIT philosophy, such as quick response (QR), efficient consumer- response (ECR), and continuous replenishment (CR). All these inventory-techniques use pull-philosophy and information to minimize buffers. (Christopher, 1998, James et al, 2000, Simchi-Levi et al, 2008 and Eckhardt, 2002).

The idea of QR is to capture demand as close to real-time as possible and as close to the final consumer as possible (Christopher 1998). In a QR system, suppliers receive point of-sale (POS) -data to synchronize production and inventory activities with actual sales at the retailer. The retailer still places individual orders but POS- data is used to improve forecasting and scheduling, and to reduce lead time. (Simchi-Levi et al, 2008). QR-logistics has become a basis for collaborative working in the supply chain.

Effectiveness of purchasing strategies on cost and customer service levels have not been studied fully. Existing purchase methodologies require a relook through research which would lead to formation of customised strategies.

2.8.SIGNIFICANCE OF SCM IN CUSTOMER SERVICE IN MANUFACTURING COMPANIES

"The road transport mode serves as one of the key factors in the developmental process of any economy. While historically, the railways have played inherent advantages. Over the past few decades, the share of road transport in the total surface traffic movement in India has been gradually increasing with a distinct shift away from the railways being observed. Most recent estimates give the road mode a share of nearly 63 per cent in freight movement compared to its share of just about 10 per cent in the early fifties. According to these estimates, this percentage share is likely to stabilize around 85 per cent (S. Sriraman, 2012). Given this emerging significant role, many issues have been raised in the context of road freight movements, which apart from many others relate to efficiency of operations, the competitiveness of the market, etc. Given the huge number of suppliers and the apparent ease of entry into the sector, it was widely believed that the market was very nearly competitive. However, it has been an emerging feeling that the organisation of the structure of the industry as well as some unimaginative policy measures and tardy implementation of even the limited but fairly well-designed regulatory measures have resulted in inefficient provision of services, which when viewed in the context of a liberalized and globalized framework of economic activities, affects competitiveness. Hence transportation strategies have to be customised and implemented to suit Indian conditions" (S. Sriraman, 2012). Appendix V shows the current Turn around time (TAT) by road and air for southern region in India especially for Consumer durables and IT Hardware industry. This is a part of capturing the current process of transportation with respect to customer service.

The systems and strategies in place are all very old in the sector under study and certainly needs a revamping. The literatures have not suggested the effectiveness of logistics on improving the cost of supply chain and a narrow look on enhancing the customer service is missing.

2.9. INFORMATION MANAGEMENT TECHNOLOGY AND SUPPLY CHAIN

Technology is an enabler in SCM for helping supply chain members to establish partnerships for better supply chain system performance (Boubekri, 2001; Yu, Yen and Cheng, 2001; Jensson, and Gunnarsson, 2005). Gunasekaran and Ngai (2004) explored that information technology is an essential ingredient for business- survival and improves the competitiveness of firms. Dawson (2002) defined that efficient supply chain network can offer substantial improvements in productivity and in customer-satisfaction by making

available online, real-time information networked around the organization and giving full supply chain visibility.

Besides that, McLaughlin, Motwani, Madan and Gunasekaran (2005) found that successful companies around the world are partly dependent on their ability to apply IT to SCM. In addition, findings from McLaren, Head and Yuan (2004) show that operational efficiency and operational flexibility have high relationship with SCM information system.

IT enhances the service-level of SCM, improves operational efficiency and information- quality (Auramo, Kaaremaa and Tarakanen, 2005).

Consumer-demand and the Internet have created a technology-savvy buyer, with high expectations and inflexible demands on product availability. As a result, the supply chain has become much more complex than it was 15 years ago.

Manufacturers and retailers are struggling to adjust to this latest norm because retail and demand-fulfilment models are evolving faster than they can react. This evolution has spurred a change in how logistics-related processes are identified and implemented. Combined with a number of new distribution-channels, this shifting landscape has injected a unique complexity into the supply chain.

In an attempt to stay competitive and reduce logistical inefficiencies, manufacturers and retailers are searching for new methods to enhance supply chain visibility. The emergence of innovative technology is allowing companies to improve visibility. The business case for exceptional supply chain visibility is clear. It provides companies with timely delivery and first-rate performance to remain competitive. All organizations striving to improve supply chain visibility need to focus on technology and integration of data.

Leveraging the right technology is essential. The rules, flexibility and exceptions associated with supply chain information have created large volumes of data for companies to evaluate. The right technology can analyze the data and produce valuable business intelligence, which can ultimately lead to better, more informed supply chain decisions.

Consisting of suppliers, shippers, third-party logistics providers, retailers and the consumer, the supply chain continues to expand the ability to use technology to integrate disparate companies is a vital factor in ensuring all parties can properly react to supply chain disruptions and implement a strategy to overcome problems. "For data integration, the outsourcing poses difficulties" (Yan,Y and Wang, X. 2010).

The quality of data used to make supply chain-decisions is critical. Leveraging integrated technologies, data is collected faster, allowing for a proactive analysis of the data to ensure a more efficient and streamlined supply chain. Once distributed, this information allows buyers and suppliers to reassess their time to market and make strategic decisions to maximize revenue.

"While there are a slew of supply chain visibility best practices, they become futile if companies don't have the technology to gather real-time information from the supply chain. A thorough evaluation of operational goals, budget considerations and other relevant factors is critical in determining the most effective approach to regain supply chain visibility for the new consumer" (Jack Rabren, 2010).

Previous researches, reports, journals, white papers and books have not gone deeply into the influences of ERP on supply chain, in particular in the consumer electronics and IT hardware industry. Whether custom made packages would be of higher benefit for an efficient SCM to be researched. Whether experience of employees and number of employees in the company has got any influence on ERP which in turn affects SC to be also researched

2.10. OF EFFECTIVENESS OF SUPPLY CHAIN MANAGEMENT EMPLOYEES OF MANUFACTURING COMPANIES

Each dot in the diagram of figure 8 represents a result of a co-maker in the classic version of the beer-distribution game online (for space reasons only some representative results were chosen). The more to the right a dot is located, the higher the costs of capital employed in stock caused by the co-maker were. The more to the top it is located, the higher costs caused by out-of-stock situations caused at a co-maker were.

The reason for humans performing lies in two types of extreme behaviour.

Some humans try to act as the "safe harbour" of the supply chain, i.e. they order more than actually necessary and by that increase their safety-stock. They cause not only high costs for capital employed in stock at their tier but they also force the supplier either to increase his orders as well or to pay for out-of-stock situations. Thus only one co-maker following the "safe harbour-strategy" has a negative effectiveness on the whole supply chain.

The second extreme strategy, "panic", is to empty the stock before the end-customer's demand increases. This first does not affect other co-makers negatively. But as soon as end-customer's orders increase, a co-maker following this strategy has to order more than a co-maker, who has safety stock left. Then, this strategy has the same negative effectiveness on the whole supply chain like the "safe harbour" strategy.

The more the behaviour of a co-maker deviates from the best solution and tends to one of these two strategies, the higher are the costs one causes. Like shown, other co-makers are affected by his behaviour as well. This is why also the agent-based strategies perform worse if humans are present in the supply chain.

Human Element in Supply Chain

Chandrasekaran N, (2010) mentions that behavioural obstacles are those activities, deeds, and conduct of actions or responses to actions or in anticipation of actions in a supply chain network, which cause disruptions in the network in the context of effectiveness of human behaviour in supply chain.

The ins and outs of supply chain logistics are so concrete and focused on numbers and growth projections and calculations that it's easy to overlook the human element. After all, supply chains function according to the leadership and management of the individual running them.

"If a director is not up to suff, the whole network is likely to be affected Similarly, solid leadership can lead to a diverse range of suppliers, timely receivables and proper supply chain functions" (Mal Peter, 2011). However, funding for leadership training and development in the supply chain is increasingly sparse (Logistics Viewpoints, 2012) especially in comparison to other industries.

"B2B practices being process and system driven has less effectiveness of human behaviour" (Kaplan, S. Sawhney, 2011).

"Quantifying the ROI of leadership development and education is not easy or straight forward, Therefore, when companies look to cut costs, especially during difficult economic times, training and education, across all levels of the organization, are among the first items to get the ax" (Adrian Gonzalez, 2012). Leadership is, in many ways, a by-product of education; so if businesses are not investing in knowledge and understanding among their managers, leadership is not possible.

Over the past decade, the management of a firm's entire supply chain has become the process for building improved and stronger upstream and downstream business linkages. "Win-win relationships, that utilize the strengths of other channel members, are created between supply chain partners (Katerke and Ler. 2008). Human resource management-policies, which directly influence and are influenced by corporate culture, also significantly effectiveness supply chaint members. That is, human resource-decisions are important because, when firms hire personnel that meld with their company culture, these actions enhance shared social knowledge and increase consistency between employer and firm goals (Wilkins and Ouchi, 2010) Shared social knowledge guides employees in making the right decision when confronted with novel situations (Weine and Jap, 2009)

One of the purposes of this research is to provide guidance to effectively implement human resource management (HRM)-policies that result in the desired logistical and supply chain strategies. In this pursuit, cultural characteristics and their relationships to HRM policies are examined. While there are considerable discussions about the importance of supply chain relationships, less emphasis has been allocated to the concept of corporate culture and its role in facilitating or hindering these relationships created due the effectiveness of HR on SCM.

2.11. IMPACT OF SCM ON CUSTOMER SERVICES

According to Lambert, Stock, and Ellam (1998), however, there exist important differences between the definition of supply chain management and the Council of Logistics Management's (1985) definition of logistics "Logistics is the process of planning, implementing and controlling the efficient flow and storage of raw materials, in-process inventory, finished-goods, services, and related- information from point of origin to point of consumption (including inbound, outbound, internal and external movements) for the purpose of conforming to customer requirements.

In the last few decades, most practitioners (Davis, 1993; Artnetizin et al 1995), consultants (Scharlacken et al, 1998, Tyndall et al, 1998), and academics (Fischer, 1997. Lee, 1992 and Handfield, 1999) had viewed supply chain management in a manner which is not appreciably different from the contemporary understanding of logistics management, as defined by the Council of Logistics Management (CLA) in 1985. That is supply chain management was viewed as logistics outside the firm to include customers and suppliers. Logistics, as defined by the CLM, always represented a supply chain orientation "from point of origin to point of consumption."

However, different authors have noted that there is presence of a lot of confusion when it comes to dealing with supply chain management from the point of view of logistics. Towers (1994) notes that this is probably due to the fact that logistics is a functional silo within companies and is also a bigger concept that deals with the management of material and information-flows across the supply chain. This is similar to the confusion over marketing as a concept and marketing as a functional area. The understanding of supply chain management has been re- conceptualized from integrating logistics across the supply chain to the current understanding of integrating and managing key business-processes across the supply chain (Cooper et al, 1995). Based on this emerging distinction between SCM and logistics, in October 1998 CLM announced a modified definition of logistics. The modified definition explicitly declares CLM's position that logistics management is only a part of SCM

2.12 DETERMINANTS OF SUPPLY CHAIN PERFORMANCE WITH RESPECT TO CUSTOMER SERVICE

2.12a Customer service

"Companies too have been applying the concept of quick response to their internal operations in order to meet the service-requirements of their own marketing efforts. The quick-response philosophy has been used to create a marketing advantage, even though big profits are made through big margins and not on cost- reductions that might be achieved from good logistics management. Supply chain costs may even raise, although the advantage is to more than cover these costs through increased profits" (Ronald H Ballou, 2011)

"Customers Increasingly Want Quick, Customized Response - Fast food retailers, automatic teller machines, overnight package-delivery, and electronic mail on the Internet has led us as consumers to expect that products and services can be made available in increasingly shorter times. In addition, improved information- systems and flexible manufacturing processes have led the marketplace toward mass customization. Rather than consumers having to accept the 'one size fits all' philosophy in their purchases, suppliers are increasingly offering products that meet individual customer needs" (Merrill Warkentin, 2009).

2.12b Relationships with Customer and Supplier

A successful strategic alliance and integrated relationship with suppliers and customers must be revolved around trust, loyalty, positive sum-game (a win-win relationship), cross-functional teams, achieving common goals and collaboration (Chandra and Kumar, 2000). Spekman, Kamauff and Myhr (1998) suggested that a firm's success is linked to the strength of its relationship with supply chain-partners and it could reduce and increase revenue

Chandra and Kumar (2000) and Choy, Kenny and Victor (2003) found that the long-term success of a firm depends on the reliability of its suppliers and level of satisfaction of its customers. Previous research found that collaborative relationship between customer and supplier has positive significant influence to SCM performance improvement (I care and Hughes, 1999, Humphreys, Shiu and Chan, 2001, Valsamakis and Sprague, 2001, Vereecke and Muylle, 2006, Bartlett, Jalien and Baines, 2007, Ounnar, Pujo, Meksooche and Glambat (2007)

Alfred Wong (2002) also explored that supplier-satisfaction and contribution lead to customer- satisfaction and SCM performance.

2.12c Customer Service Performance Measurement

Gunasekaran, Patel and Tirtiroglu (2001) explored that SCM needs to be assessed for its performance in order to evolve an efficient and effective supply chain. Swinehart and Smith (2005) found that customer satisfaction is increasingly being recognized as an appropriate measure for determining how well a particular organization is accomplishing its mission and while customer satisfaction surveys provide valuable information and may be used to improve the entire operation. Besides that Liang, Yang, Cook and Zha (2006) suggested that an appropriate performance measurement system is a critical requirement for the effective management of a supply chain. Shepherd and Gunter (2006) studied the performance measurement systems and metrics of supply chains by critically reviewing the contemporary literature and suggesting possible avenues for future research. According to Shepherd and Gunter (2006), there are a number of important problems which have not yet been addressed, including: the factors influencing the successful implementation of performance-measurement systems for supply chains, the forces shaping their evolution over time and the problem of their on-going maintenance. These are to validate the gaps that the present study is filling up and the potential for future researches.

While these researches focused on the customer-service through supply chain-performance, there is a void in terms of analysis of supply chain strategies with respect to SC performance for an effective customer service.

CONCLUSION

This chapter concludes that many researches on supply chain management did not explore all the elements of SCM, prospects of SCM, problems of implementing SCM and

effectiveness of SCM, hence this study focuses on such areas. The present research intended to focus on predominant lacuna that remains unanswered in manufacturing industry. Therefore this chapter captured the works of various authors in the field of supply chain strategies, cost-effectiveness and customer-service.

A CONCEPTUAL FRAMEWORK OF SUPPLY CHAIN MANAGEMENT

CHAPTER-III

3.1. A CONCEPTUAL FRAMEWORK OF SUPPLY CHAIN MANAGEMENT IN MANUFACTURING INDUSTRY

This chapter intended to present the conceptual frame work of SCM and its contribution to all manufacturing sector.

- The entire supply chain is a single, integrated entity. The cost, quality and delivery requirements of the manufacturing customer are objectives shared by every company in the chain.
- Inventory is the last resort for resolving supply-demand imbalances between tiers.
- The philosophy is supported by three fundamental features of supply chain 4 management: process orientation, customer orientation and teamwork. The critical issues of managing the supply chains are relationship, quality, performance, integration, responsiveness, risk management strategies, agility and incentive systems.

Salient features of SCM

1. Critical issues of managing supply chains, specifically, topics, such as relationship, quality, performance, integration, responsiveness, risk management strategies, agility and incentive systems in the supply chains are addressed.
2. The supply chain networks involve five principles (velocity, variability, rationalize an existing network and to design, operate and optimize a new network.
3. A number of issues such as role of Information Technology, areas of IT applications, benefits of employing SCM. Supply chain performance measures, issues hindering practices have been addressed in the context of the Indian Manufacturing companies.
4. It discusses how the long-term profitability of a supply chain is affected by strategic decision making tools like determination of optimal network configuration, inventory management policies, supply contracts, distribution strategies, supply chain integration, outsourcing and procurement strategies, product design and information technology.

5. It aims to develop a supply chain strategy, by 1) Identifying relevant supply chain segment (Customer segmentation and Product segmentation), 2) Constructing logically distinct supply chains, 3) Matching strategies to supply chains and 4) Defining reconfiguration plan, with each step, carefully following, a) Purpose, b) Approach and c) Result
6. It advocates that the Firms must have clear strategic thinking in order to effectively organize such complicated activities, resources, communications and processes.
7. Supply chain management practices mediate the relationship between operations capability and firm performance.

Current issues are delivery, risk, and leadership and the following five issues 1) chain risk, 2) Leadership within the supply chain, 3) Managing the timely delivery of goods and services, 4) Managing production innovation by drawing on the capabilities of the supply chain, 5) Implementing appropriate technology to allow seamless exchange of information within the supply chain..

The integration and coordination of Supply chain activities through their members is essential for the continuity flow of materials and services. The production methods namely pull production leverage is linked processes, not isolated functions, that create value in products and services. The supply chain management moves this concept beyond the factory to the processes in companies at the next lower tier, then on down to the lowest tier in the supply chain. Understanding customer supplier include more than just knowing delivery, quality, quantity, and cost requirements, it includes knowing the customer's market, processes and organizational culture as well as its problems, constraints and

A business plan is a statement of an organization's overall business activities for the ensuing 6 to 18 months. The business plans are based on the forecast of general economic conditions, anticipated condition of the industry and the prevailing competitive factors. For the success of a business plan it is necessary that the demand planning (forecasting) should be close to the future expected demands. Forecasting is the integral part of decision-making. All other planning decisions are made on the basis of what is forecasted Business plan guides lower level, requiring detailed decisions. Aggregate production planning (APP) represents the production side of business plan. It addresses the demand side of plan by showing how much output is to be produced, in number of units. At this level plan ignores the individual product family details about size, color, weight, style etc. Aggregate plan provides the overall level of output, backlogs, and inventory dictated in the business plan. Hence it is necessary to break down the aggregate plan into finer details. This process of breaking down of aggregate plan into finer details is called Disaggregation. Disaggregation

leads to master production scheduling (MPS). MPS translates the aggregate plan into operational production schedules for individual products. It decides when individual products will be produced on a weekly basis.

1) It disaggregates the product groups into individual products and indicates where the individual products will be produced.

2) It links sales with production by showing when incoming sales orders can be scheduled around, when production is over and when shipments can be scheduled.

3.2. Supply chain and Logistics sector in India

In this globalized era, supply chain management has increased steadily since the 1980s. The companies began to see the benefits of collaborative relationships. The supply chain concept is still nascent in India. The need for SCM is necessary because of the challenges unleashed on the competitiveness of the Indian industry by deregulation and globalization. An essential first step in the process is to assess the current supply chain capability. A recently concluded extensive research carried out jointly by Management Development Institute, Gurgaon and KPMG India, the first of its kind in the country, to gauge the current state of supply chain management in the Indian industry. The research concludes large number of Indian organizations today have realized. The importance of developing and implementing a comprehensive supply chain strategy - and then linking that strategy to deliver bottom line results.

Many global supply chains are not equipped to cope with the world. Most were engineered, some brilliantly, to manage stable, high-volume production by capitalizing on labor-arbitrage opportunities available in China and other low-cost countries. But in a future when the relative attractiveness of manufacturing locations changes quickly along with the ability to produce large volumes economically- such standard approaches can leave companies dangerously exposed.

Spurred by a rising tide of global uncertainty and business complexity, is coming sooner than many companies expect. Some of the challenges (turbulent trade and capital flows, for example) represent perennial supply chain worries turbocharged by the recent downturn. Yet other shifts, such as those associated with the developing world's rising wealth and the emergence of credible suppliers from these markets will have supply chain implications for decades to come. The bottom line for would-be architects of manufacturing and supply chain strategies is a greater risk of making key decisions that become uneconomic as a result of forces beyond your control.

Against this backdrop, a few pioneering supply chain organizations are preparing themselves in two ways. First, they are "splintering their traditional supply chains into smaller, nimbler ones better prepared to manage higher levels of complexity. Second they are treating their supply chains as hedges against uncertainty by reconfiguring their manufacturing footprints to weather a range of potential outcomes. A look at how the leaders are preparing today offers insights for other companies hoping to get more from

their supply chains in the years to come. These are a part of Customization process in supply chains. "The stakes couldn't be higher, in our industry, the competitor that's best at managing the supply chain is probably going to be the most successful competitor over time. It's a condition of success from customer service point of view" (Jim Owens, 2012). Yet the legacy. supply chains of many global companies are ill-prepared for the new environment's growing uncertainty and complexity. "Rising manufacturing and supply chain costs, leaves a worry on worry on profitability and sustainability of the IT hardware sector" (Robert, 2011).

3.3 More uncertain world of Supply chain sector

68 percent of global executives responding to a recent McKinsey survey said that supply chain risk will increase in the coming five years. And no wonder, the financial crisis of 2008 dramatically amplified perennial sources of supply chain uncertainty-notably the trajectory of trade and capital-flows, as well as currency values-even as the crisis sparked broader worries about the stability of the financial system and the depth and duration of the resulting recession. While many of these sources of uncertainty persist, it's important to recognize that new, long-term shifts in the global economy will continue to pressure supply chains long after more robust growth returns.

Rising complexity

Supply chain planners must also deal with rising complexity For many companies, this need means working harder to meet their customers increasingly diverse requirements. Mobile-phone makers, for example, introduced 1820 more varieties of handsets in 2011 than they did in 2000 (Handset directory, 2012). Proliferation also affects mature product categories: the number of variants in baked goods, beverages, cereal, and confectionery, for instance, all rose more than 25 percent a year between 2004 and 2006, and the number of SKUs at some large North American grocers exceeded 100,000 in early 2012 (Grocery magazine, Mar 2012). This shows the complexities of many sectors in terms of supply chain.

Meeting the challenge

In such a world, the idea that companies can customize their supply chains once and for all circumstances and customers-is a fantasy. Recognizing this, a few forward-looking companies are preparing in two ways. First, they are splintering their traditional monolithic supply chains into smaller and more flexible ones. While these new supply chains may rely on the same assets and network resources as they old, they use information very Effectively-helping companies to embrace complexity while better serving customers

Second leading companies treat their supply chains as dynamic hedges against uncertainty by actively and regularly examining even reconfiguring their broader supply networks with an eye towards economic conditions five or ten years ahead. In doing so,

these companies are building diverse and more resilient portfolios of supply chain assets that will be better suited to thrive in a more uncertain world

Use ones network as a hedge

The advantages that multiple supply chains confer are most valuable, if companies view them dynamically, with an eye toward the resiliency of the overall supply chain under a variety of circumstances.

In fact, it's believed that the ability of supply chains to withstand a variety of different scenarios, could influence the profitability and even the viability of organizations in the not-too-distant future. In the light of this, companies should design their portfolios of manufacturing and supplier networks to minimize the total landed-cost risk under different scenarios.

Nonetheless, the rewards are worthwhile. By creating more resilient and focused supply chains that can thrive amid heightened uncertainty and complexity, companies will gain significant advantages in the coming years.

The recent global economic meltdown has served to shift the emphasis to reducing costs and improving the efficiency of supply chains across the sectors. which has led to the rise in outsourcing concept. The new generations of Indian corporations are looking at outsourcing of non-traditional logistics-functions such as reverse logistics, inventory management, orders processing, distribution and VAS

3.4Contribution of Supply chain Industry

"With companies across sectors of manufacturing industry increasingly outsourcing their Supply Chain requirement to third and fourth party service- providers, it is vital that the Supply Chain and logistics infrastructure is strengthened to support the growth in the industry. While the Indian SCM industry is estimated to have grown to \$125-130 billion, warehousing accounts for about 20 per cent of this market and is expected to grow to about \$55 billion by the end of the current fiscal (Council of Supply Chain Management Professionals, 2011) Apart from the steady expansion of operations by large domestic industrial groups, an increasing number of global majors in industries ranging from automotive and Consumer electronics to pharmaceuticals and IT Hardware have been targeting a spot in the highly lucrative Indian market (Frost and Sullivan, 2012).

Strong economic growth, outsourcing of logistics activities by various industries along with favorable government policies are likely to result in a 20% CAGR in Supply Chain industry in India for the next five years(Council of Supply Chain Management Professionals, 2011).

Despite the challenges of infra, labour, a ation and regulatory landscape, the Supply Chain industry in India is positioned to grow at healthy rate. Sectors such as Consumer electronics, IT hardware, Chemicals Pharmaceuticals, Metals, FMCG, Cement, Textiles,

Agri and Retail segment have been identified as the top contributors to the projected growth of the economy and by extension to logistics revenues (The Hindu. Business line, Feb 2012)

These industries need multimodal transportation services as they have a widespread consumer base but limited production bases Industries such as consumer electronics, FMCG, IT Hardware have considerable requirements for integrated logistics parks owing to their higher need for Supply Chain activity.

These industries are the leading contributors in the growth share accounted by total Indian logistics market (India Express Cargo Logistics Summit, 2011).

"Indian Express industry currently stands at 71 bn INR and is growing at 20% annually, Domestic Air Cargo industry in India is over 25000 mn INR with a growth rate of 12.9%, International Air Cargo is growing at a pace of 12.8% annually" (India Express Cargo Logistics Summit 2011).

- Indian Supply Chain and Logistics Industry is 130 Bn USD and growing (Finance ministry report, 2012)
- India spends more than 10% of its GDP on Logistics higher than USA, Europe and Japan
- Industry is growing at the consistent rate of 20%

3.5 Production planning and production

Manufacturing strategy consists of a sequence of decisions that, over time, enables a business unit to achieve a desired manufacturing structure, infrastructure and set of specific capabilities.

A strategic division can profoundly alter, and have major consequences for the firm. Strategic division can have long-term implication for the firm the factor of time an important one for strategies. The fig 14a explains firms operations in tactical and strategies areas. It indicates the tactical and strategic concerns in manufacturing operations (Steve Brown and others, 2005)

The strategy can be internal, resource-based or fully externally market- driven. In practice, organizations combine both internal and external considerations in the same way that they tend to innovate as a result of both "push technology (from internal development) and 'pull demand (from market requirements). These capabilities are not limited to operations only but they must include operations capabilities, including quality, innovation, flexibility of volume and variety requirements, delivery speed and reliability. Excellent marketing skills need to be in place within an organization and support world-class operations management capabilities (internal and external)

The firm must be aware of external, including macro-economic factors, social and technological changes. The PEST model (Political, Economic, Social and Technical elements) is convenient. The process of strategy is dynamic The content should include supply chain management, col

of mass production control, work organization and process choice. The process choice is the selection of the right approach to placing and delivering service

Production Planning Factors (Management Strategic Activities, covering Strategic and Tactical levels) and Production Factors (Shop Floor Production Activities, covering Operational Level and with scope of Internal Supply Chain) can be inclusive of Aggregate Planning, Disaggregation Capacity Planning and management, decision rules with MRP II, KANBAN, JIT, Green Channel Items Inventory, Quality and ERP packages. Analyzing and assimilating JIT, Kanban, Pull control and Lean manufacturing are essential for the study and they also help in formulating effective production planning systems.

JIT: Just in time is a method of planning and control and an operations philosophy that aims to meet demand instantaneously with perfect quality and no

Kanban: a Japanese term for card or signal; It is a simple controlling device that is used to authorize the release of materials in pull control systems such as those used in JIT.

Pull control: a term used in planning and control to indicate that a workstation requests work from the previous station only when it is required, one of the fundamental principles of just-in-time planning and control.

Lean manufacturing is an approach to operations management, that emphasizes the continual elimination of waste of all types, often used interchangeably with JIT: it is more an overall philosophy whereas JIT is used to indicate approach to planning and control that adopts lean principles.

A characteristic of an efficient production system is that jobs and materials flow smoothly through the system, most production lead time is value-added processing and jobs hardly ever wait. Since production schedules dictate the frequency and level of changes in products and output volumes, smooth production flow is largely a matter of production scheduling

Production leveling is the technique to hold the frequency and size of changes in production schedules to a minimum. Achieving level production is a cross functional effort to avoid imbalances between demand and production. Level production is a prerequisite for pull production. When a number of different

items are produced in the same process, uniform demand is achieved by intermixing products. This is called mixed-model production and refers to the mixed sequencing of different items as they move through the process. The mixed-model production requires flexible operations, cross-trained workers, strong emphasis of quality assurance and small lot delivery of incoming materials. Mass customization is the ability to produce products or services in high volume, yet vary their specification to the needs of the individual customers or types of customers. Aligning the production rates and sequences of all upstream work centers so that the materials arrive at the rate needed at the final stage,

called synchronization. Achieving smooth, uniform flow by equalizing the capacity and/or workload of all stages is called balancing

3.6 Production Planning and Production Factors

Supply chain activities are segmented into three levels based on the decision phases

1) Strategy/Design with the time frame of 3 to 5 years

2) Tactical/Planning with the time frame of to 3 years

3) Operational with the time frame of less than year.

Gunasekaran and others, (2004) and Sunil Chopra and others. (2007).

The following essential business processes are closely monitored by the supply chain members

- Viability
- Sustainability
- Retention of manpower,
- Competition among OEMs to attract the supplier
- Shortening Product Life Cycle
- Increase in varieties
- Skill set & knowledge

Motivation through incentives

- Mechanisms for information- sharing
- Mechanisms for conflict resolution

The supply chain activities involved in the Strategic and Tactical levels are classified as Management Strategic Activities (Production Planning Factors) and the supply chain activities involved in the Operational level are classified as Shop Floor

3.7 Production Activities (Production Factors).

Production and Production Planning Factors used in Manufacturing Industry are examined. Some of the Production factors are indicated in the literature, under the focus areas, Manufacturing Industry, Supply chain management, production planning and control and performance metrics. The other data are collected from the Training and Development manual of companies and discussion with practicing professionals in the production planning area. The production and production planning

activities are consolidated depending on the levels (Strategic, Tactical and operational) and the area of the activities (shop floor, company, corporate).

Depending on the nature of activities, they have been classified under Production and Production Planning factors. Management Strategic Activities are listed below as

- 1) Measures to control expenditure (power, water, manpower etc)
- 2) Infrastructure Development & Facilities
- 3) Training & Development (Training Needs/Effectiveness)
- 4) Technology-Flexibility in adoption
- 5) Supplier Development & support activities (Finance, Technical, supervisor, pricing, employees, Quality systems)
- 6) New Products Development
- 7) Information-connecting all SCM stages & ERP linkages
- 8) Transportation-raw material to customer end
- 9) Response to customer Requirements
- 10) Flexibility (production/HR/Products)
- 11) IR Performance Reviews Motivation
- 12) Creativity Partnership) Knowledge, Industry-Academic
- 13) Bench Marking
- 14) Expansion Plans (Diversification, New Locations-production, suppliers,Marketing-Network)
- 15) Corporate Social Responsibility
- 16) Quality Certifications

Management Strategic Activities are basically aimed to identify the activities connected to the Supply chain management at strategic and Tactical levels. Basically they

are involved in the flow of information, materials/products and finances apart from planning and projects functions. They include various parameters such as Quantity, Quality, Time, cost and Flexibility. They also address the customer requirements in terms of Value and Variety. The activities range from Product Development to product delivery ably supported by Logistics arrangements. The connected activities are Performance review, Incentives, Motivation, Training, Creativity and Innovation along with Expansion Plans, Infrastructure development, Supplier development, Diversification and Benchmarking.

The Corporate Social Responsibility normally fulfills the Government regulations (eg Pollution control, Environment protection, Acts of Income Tax Excise, Labor and Standing Orders), It undertakes Community development apart from welfare measures such as housing, medical and educational facilities for the employees, their wards and for the public. It aims to provide good working environment, food, air, fair treatment and training and development for their employees.

The Quality System denotes formulation and adaptation of product quality standards and data integrity. It also indicates quality of culture, Programs, Practices and their reliability.

One of the ways to survive in the competitive markets is to have Flexibility in addressing the demands of the customers with respect to Quantity, Quality, Time and cost of the products and services. It indicates flexibility in absorption of changes in technology and HR policies and practices.

3.8 Shop Floor production activities

- 1) Capacity-Plants, ware house, Transportation, suppliers
- 2) Production Planning & Control (Master Production Scheduling, MRP 1,MRP II)
- 3) Inventory Control
- 4) HR Policies
- 5) Quality Systems
- 6) Review of Manufacturing Processes
- 7) a) Job Shop b) Large Batch Shop c) Cellular Manufacturing d) Assembly Line e) continuous Process
- 8) Review of Manufacturing Practices (ERP, TOC, JIT, Lead Time Men Japanese Manufacturing & Quality Systems (5 S, SMED, QFD, VSM, Lean Manufacturing, Kaizen, six sigma)
- 9) Orchestration of all SCM Members
- 10) Performance Measurement-Finance, cost, consistent quality and delivery.

The Shop Floor Production Activities are basically aimed to identify the operating systems, processes and practices normally performed on the production shop floor. These activities are closely linked and are part of supply chain management, maintaining the continuity of systems and processes to fulfill the customer demands.

The capacity of the Plant include factors such as production volume, Quality, Jigs and Fixtures, Tools, manpower, knowledge. Training, Skill, Warehouse, Transportation and supply of materials and components. Review of Production processes and practices help the enhancement of technology flexibility.

TOC is theory of constraints to find out the bottleneck areas for the free flow of materials 35 is the habit formation in keeping place and materials clean and keeping them in designated places. SMED is single minute exchange of dies for reducing set up time. QFD is quality function deployment VSM is value stream mapping for studying the activities to reduce time and cost. Kaizen is continuous improvement. Six Sigma is a method of quality control and practices

3.9 RESEARCH MODEL

Research model represents synchronized working of system elements input, process, output, feedback and control surrounded by boundary conditions Quantity, Quality, Time and cost. The supply chain members, Manufacturer, T 1 supplier and T 2 supplier, dealer, retailer and customer, each one, is represented by a system.

The Research Model has "Strategies for Production and Production Planning Factors at its center, as Processing system element. The Strategies are formulated based on the competitive strategy of the company. The inputs for Strategies are from Marketing Competitors, Technologies and Organization. The outcome of the Inputs and processing through 'Strategies' results in the Output of the vehicles to be accounted in terms of cost, Quality, Delivery, Flexibility and Innovation. The three functions are continuously subjected to Feedback and Control functions and coordinated to avoid/reduce variances from targets. The Inputs from Technologies and Organization form the basis for internal controls as they are within the domains of the company. The inputs about Competitors and information from Marketing form the basis for external controls with possible limitations on the company.

The above Concept is extended to all the members of the Supply chain Management with each member is treated as a system. Each member is having system elements, input, processing, output along with feedback and control.

Supply chain members are represented as six entities with each entity working as a system.

- TI Suppliers
- OEM

- Distributor
- Retailers
- T2 Suppliers
- Customer

Each of these six entities are representing a system with its Input, Process, Output, Feedback and Control along with its Boundary conditions. Each one is interlinked with other directly or indirectly. They have common Objectives and Interests. (Forrester JW 1999)

The conceptual frame work for the supply chain management and production planning strategies are developed to analyze various options and to take appropriate decisions.

The consolidation of production planning factors is done by combining the details from few of the publications and by examining their applications.

The research model is developed to represent Production and production planning strategies' as 'system process element with supporting 'Input system elements. It has "feedback" and "control" mechanism among the system elements The "output" is monitored continuously against set standards. The research model is extended to cover manufacturer, Tier 1 and Tier 2 suppliers.

In ensuing chapters, the production planning factors are subjected to further analysis to examine their influences in economic changes and on achieving the business economic goals

PROBLEMS AND PROSPECTS OF CUSTOMER SERVICE

CHAPTER-IV

PROBLEMS AND PROSPECTS OF CUSTOMER SERVICE AND SUPPLY CHAIN MANAGEMENT- AN ANALYSIS

4.1 INTRODUCTION

This chapter is intended to analyze the socio economic profile of respondents working in manufacturing industries and their views about the prospects, benefits and effects of SCM in their companies are sharply estimated in this chapter. The researcher used univariate and multivariate statistical tools t-test, factor analysis, cluster analysis, one way analysis of variance, regression to examine the perception of employees towards SCM in customer service in manufacturing companies.

4.2 ANALYSIS PERTAINING TO OBJECTIVE 1

Position in company

The employees of the manufacturing companies are greatly influenced by the designation assigned to them. In certain cases, it is obviously felt that the designation matters much more than the pay. The manufacturing companies take much care in formulating the designations and setting up the hierarchy to the effective practice of supply chain. It is felt that employees consider designation as a prominent factor determining their perception towards supply chain. They are grouped under three heads - Sr. Manager, Manager and Dy.Manager.

.Table 4.1: position in company

Position	Frequency	Valid Percent
Sr. Manager	27	7.1
Manager	196	51.4
Dy. Manager	158	41.5
Total	381	100.0

Age

Age is a crucial factor which depicts the personal and psychological maturity of the individuals. The effectiveness on the productivity and output of the employees depends upon the age group to which they belong. In this analysis, the responses acquired from the various age groups of employees are depicted below.

It can be extracted from the table that the sample unit comprises 46.23% of employees in the age 30 to 40 years, 28.3% of employees between 41 to 50 years and

25.5% of the employees in the age above 50 years. This shows that the sample unit is dominated by the employees whose age is between 30-40 years.

Age	Frequency	Valid Percent
30 - 40	176	46.2
41 - 50	108	28.3
Above 50	97	25.5
Total	381	100.0

Experience in supply chain area

As far as the manufacturing companies is concerned, experience in supply chain management by the senior managers, managers and deputy managers takes a lead in depicting their resume and exhibits the knowledge potentialities. The value added to the manufacturing companies by the employees is enhanced through experience. The responses are collected from the senior managers, managers and deputy managers based on their experience in the supply chain management. The data are expressed as frequency distribution in the table below.

Table 4.3: Experience

Years	Frequency	Valid Percent
0 - 5	135	35.4
6 - 10	118	24.7
Over 10	128	41.7
Total	381	100.0

The above table displays that 35.4% of employees have five years of experience in SCM, 33.7% of the employees have more than 10 years of experience and 30.9% of the employees have 6 to 10 years of experience. It can be inferred that the sample unit consists of maximum number of executives are have 0 to 5 years of experience in SCM.

Nature of organization

The SCM is practices in many organizations. The researcher for his study has segregated this organization into manufacturing, trading and both. The following table explains the frequencies presented below.

Table 4.4: Nature of organization

Position	Frequency	Valid Percent
Manufacturing	128	33.6
Trading	94	24.7
Both	159	41.7
Total	381	100.0

From the above table, it can be identified that the responses from the sample unit comprises 41.7% of the organization possess both manufacturing and trading organization, 33.6% of the organization have manufacturing organization and 24.7% have only trading organization. The percentage analysis clearly shows that the sample maximum of the organization practicing SCM have both manufacturing and trading organization.

Educational Qualification

Education plays a vital role in shaping the personality of an individual determining his future career prospects. It can be inferred that employees are categorized on the basis of their educational qualification in manufacturing companies namely technical and non-technical. In this study the responses are collected from both the groups. Their frequency distribution is presented as in the table given below

Table 4.5: Educational Qualification

Major	Frequency	Valid Percent
Technical Education	219	57.5
NON - Technical Education	162	42.5
Total	381	100.0

From the above table it is found that 57.5% of the employees having experience in SCM have technical educational qualification and 42.5% of the employees have non-technical education experience. The percentage analysis shows that the sample unit is dominated by employees have technical education qualification.

Executives opinion to have a separate Logistics department

The logistics department is an important aspect for the effective supply chain management practices in an organization. The executives in manufacturing companies have different opinion about the need for a separate logistics department. They responded their opinion in a bipolar opinion and results are presented in the table below

Table 4.6: Opinion of executives to have a separate logistics department in manufacturing companies

Opinion	Frequency	Percent	Valid Percent	Cumulative percent
Yes	224	84.9	84.9	84.9
No	57	15.1	15.1	100.0
Total	381	100.0	100.0	

The above table shows that 84.9% of the executives of manufacturing companies of the opinion have separate logistics department for the smooth flow of supply chain management practices. It is also found that remaining 15.1% feel that there is no need to have a separate logistics department for the smooth flow of supply chain management practices.

Clear logistics strategic plan

Strategic plan is a vision and mission statement to achieve the goal of organization. Clear strategic plan is an important aspect for the effective supply chain management practices in an organization. The executives in manufacturing companies have different opinion about the need for a clear logistics strategic plan. They responded their opinion in a bipolar opinion and results are presented in then table below

Table 4.7: Clear logistics Strategic plan

Opinion	Frequency	Percent	Valid Percent	Cumulative percent
Yes	287	75.3	75.3	75.3
No	94	24.7	24.7	100.0
Total	381	100.0	100.0	

From the above table it is found that 75.3% of the executives of manufacturing companies of the opinion have clear logistics strategic plan for the smooth flow of supply chain management practices. It is also found that remaining 24.7% feel that there is no need to have a logistic strategic plan for the smooth flow of supply chain management practices.

Standard software packages procedures in handling supply chain

The executives of manufacturing companies use standard software packages and procedures in handling supply chain. The following frequency table explains the percentage of executives handling the software package.

Table 4.8: Standard software packages procedures

Opinion	Frequency	Percent	Valid Percent	Cumulative percent
Yes	246	64.6	64.6	64.6

No	135	35.4	35.4	100.0
Total	381	100.0	100.0	

From the above table it is understood that 64.6% of the executives of manufacturing and trading companies use standard software packages for handling supply chain whereas 35.4% of the executives in the organization are not interested in using standard software packages in handling supply chain. Therefore it is concluded that most of the executives use different standard software packages for handling supply chain.

4.3 ANALYSIS PERTAINING TO OBJECTIVE 2

T-Test for different ways of establishing Supply chain Management in an organization The supply chain process is an important aspect in any manufacturing sector to increase organizational productivity. SCM is a conglomeration of several elements (See appendix). These elements and their important are recognized by the execution in different department of manufacturing companies. The researcher considered 13 elements of SCM and their important is analyze through a parametric 'T' test. The application of 't' test and 13 elements of supply chain brought the following results.

Table 4.9: One sample statistic for elements of SCM

Elements of SCM	N	Mean	Std. Deviation	Std. Error Mean
Close partnership with supplies	381	4.483	.685	.071
Close partnership with customers	381	4.387	.676	.070
JIT supply	381	4.397	.739	.076
e-procurement	381	4.473	.600	.062
Outsourcing	381	4.408	.679	.070
Subcontracting	381	4.526	.669	.063
3PL	381	4.397	.677	.070
Plan strategically	381	4.473	.716	.074
Supply Chain Benchmarking	381	4.333	.742	.076
Few Suppliers	381	4.516	.774	.080
Holding safety stock	381	4.413	.756	.078
Use of external consultants	381	4.365	.869	.090
Others	381	4.215	.895	.092

The above table shows that the mean value of the 13 variables ranges from 4.21 to 4.52 and standard deviation ranges from .60 to .89. The standard error of the mean also consistent and is varies from .062 to .092. It is found that the 't' values 20.877, 19.783, 18.235, 23.655, 19.992, 22.008, 19.885, 19.837, 17.327, 18.871, 18.095, 15.144, 13.092 are

statistically significant at 5% level and all the 't' values are positive with consistent standard deviation. Therefore it can be concluded that the executives in manufacturing companies strongly agree the e-procurement, sub-contracting and close partnership with suppliers. They strongly believe these elements of supply chain are very important of organization for smooth flow of supply chain through the entire department. Secondly for the best practices of supply chain management the executives agree to consider the following factors close partnership with customers, outsourcing, 3PL, Plan strategically, few Suppliers, Holding safety stock. Finally the executives of Manufacturing companies neutral to consider the given elements Supply chain benchmarking, use of external consultants and other factors for the perfect practices of SCM.

4.4 DIFFERENT SYSTEMS SUPPORTING SUPPLY CHAIN MANAGEMENT

1) Material requirement planning

In manufacturing companies the raw materials and other corollary supportive materials are properly planned through the material requirement planning system. This package is used in all the department of manufacturing companies for the appropriate information regarding raw material requirement and other productive material. The executives gave their opinion of using MRP in their department

Table 4.10: Material Requirement Planning (MRP)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	164	43.0	43.0	43.0
Standard Package	139	36.6	36.6	79.6
Not in use	78	20.4	20.4	100.0
Total	381	100.0	100.0	

From the above table it is clear that the 43% of the department use in the MRP in the custom made form 36.6 % of the department use in the standard package form and 20.4% of the departments do not use MRP systematically.

2) Manufacturing Resources planning (MRPII)

In manufacturing companies master production schedule, Bill of materials, inventories and orders, Material requirement planning are properly planned through MRP II system. The executives gave their opinion of using MRPII in their department

Table 4.10: Manufacturing Resources planning (MRPII)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	139	36.6	36.6	36.6
Standard Package	148	38.7	38.7	75.3
Not in use	94	24.7	24.7	100.0
Total	381	100.0	100.0	

From the above table it is ascertained that the 36.6% of the department use in the MRPII in the custom made form. 38.7 % of the department use in the standard package form and 24.7% of the departments do not use MRPII systematically.

3. Enterprise Resource planning (ERP)

In Manufacturing companies Enterprise resource planning (ERP) systems integrate internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, customer relationship management. The executives gave their opinion of using MRPII in their department

Table 4.11: Enterprise Resource planning (ERP)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	148	38.7	38.7	38.7
Standard Package	139	36.6	36.6	75.3
Not in use	94	24.7	24.7	100.0
Total	381	100.0	100.0	

From the above table it is clear that the 38.7% of the department use in the ERP in the custom made form. 36.6% of the department use in the standard package form and 24.7% of the departments do not use ERP systematically.

4) Warehouse Management System (WMS)

In manufacturing companies using Warehouse Management system (WMS) the product receiving, storing, picking solutions are maintained successfully. The executives view is given below.

Table 4.12: Warehouse Management System (WMS)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	197	51.6	51.6	51.6

Standard Package	115	30.1	30.1	81.7
Not in use	69	18.3	18.3	100.0
Total	381	100.0	100.0	

From the above table it is found that the 51.6% of the department use in the WMS in the custom made form. 30.1 % of the department use in the standard package form and 18.3 % of the departments do not use WMS systematically.

5) Customer Relationship Management (CRM)

In manufacturing companies Customer relationship management (CRM) is a widely implemented for managing a company's interactions with customers, clients, and sales prospects. The executive's opinion is given below

Table 4.13: Customer Relationship Management (CRM)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	188	49.5	49.5	49.5
Standard Package	127	33.3	33.3	82.8
Not in use	66	17.2	17.2	100.0
Total	381	100.0	100.0	

The above table reveals that the 49.5% of the department use in the CRM in the custom made form. 33.3 % of the department use in the standard package form and 17.3% of the departments do not use CRM systematically.

6) Supplier Relationship Management (SRM)

In manufacturing companies, Supplier relationship Management (SRM) clearly maintaining for creating closer, more collaborative relationships with key suppliers in order to uncover and realize new value, and reduce risk. The executives opinion is stated below

Table 4.14: Supplier Relationship Management (SRM)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	164	43.0	43.0	43.0
Standard Package	139	36.6	36.6	79.6
Not in use	78	20.4	20.4	100.0
Total	381	100.0	100.0	

From the above table it is found that the 43.0% of the department use in the SRM in the custom made form. 36.6 % of the department use in the standard package form and 20.4 % of the departments do not use SRM systematically.

7) Advanced Planning system

In Manufacturing companies, the advanced planning systems that support the solution of primarily operative planning problems in Supply Chain Management, Logistics and Operations Management with the help of quantitative solution methods (Operations Research methods). The executive's mindset is given below table.

Table 4.15: Advanced Planning System (APS)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	164	43.0	43.0	43.0
Standard Package	139	36.6	36.6	79.6
Not in use	78	20.4	20.4	100.0
Total	381	100.0	100.0	

The above table shows that the 48.4% of the department use in the APS in the custom made form. 34.4 % of the department use in the standard package form and 17.2% of the departments do not use APS systematically.

8) Just in time

Followed by the technique of JIT the Manufacturing companies focus on continuous improvement and can improve a manufacturing organization's return on investment, quality, and efficiency. The executives are stated their opinion below.

Table 4.16: Just In Time (JIT)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	164	43.0	43.0	43.0
Standard Package	135	35.5	35.5	78.5
Not in use	82	21.5	21.5	100.0
Total	381	100.0	100.0	

From the above table it is found that the 43.0% of the department use in the JIT in the custom made form. 35.5% of the department use in the standard package form and 21.5% of the departments do not use JIT systematically.

9) E-Commerce

In Manufacturing companies with the help of Electronic commerce draws on such technologies as electronic funds transfer, supply chain management, Internet marketing, online transaction processing, electronic data interchange (EDI), inventory management systems, and automated data collection systems for the smooth flow of SCM. The executives suggestion is given in the table

Table 4.17: E-Commerce

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	152	39.8	39.8	39.8
Standard Package	135	35.5	35.5	75.3
Not in use	94	24.7	24.7	100.0
Total	381	100.0	100.0	

From the above table it is understood that the 39.8% of the department use in the E-commerce in the custom made form. 35.5 % of the department use in the standard package form and 24.7% of the departments do not use JIT systematically.

10) Decision support/expert system

In manufacturing companies they are practicing the decision support system (DSS) to supports business or organizational decision-making activities. DSSS serve the management, operations, and planning levels of an organization and help to make decisions, which may be rapidly changing and not easily specified in advance. The employees of manufacturing companies opinion is given below

Table 4.18: Decision support/expert system

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	184	48.4	48.4	48.4
Standard Package	127	33.3	33.3	81.7
Not in use	70	18.3	18.3	100.0
Total	381	100.0	100.0	

The above table illustrates that the 48.4% of the department use in the Decision support/expert system in the custom made form. 33.3 % of the department use in the

standard package form and 18.3% of the departments do not use Decision support/expert systematically.

11) Radio Frequency Identification (RFID)

In manufacturing companies -frequency electromagnetic fields are used to transfer data from a tag attached to an object, for the purposes of automatic identification and tracking. The executive's opinion is given in the table

Table 4.19: Radio Frequency Identification (RFID)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	160	41.9	41.9	41.9
Standard Package	131	34.4	34.4	76.3
Not in use	90	23.7	23.7	100.0
Total	381	100.0	100.0	

From the above table it is found that the 41.9% of the department use in the RFID in the custom made form. 34.4 % of the department use in the standard package form and 23.7% of the departments do not use RFID.

12) Electronic Data Interchange (EDI)

In manufacturing companies Electronic Data Interchange is used to transfer electronic documents or business data from one computer system to another computer system for the effective flow of SCM. The executive's opinion is given in the table

Table 4.20: Electronic Data Interchange (EDI)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	168	44.1	44.1	44.1
Standard Package	160	41.9	41.9	86.0
Not in use	53	14.0	14.0	100.0
Total	381	100.0	100.0	

From the above table it is ascertained that the 44.1% of the department use in the EDI in the custom made form. 41.9 % of the department use in the standard package form and 14.0% of the departments do not use EDI.

13) Transport Management System

In manufacturing companies using Transportation Management System software deals with the planning and execution of the external physical (transportation) of products across supply chains. In this juncture the executive's opinion is given below

Table 4.21: Transport Management System (TMS)

Option	Frequency	Percent	Valid Percent	Cummulative Percent
Custom made	176	46.2	46.2	46.2
Standard Package	152	39.8	39.8	86.0
Not in use	53	14.0	14.0	100.0
Total	381	100.0	100.0	

From the above table it is found that the 46.2% of the department use in the TMS in the custom made form. 39.8 % of the department use in the standard package form and 14.0% of the departments do not use TMS.

4.5 ANALYSIS PERTAINING TO OBJECTIVE 3-PROBLEMS IN IMPLEMENTING THE SUPPLY CHAIN MANAGEMENT IN MANUFACTURING COMPANIES

Factors of problems in implementing supply Chain Management practices in Manufacturing companies

Since manufacturing companies deals with health care products the supply chain management practices face some problems at the implementation level as well as at the functional level. The literature reviews at national and international level on SCM practices in health care industry identified seventeen predominant problems at the point of implementation as well as execution. In order to reduce this variables into predominant factors to get a picture of colossal problem faced by companies. At this juncture factor analysis by principle component method is applied to reduce the variable in to predominant factors. The application of factor analysis on the 17 problems of implementing SCM in manufacturing companies derived the following results

Table 4.22: KMO and Bartlett's Test in implementing supply chain management practices in Manufacturing companies.

KMO measure of sampling adequacy		.836
Bartlett's Test of Sphericity	Approx. Chi-Square	1048.509
	df	136

	Sig.	.000
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From the above table it is found that the Kaiser- Meyer-Olkin measure of sampling adequacy is .836 and Bartlett's test of sphericity with approximate Chi- Square value 1048.509 are statistically significant at 5% level. These designate all the 17 variables are more appropriate and suitable to reduce into predominant problems of SCM implementation. This leads to further verification of significant variances existing among 17 variables.

EFFECTIVENESS OF SUPPLY CHAIN MANAGEMENT

CHAPTER-V

EFFECTIVENESS OF SUPPLY CHAIN MANAGEMENT IN CUSTOMER SERVICE AN ANALYSIS

This chapter completely evaluates the primary data to verify objective 4, 5 and 6 of the research. The main aim of this chapter is to sharply estimate the perceptual difference among executives of manufacturing companies as well as the convenient and standard implementation of SCM for the effectiveness of the organizations. The multivariate statistical techniques, one-way ANOVA and multiple regression analysis are used to analyse the primary data comprises of independent and dependent variables.

5.1 ANALYSIS PERTAINING TO OBJECTIVE 4

Factors towards Effectiveness of Supply Chain in Customer Services in Manufacturing Companies

The factor analysis is applied on 17 variables of effectiveness of supply chain in customer services in manufacturing companies derived the following results and factor segmentation

Table 5.1: KMO and Bartlett's Test

KMO measure of sampling adequacy		.811
Bartlett's Test of Sphericity	Approx. Chi-Square	746.972
	df	136
	Sig.	.000

From the above table KMO and Bartlett's Test it is found that the sampling adequacy value 0.811 and the Chi-Square value for Bartlett's Test of Sphericity 746.97 are statistically significant at 5% level. This means that the 17 variables relating to effectiveness of supply chain in customer services in manufacturing companies are adequate in demonstrating the normal distribution of the sample. It also shows that the sample size is adequate and the factors would be emerged are reliable

From the above table it is found that the variance of the 17 variables effectiveness of supply chain in customer services in manufacturing companies ranges from 0.545 to 0.770. Therefore this varies from 54.5% to 77.0 %. The upper limit of the variance is statistically significant and as the implication of properly segregated predominant factors as expressed in the table below:

Table 5.2: Total Variance Explained

Component	Initial Eigen	Extraction Sums of Squared Loadings	Rotation Sums Values of Squared Loadings
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	Total	% of Cumulative Variance %	Cumulative Variance %	Total	% of Cumulative Variance %	% of Cumulative Variance	Total	Variance	% of Cumulative Variance
2	1.968	37.551	37.551	6.384	37.551	37.551	3.583	21.079	21.079
3	1.247	11.579	49.130	1.968	11.579	49.130	2.549	14.997	36.075
4	1.167	7.333	56.463	1.247	7.333	56.463	2.378	13.990	50.065
5	1.008	6.865	63.328	1.167	6.865	63.328	1.826	10.744	60.809
6	0.887	5.929	69.257	1.008	5.929	69.527	1.436	8.448	69.257
7	0.728	5.220	74.777						
8	0.627	4.280	78.757						
9	0.570	3.685	82.442						
10	0.497	3.335	85.798						
11	0.411	2.923	91.136						
12	0.353	2.415	93.210						
13	0.337	2.074	95.195						
14	0.266	1.984	96.760						
15	0.231	1.565	98.111						
16	0.176	1.359	99.152						
17	0.144	0.848	100.00						

Extraction Method: Principal Component Analysis.

From the above table it is found that the 17 variables are reduced into 5 major factors with Eigen values 3.583, 2.549, 2.378, 1.826 and 1.436 are statistically significant. The 5 major factors also possess significant individual values 21.079, 14.997, 13.990, 10.774 and 8.448 with total cumulative variance 69.257. This clearly indicates the very existence of 5 major factors with their respective variable loadings as expressed in the table given below:

Table 5.3: Rotated Component Matrix (a)

	Component				
	1	2	3	4	5
Introduce production planning and control system	.815				
Refines the inventory control system	.773				
Insists to follow periodic quality certifications	.758				
Helps to adopt corporate social responsibility	.660				
SCM is the performance measurement indicator	.634				
Helps to carry out expansion plans	.613				
Helps to integrate all the departments		.774			
Helps the organization in involving HR performance		.721			
SCM is performance measurement indicator		.690			
Helps refine the infrastructure development and facilities		.587			

SCM helps to control expenditure in the organization			.782		
Helps to give proper responses to customers on their complaints			.739		
SCM helps to adopt technology and flexibility			.733		
Human behaviour has effectiveness on supply chain and customer services				.773	
A minor change in demand has significant effectiveness on supply chain variation				.763	
Helps to achieve bench marking against industry leaders					.796
Encourages to learn skills, knowledge acquirement in organization					.604

Extraction Method:

Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 8 iterations. From the above table it is clear that there are five factors to be considered for effectiveness of supply chain in customer services in manufacturing companies.

The first factor consists of 6 variables

Introduce production planning and control system (0.815)

Refines the inventory control system (0.773)

Insists to follow periodic quality certifications (0.758)

Helps to adopt corporate social responsibility (0.660)

SCM is the performance measurement indicator (0.634)

Helps to carry out expansion plans (0.613)

Hence, the first factor can be called as "Periodic controls"

The second factor consists of 4 variables

Helps to integrate all the departments (0.774)

Helps the organization in involving HR performance (0.721)

SCM is performance measurement indicator (0.690)

Helps refine the infrastructure development and facilities (0.587)

Hence, the second factor can be called as "Constructive integration"

The third factor consists of 3 variables

SCM helps to control expenditure in the organization (0.782)

Helps to give proper responses to customers on their complaints (0.739)

SCM helps to adopt technology and flexibility (0.733)

Hence, the third factor can be called as "Technology augmentation"

The fourth factor consists of 3 variables

Human behaviour has effectiveness on supply chain and customer services (0.773)

A minor change in demand has significant effectiveness on supply chain variation (0.763)

Hence, the fourth factor can be called as "Best customer service"

The fifth factor consists of 2 variables

Helps to achieve bench marking against industry leaders (0.796)

Encourages to learn skills, knowledge acquirement in organization (0.604)

Hence, the fifth factor can be called as "skill developments"

The factor analysis revealed the supply chain management practices are highly significant among the manufacturing companies to periodically evaluate the efficiency of the system and to control during emergency. The constructive integration and technology augmentation are important outputs of supply chain in the manufacturing sector to expose their potentiality. The supply chain paved the way for the companies to offer best customer service and also useful to develop the skill of the employees.

5.2 The relationship between prospects and effectiveness of SCM in customers service

In any organization the SCM practices are focused at the increase of organizational efficiency and productivity. Therefore it is important to identify the appropriate SCM practices to give maximum prospects to the organization. This forces to establish the relations between prospects and effectiveness of SCM. Therefore in this juncture Karl parson's coefficient of correlation is applied and the results are presented below. For this analysis the three factors are prospects for SCM in customer service namely, efficiency increase, Cost effectiveness, Coordinating effects are considered in one hand and 5 important of SCM factors 1) Periodic controls 2) Constructive integration 3) Technological augmentation 4) Best customer service 5) Skill developments are considered in another

hand. The following matrix indicates the relationship between prospects and effectiveness of SCM in organization

Correlation is significant at the 0.01 level (2-tailed). • Correlation is significant at the 0.05 level (2-tailed).

efficiency increase and the Periodic controls are positively correlated ($r=.676$). This shows that the SCM practices increase the efficiency of the manufacturing companies and in term, it increases it competency to meet the productivity demand as well as challenges at the production front.

Similarly periodic controls and cost effectiveness are positively correlated ($r=.625$). This shows that the SCM practices will support to the organization of manufacturing companies to maintain cost effectiveness to meet out the customer expectation.

The correlation table shows the positive correlation between Periodic controls and Coordinating effects($r=.417$). This shows that the good SCM practices increase the coordination among the employees and also able to control the employees within the framework of commitment and productivity.

There is a positive correlation between efficiency increase and Constructive integration ($r=.689$) Therefore it can be concluded that SCM practices impose constructive integration in the organization setup to increase the individual and organizational efficiency. The positive correlation between Cost effectiveness and constructive integration ($r=.643$) implies SCM practices create a positive climate of reducing unnecessary expenditure and to increase profitability.

There is a positive correlation between Coordinating effects and Constructive integration ($r=.417$), efficiency increase and Technological augmentation ($r=.543$), Cost effectiveness and Technological augmentation($r=.543$). Co coordinating effectsand technological augmentation ($r=.382$), efficiency increase and Best customer service ($r=.457$), Cost effectiveness and Best customer service($r=.509$), between Coordinating effects and Best customer service ($r=.282$), efficiency increase and skill developments ($r=.1025$), Coordinating effects and skill developments ($r=.269$).

It shows that SCM prospects in customer service in manufacturing companies are well related among coordinating effects of various departments and constructive integration among the employees. The SCM practices are the important cause for manufacturing companies efficiency through technological augmentations and reduction in the cost to increase the profitability. They are able to achieve in the offer of best customer services and best coordination among the employees in different departments. It also helps the employees to acquire skill developments as well as to have better coordination at various levels of designations. Classification of executives on the basis of their perception towards

5.3 Effectiveness of SCM

The cluster analysis is applied on the three factors problems of SCM namely periodic controls, constructive integration, technological augmentation, best customer service and skill development and the results are presented below.

Table 5.4: Final Cluster Centers of executives perception towards

	Cluster	
	1	2

Periodic controls	2.28	4.51
Constructive integration	2.58	4.44
Technological augmentation	2.22	4.44
Best customer service	2.67	4.52
Skill developments	4.00	4.38

Table 5.5: Number of Cases in each Cluster of executives perception towards effectiveness of SCM

Cluster	1	107.000(28.1%)
	2	274.000(71.9%)
Valid		381.000(100%)
Missing		.000

From the above table it is found that the sample unit is segmented into two heterogeneous groups with respect to factors of effectiveness of SCM. The first group consists of 28.1% of employees with moderate agreements with 5 effectiveness namely periodic controls, Constructive integration, technological augmentation, Best customer service, Skill developments. Therefore this group is known as moderate effectiveness realizes. The other group consists of maximum number of employees 71.9% with strong agreements for the effectiveness of SCM. Therefore this group is known as maximum effectiveness realizes.

1. Cross tab Association between clusters of prospects of SCM and effectiveness of SCM

The Application of K-means cluster analysis designed 2 different clusters of prospects of SCM as well as the effectiveness of SCM. The cross tabs between these two clusters clearly presented the following results

Table 5.6: Crosstab for the association between clusters of prospects of SCM and effectiveness of SCM

			Effectiveness		Total
			1	2	1
Prospects	1	Count	78	94	172
		% within Prospects	45.3%	54.7%	100.0%
	2	Count	29	180	209
		% within Prospects	13.9%	86.1%	100.0%
Total		Count	107	274	381
		% within Prospects	28.1%	71.9%	100.0%

From the above table it is found that 45.3% of moderate prospectors moderately realize the effectiveness and 54.7% of moderate prospectors realize maximum effectiveness of SCM.

It is also found that 13.9% of maximum prospectors 86.1% of them also realize moderate as well as maximum prospects of SCM. These leads to the test of attributes through Chi-Square analysis and following results are obtained.

Table 5.7: Chi-Square Tests for the association between clusters of prospects of SCM and effectiveness of SCM

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
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Pearson Chi-Square	11.356(b)	1	.001		
Continuity Correction(a)	9.845	1	.002		
Likelihood Ratio	11.576	1	.001		
Fisher's Exact Test				.001	.001
Linear-by-Linear Association	11.234	1	.001		
N of Valid Cases	381				

a Computed only for a 2x2 table

b 0 cells (.0%) have expected count less than 5. The minimum expected count is 11.74.

From the above table it is found that the Chi-Square is 11.356, $P = .001$ is statistically significant at 5% level. This indicates there is an association between clusters of prospects of SCM and effectiveness of SCM. Therefore it concluded that the effective SCM practices depend up on both prospects as well as effectiveness realized by the organization in implementing SCM Practices. Cross tab Association between clusters of problems of SCM and

1.effectiveness of SCM

The Application of K-means cluster analysis designed 2 different clusters of problems of SCM as well as the effectiveness of SCM. The cross tabs between these two clusters clearly presented the following results

Table 5.8: Crosstab for the association between clusters of problems of SCM and effectiveness of SCM

			Effectiveness		Total
			1	2	1
Problems	1	Count	53	90	143
		% within Problems	37.1%	62.9%	100.0%
	2	Count	53	185	238
		% within Problems	22.3%	77.7%	100.0%
Total		Count	106	275	381
		% within Problems	27.8%	72.2%	100.0%

From the above table it is found that 37.1% of moderate problem facers realize the effectiveness and 62.9% of moderate problem facers realize maximum effectiveness of SCM. It is also found that 22.3% of maximum problem facers 77.7% of them also realize moderate as well as maximum problems of SCM. These leads to the test of attributes through Chi-Square analysis and following results are obtained.

Table 5.9: Chi-Square Tests for the association between clusters of problems of SCM and effectiveness of SCM

	Value	Df	Asymp. Sig.	Exact Sig.	Exact Sig.
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			(2-sided)	(2-sided)	(1-sided)
Pearson Chi-Square	2.351(b)	1	.025		
Continuity Correction(a)	1.677	1	.195		
Likelihood Ratio	2.311	1	.128		
Fisher's Exact Test				.025	.098
Linear-by-Linear Association	2.326	1	.127		
N of Valid Cases	381				

a Computed only for a 2x2 table, b 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.78. From the above table it is found that the Chi-Square is 2.351, $P = .025$ is statistically significant at 5% level. This indicates there is an association between clusters of problems of SCM and effectiveness of SCM. Therefore it is concluded that the effective SCM practices depend up on both problems as well as effectiveness faced by the organization in implementing SCM Practices.

Association between clusters of effectiveness and procedure in case of non-conformities regarding SCM in Manufacturing companies

The K-means cluster analysis identified two different types of clusters of effectiveness namely 1) Moderate effectiveness realizes 2) Maximum effectiveness realizes of SCM. The employees express their perception to have separate logistics department. The cross tables between the clusters of effectiveness the bipolar opinion of need for logistics department derived the following results.

Table 5.9: Crosstab association between clusters of problems and procedure in case of non conformities regarding SCM in manufacturing companies

			Need for logistics department		Total
			1	2	1
Effectiveness	1	Count	91	16	107
		% within Effectiveness	85.1%	14.9%	100.0%
	2	Count	233	41	274
		% within Effectiveness	97.8%	17.2%	100.0%
Total		Count	324	57	381
		% within Effectiveness	85.1%	14.9%	100.0%

From the above table it is found that 85.1% of moderate effectiveness realizes and 97.8% of maximum effectiveness realizes demand separate logistic department in manufacturing companies. Whereas 14.9% of moderate effectiveness logistic department. Therefore this leads to the non-parametric Chi-Square analysis of associations as presented in the table below.

5.4 Association between clusters of effectiveness and clear logistics strategic plan in Manufacturing companies

Table 5.10: Crosstab association between clusters effectiveness and clear logistics strategic plan in manufacturing companies

			Need for logistics department		Total
			1	2	1
Effectiveness	1	Count	87	20	107
		% within Effectiveness	81.3%	18.7%	100.0%
	2	Count	201	73	274
		% within Effectiveness	84.4%	30.6%	100.0%
Total		Count	288	93	381
		% within Effectiveness	75.6%	24.4%	100.0%

From the above table it is found that 81.3% of moderate effectiveness realizes and 84.4% of maximum effectiveness realizes suggested for clear logistics effectiveness realizes and 30.6% of maximum effectiveness realizes do not care for clear logistic plan. Therefore this leads to the non-parametric Chi-Square analysis of associations as presented in the table below.

Table 5.11: Chi Squares test for association between clusters effectiveness and clear logistics strategic plan in manufacturing companies

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.587(b)	1	.444		
Continuity Correction(a)	.248	1	.618		
Likelihood Ratio	.608	1	.436		
Fisher's Exact Test				.594	.315
Linear-by-Linear Association	.580	1	.446		
N of Valid Cases	381				

a Computed only for a 2x2 table, b 0 cells (.0%) have expected count less than 5. The minimum expected count is 6.43.

From the above table it is found that the Pearson Chi-Square value is .587 and $P=.444$ which is statistically insignificant. Therefore it can be concluded that the perceptual difference among the employees on effectiveness of SCM is not affected by their opinion on having logistics strategic plan. It is an independent opinion of the employees to have

logistic strategic plan not only possess SCM effectiveness but also to have other effectiveness in their organization.

Association between clusters of effectiveness and procedure for non-conformities regarding SCM in Manufacturing companies

Table 5.12: Crosstab association between clusters effectiveness and procedure for non-conformities regarding SCM in manufacturing companies Soft package

			Soft Package		Total
			1	2	1
Effectiveness	1	Count	74	33	107
		% within Effectiveness	69.2%	30.8%	100.0%
	2	Count	172	102	274
		% within Effectiveness	72.2%	42.8%	100.0%
Total		Count	246	135	381
		% within Effectiveness	64.6%	35.4%	100.0%

From the above table it is found that 69.2% of moderate effectiveness realizes and 72.2% of maximum effectiveness realize the effectiveness and procedure for non-conformities regarding SCM in manufacturing companies. Whereas 30.8% of moderate effectiveness realizes and 42.8% of maximum effectiveness realizes do not care for clear logistic plan. Therefore this leads to the non-parametric Chi-Square analysis of associations as presented in the table below.

Table 5.13: Chi-Squares test for association between clusters effectiveness and procedure for non-conformities regarding SCM in Manufacturing companies

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.350(b)	1	.554		
Continuity Correction(a)	.123	1	.726		
Likelihood Ratio	.355	1	.551		
Fisher's Exact Test				.634	.367
Linear-by-Linear Association	.347	1	.556		
N of Valid Cases	381				

a Computed only for a 2x2 table b 0 cells (.0%) have expected count less than 5. The minimum expected count is 9.23.

From the above table it is found that the Pearson Chi-Square value is .350 and P-554 which is statistically insignificant. Therefore it can be concluded that the perceptual

difference among the employees on effectiveness of SCM is not affected by their opinion on having procedure for non-conformities regarding SCM.

SUMMARY, FINDING & SUGGESTION

CHAPTER-VI

SUMMARY OF FINDINGS, SUGGESTIONS AND CONCLUSION

The business of manufacturing industry and its SCM during economic upswing and economic recession creates an atmosphere of perfection and emergence of skills among the suppliers. The manufacturing Industry in India has grown phenomenally over the past decade and a half has attracted the attention of the world. Indian manufacturing industry has to face the global competition and market demands. The manufacturing Industry is maturing and this is reflected in the volume in terms of large pool of skilled manpower hired by big manufacturing companies are clearly presented in this thesis after analyzing their opinion through statistical analysis. The following summary highlights the important breakthrough and findings of the study.

6.1 Analysis pertaining to objective 1

The sample unit consists of 7.1% Sr. Manager, 51.4% managers and 41.5% deputy managers in manufacturing companies. In an age wise distribution 46.2% of employees in the age group of 30 to 40 years, 28.3% of employees between 41 to 50 years and 25.5% of the employees in the age of above 50 years.

The percentage analysis revealed that 35.4% of employees have five years of experience, 33.6% of the employees have more than 10 years of experience and 30.9% of the employees have 6 to 10 years of experience. 41.7% of the organization involve in both manufacturing and trading organization, 33.6% of them are only manufacturing organization and 24.7% only do trading.

57.5% of the employees with experience in SCM have technical educational qualification and 42.5% of the employees have non-technical education. 84.9% of the executives of manufacturing companies agreed that their organizations have separate logistics department for the smooth flow of supply chain management practices and 15.1% feel that there is no need to have a separate logistics department.

75.3% of the executives of manufacturing companies have clear logistics strategic plan for the smooth flow of supply chain management practices. 24.7% feel that there is no need to have a logistic strategic plan. 64.6% of the executives of manufacturing and trading companies use standard software packages for handling supply chain whereas 35.5% of the executives in the organization are not interested in using standard software packages in handling supply chain.

6.2 Analysis pertaining to objective 2

The executives in manufacturing companies strongly agree the e- procurement, sub-contracting and close partnership with suppliers to establish supply chain management in their organisation. Secondly the executives agreed to consider close partnership with customers, outsourcing, 3PL, Plan strategically, few Suppliers, Holding safety stock for the

best SCM practices. Finally the executives of manufacturing companies neutrally consider the benchmarking use of external consultants and other factors for the perfect practices of SCM.

It is found that 43% of the manufacturing companies use the custom made MRP and 36.6% of the department use the standard package of MRP and 20.4% of the do not use MRP systematically. 36.6% of the departments of manufacturing companies use custom made MRPII. 38.7 % of the departments use the standard package form and 24.7% of the departments do not require MRP II.

The frequency distribution revealed that 38.7% of the manufacturing companies use custom made ERP, 36.6 % of the departments use the standard package and 24.7% of the departments do not use ERP systematically. 51.6% of the department use the WMS in the custom made form. 30.1 % of them use in the standard package form and 18.3 % of the departments do not use WMS systematically.

The analysis revealed 49.5% of the department use the custom made CRM, 33.3% of the departments in the manufacturing companies use the standard package and 17.2 % of the departments do not require CRM. 43.0% of the manufacturing companies use the SRM in the custom made form, 36.6 % of the department use the standard package and 20.4 % of the companies do not need the assistance of SRM.

The frequency distribution identified in the sample unit that 48.4% of the manufacturing companies use the custom made APS, 34.4 % of them use the standard package and 17.2% of them do not use APS systematically. 43.0% of the companies use the custom made JIT, 35.5 % of the departments of the companies use the standard package form and 21.5% of the departments do not use JIT.

The percentage analysis revealed that 39.8% of the manufacturing companies use custom made E-commerce, 35.5% of them use the standard package and 24.7% of the departments do not use JIT at all. 48.4% of them use in the Decision support/expert system in the custom made form, 33.3% of the department use in the standard package form and 18.3% of the departments do not use Decision support/expert at all.

It is found that 41.9% of the sample unit use in the RFID in the custom made form. 34.4% of them use the standard package and 23.7% of the departments do not use RFID. 44.1% of the department use the EDI in the custom made form. 41.9% of them use in the standard package form and 14.0% of the departments do not use EDI.

Similarly 46.2% of the manufacturing companies use the custom made Transport management system 39.8% of them use the standard package form and 14.0% of the departments do not use TMS.

6.3 Analysis pertaining to objective 3

The problems in implementing supply Chain Management practices in Manufacturing companies depends upon three predominant factors namely economic hindrances, supply chain breakage and co-ordination lack. The economic upswing and economic recessions

severely influence and break the supply chain that exist among the companies, suppliers and customers.

The study revealed that 37.53% of employees with moderate agreements on 3 problems economic hindrances, Supply chain breakage, Co-ordination lack. The other group consists of maximum number of 62.47% of employees with strong agreements for the factors economic hindrances, Supply chain breakage, Co-ordination lack.

There is an association between clusters of problems and separate logistics department in Manufacturing companies. It is identified 88.8% of moderate problem facers and 82.8% of maximum problem facers demand separate logistic department in manufacturing companies. It is concluded that the perceptual difference among the employees on problems of SCM is not affected by their opinion on having separate logistic department.

There is an association between clusters of problems and clear logistics strategic plan in manufacturing companies. It is found that 77.6% of moderate problem facers and 74.4% of maximum problem facers suggested for clear strategic separate logistic department in Manufacturing companies and concluded that the perceptual difference among the employees on problems of SCM is not affected by their opinion on having strategic plan for logistic department.

There is an association between clusters of problems and problems and procedure of non-conformities regarding SCM in Manufacturing companies. It is found that 68.5% of moderate problem facers and 61.8% of maximum problem facers suggested for procedure in case of non-conformities regarding SCM in Manufacturing companies. There is a perceptual difference among the employees on problems of SCM and it is not affected by their opinion on having procedure in case of for non-conformities in SCM.

The executives in the manufacturing companies strongly agreed that the manufacturing units are satisfied with the application of supply chain management on quality information, quantity information, Flexibility, Reduced lead-time in production, Cost saving, Forecasting, Resource planning, Better operational efficiency, Reduced inventory cost, More accurate costing, Inter coordination with suppliers, Inter coordination with customers and increased sales.

The prospects of supply chain in manufacturing industry is revealed in the form of 3 predominant factors namely efficiency increase, cost effectiveness & coordinating effects. These factors are significant for the organization to get a smooth flow of supplies as well as to deliver the goods as per the orders of the customers.

In the sample unit there are two different groups of executives in the manufacturing companies with respect to prospects of SCM namely Moderate prospectors (45.1%) and Maximum prospectors (54.9%)

It is found that 83.1% of moderate prospectors and 86.1% of maximum prospectors demand separate logistic department in manufacturing companies, whereas 16.9% of moderate prospectors and 13.9% of maximum prospectors do not care for separate logistic department.

It is found that 71.5% of moderate prospectors and 78.5% of maximum prospectors demand for clear logistic strategic plan in manufacturing companies, whereas 28.5% of moderate prospectors and 21.5% of maximum prospectors do not care for clear logistic strategic plan. 59.3% of moderate prospectors and 68.4% maximum prospectors demand for clear procedure in case of non-conformities regarding logistic in manufacturing companies whereas, 40.7% of moderate prospectors and 31.6% of maximum prospectors do not care for clear procedure in case of non-conformities regarding logistic

6.4 Analysis pertaining to objective 4

The effectiveness of supply chain management in customer services in manufacturing companies is realized through 5 predominant factors namely periodic controls, constructive integration, technology augmentation, Best customer service, skill developments. The supply chain paved the way for the companies to offer best customer service and also useful to develop the skill of the employees.

The SCM practices in manufacturing companies are vital to increase organizational efficiency through technological augmentations. It also helps the companies for reduction in the cost to increase the profitability and helps the employees to acquire skill developments as well as to have better coordination at various levels of designations

The sample unit consists of 28.1% of moderate effectiveness s realizers and they have moderate agreements for the effectiveness of SCM in customer services. The maximum number of employees of 71.9% has strong agreements for the effectiveness of SCM in customer services.

It is found that 45.2% and 54.8% of moderate prospectors realize the maximum effectiveness of SCM and 13.7% and 86.3% of maximum prospectors also realize moderate as well as maximum prospects of SCM. The effective SCM practices depend on both prospects as well as effectiveness realized by the organization in manufacturing companies implementing SCM in customer services.

The analysis revealed that 37.1% and 62.9% of moderate problem facers realize maximum effectiveness of SCM and 22.4% and 86.3% of them also realize moderate as well as maximum problems of SCM and concluded that the effective SCM practices depend up on both problems as well as effectiveness faced by the organization in implementing SCM Practices.

The perceptual difference among the employees on effectiveness of SCM is not affected by their opinion on having logistics strategic plan. It is found that 85.1% of moderate effectiveness realizes and 97.8% of maximum effectiveness realizes demand separate logistic department in manufacturing companies. Whereas 14.9% of moderate effectiveness realizes and 17.2% of maximum effectiveness realizes do not care for separate logistic department.

The perceptual difference among the employees on effectiveness of SCM is not affected by their opinion on having procedure for non conformities regarding SCM. It is

found that 81.3% of moderate effectiveness realizes and 84.4% of maximum effectiveness realizes suggested for procedure for Soft package in manufacturing companies. Whereas 30.6% of moderate effectiveness realizes and 18.7% of maximum effectiveness realizes do not care for clear logistic plan.

It is further found that 69.2% of moderate effectiveness and 72.2% of maximum effectiveness realize the effectiveness and procedure for non-conformities regarding SCM in manufacturing companies and concludes that the perceptualuseful for the constructive integration, augmentations in technology and to offer best customer services.

CRM practices based on the products are able to increase the efficiency, cost effectiveness s and coordinating effects of the manufacturing companies. Supply relationship management are useful to develop skills of the employees during the practice of SCM in customer services.

The advanced planning systems create a conducive atmosphere for a constructive and optimistic integration of departments in manufacturing companies for the smooth flow of SCM. Technological augmentation in manufacturing companies is for the perfect implementation of SCM.

Just in time systems offer better control service, creating a conducive atmosphere for the skill development of the employees through effective SCM practices. E-commerce planning systems are useful to control the SCM practices periodically and to manage the cost effectively in various departments as well as encouraging optimistic coordinating effects in manufacturing companies for the perfect implementation of SCM.

Decision support/expert system are useful to control the SCM practices periodically, encouraging to implement technological augmentation for the effective practice of SCM in manufacturing companies.

Radio frequency identification system is highly significant to increase the efficiency of the organization and encouraging the coordinating effects difference among the employees on effectiveness of SCM is not affected by their opinion on having procedure for non-conformities regarding SCM.

6.5 Analysis pertaining to objective 5

The executives in the position of the deputy managers strongly agree for the cost effectiveness s, co-ordination lack and constructive integration and the Sr. Managers executives moderately agree the cost effectiveness s, co-ordination lack in their manufacturing companies.

The deputy managers strongly agree for the cost effectiveness s, supply chain breakage, periodic controls whereas the senior Managers moderately agree for the cost effectiveness s practices followed in their manufacturing companies.

The manufacturing and trading have the same perception towards prospects, problems and effectiveness of SCM. The technical and non technical employees have same perception towards prospects, problems and effectiveness of SCM in customer service.

The executives of manufacturing companies accept that their respective companies take initiatives to implement MRP at their own convenience to support SCM and take more initiatives in implementing manufacturing resources planning and solving the problems of economic hindrances.

The ERP implemented in manufacturing companies are more useful to solve supply chain breakage problems planning. The warehouse management systems are manufacturing companies for the perfect implementation of SCM in customer services.

Electronic data system are more appropriate to solve the problems of economic hindrances of manufacturing companies and also help the manufacturing companies to continue the supply chain among manufacturer, supplier and customers with smooth flow of the business in manufacturing companies.

The Transport management system are significant for the constructive integration of SCM practices and offer best customer services, best training to the employees to increase the skill development services.

6.6 Analysis pertaining to objective 6

The prospects and problem of SCM influence the competency increase and it is concluded that the efficiency increase obtained through SCM practices directly aims at the increase of organizational competency.

It is found that the effectiveness of prospects and problem of SCM influence the constructive integration and the technological methods. It is inferred that the effectiveness of prospects and problem of SCM influence the infrastructural Development and also increase the technological augmentation and increased the customer service effectively. Periodic review on the effectiveness of prospects and problem of SCM influence the coordinating effects of SCM practices and increase the organizational skill developments.

6.7 SUGGESTIONS

Based on the findings emerged from the analysis of the data collected through questionnaires and interactions with the manufacturing company executives, the following suggestions are offered to improve the SCM Practices, which are prevalent in companies.

1. In the manufacturing companies, SCM practices may be accelerated through effective implementation of change management techniques and restructuring the basic environment to increase the individual and organisational efficiency. The supplier and customer needs to be totally identified in all manufacturing companies to avoid supply chain breakage. This would help the companies to attain maximum efficiency of the organization within the limited resources.

2. The logistic strategic planning in manufacturing companies need to be revamped to meet the present innovative technological requirements of the suppliers and customers. The

Managers of manufacturing companies should be trained adequately to be able to use state of the art technology. Separate training and development wing may be created to discuss the technological developments and innovations in SCM practices. It is necessary to make SCM training cost effective and link it to business strategy and goal.

3. The separate logistic department must be sound enough, so as to aid the process of just in time supply out sourcing and third party logistics. The format of the SCM should be modified to facilitate further refinements and improvements in tune with the changes in the organisational structure, systems and procedures, work technology, information technology and other environmental factors. Incentive and reward systems based on individual and team achievement need to be introduced for best SCM practices.

Since the managers of manufacturing companies are well acquainted with methods of SCM, internal orientation and external chains, they may be further enlightened through both internal and external training programmes to achieve their desired goals of SCM in their organisations.

Periodic evaluation programmes and clinics by the top management may be conducted to interact with all the employees individually. It would enable them to express their opinion about the present scenario of the SCM effectiveness and developmental activities.

6. Measures must be taken to implement SCM techniques in T1 and T2 suppliers to increase productivity and profitability. The production planning must be redesigned to avoid the chain break of SCM.

7. The collective and equal enthusiasm must be created among all the suppliers during economic upswing to practice effective SCM and they might be told the significance of management strategic activities as the long term process to accrue maximum prospects.

8. The production department should organize classes, debates, panel discussions etc. to create a view among the executives that SCM is an integrated system meant for every one in an organization.

9. The efforts must be made by the HR departments to restructure all the HR policies and review the system to generate application of shop floor production activities in SCM..

10. Special care must be taken by the quality department to monitor the short term effects of ISO and ERP practices on productivity and profitability and the long term prospects of building good developmental climate.

11. Concerted efforts must be made by T1 and T2 suppliers to restructure production planning control system and implementing effectively. Much more focus and emphasize on identifying and developing production and inner and hidden potential for the own and organizational betterment in the present competitive industrial and economic scenario.

12.Orchestration of SCM members must be done periodically to evaluate the increase in productivity and profitability during economic upswing and recession.

6.8CONCLUSION

Based on the study, the following conclusions are drawn:

The supply chain is considered as the most significant resource activating all other resources in manufacturing industry which are production driven. The supply chain objectives are accomplished by strengthening the management strategic activities, maintaining the production level, to maximize their production potential. Strong management strategic activities initiate creative skills and initiate thesuppliers to innovate new products and services. Shop floor production activities are fulfilled through conducive supplier development, production planning and developmental climate prevailing in the organisation. New dimensions of Orchestration of SCM in the form of discussions on production, performance measurement, manufacturing reviews are to be incorporated to retain production capacity.

Training and development program are found to be popular among the new product development scenario during economic upswing and useful to increase productivity and profitability. Accurate evaluation of performance measures adds impetus to the companies' goodwill and promotes customer loyalty. Appropriate quality assessment system followed by the automobile companies through Self evaluation, Appraisers' report and Reviewers' report reflects on the attachment of the suppliers to the company. Developing core competencies and managerial capabilities increases the value of the production force. The automobile Companies providing supply chain opportunities are able to retain quality of production. The management prefer the effective supply chains during economic upswing and recession and challenging work involving cutting edge technology.

6.9 SCOPE FOR FURTHER RESEARCH

The supply chain management with strategic decision making for effective production planning can be evaluated and studied in detail individually like management strategic activities, Performance measurement Management and production Growth. The quality system policies followed by the automobile companies can be researched to arrive at models and techniques.The role of effective production department managing the various

SCM practices is to be detailed separately. The shop floor production process has to be analysed step by step by critically examining the stages such as pre, during and post production. The factors contributing to the organisation to increase productivity and profitability can be analysed. The study can be extended to the related business of other manufacturing sector. A comparative study between manufacturing and automobile companies on SCM can be done. The crucial SCM practices differentiating manufacturing and services sector can be examined.

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APPENDIX

**IMPACT OF SUPPLY CHAIN MANAGEMENT ON PROBLEMS
FACED AND PROSPECTS OF EMPLOYEES IN FREIGHT
LOGESTICS COMPANIES
QUESTIONNAIRE**

1. Name of the Company :
2. Location :
3. Position in Company :
4. Age :
5. Experience :
6. Nature of organisation :
7. Educational qualification :
8. Does you company have a separate logistics department?
☐ Yes ☐ No
9. Does your company have a clear logistics strategic plan?
☐ Yes ☐ No
10. Your company have a Standard software packages procedures
☐ Yes ☐ No
11. Which of the following you think that your company needs to do in or
order to manage its supply chain better?

Mark **Y** in the all the apply

	Improve	Start Implementing	Satisfied already	Not appropriate
a) Close partnership with suppliers				
b) Close partnership with customers				
c) JIT supply				
d) e-procurement				
e) Outsourcing				
f) Subcontracting				
g) 3PL				
h) Plan strategically				
i) Supply Chain Benchmarking				
j) Few suppliers				
k) Many suppliers				
l) Holding safety stock				
m) Use of external consultants				
n) Other (<i>specify</i>)				

12. Do you have procedures in place in case of non-conformities regarding SCM?

☐ Yes ☐ No

13. What types of systems are currently in use in your company to support Supply Chain Management?

14. If None now, do you plan to install any one of the below?

Mark **Y** in all that apply

	Custom -made	Standard package	Not in use
A. Material Requirements Planning (MRP)			
B. Manufacturing Resources Planning (MRPII)			
C. Enterprise Resource Planning (ERP)			
D. Warehouse Management System (WMS)			
E. Supply Chain Management (SCM)			
F. Customer Relationships Management (CRM)			
G. Supplier Relationships Management (SRM)			
H. Advanced Planning System (APS)			
I. Just In Time (JIT)			
J. E-commerce			
K. Decision support / expert system			
L. Radio Frequency Identification (RFID)			
M. Electronic Data Interchange (EDI)			
N. Transport Management System(TMS)			
O. Others (<i>specify</i>)			

15. In what level your company is facing the below problems when using these systems?

Mark **Y** in all that apply

	No problem at all	Little problem	Some problem	Significant problem	Serious problem	Don't know
	(1)	(2)	(3)	(4)	(5)	
Resistance to change from employees						
Resources shortages e.g. no maintenance and update						
Skills shortages e.g. Computer illiteracy within the company						
Insufficient vendor support						
Hidden cost						
Integration with existing system						
Integration with supplier's system						
Integration with customer's system						
Possibility of chain failure						
Lack of supplies from tier 1 and tier 2 supplier						
Difficulties during economic upswing						
Difficulties during economic recession						
Hindrances from management strategic activities for effective SCM						
New product developments gives additional burden to SCM						
No proper orchestration of SCM members						
No periodic manufacturing reviews						
Failure of inventory control						

16. How much did you actually benefit from using these systems? Mark **Y** in all that apply

	Not at all	Little	Average	Greatly	A lot	Don't know
	(1)	(2)	(3)	(4)	(5)	
AA Better quality of information						
AB Better quantity of information						
AC Flexibility						
AD Reduced lead-time in production						
AE Cost saving						
AF Forecasting						
AG Resource planning						
AH Better operational efficiency						
AI Reduced inventory level						
AJ More accurate costing						
AK Inc coordination with suppliers						
AL Inc coordination with customers						
AM Increased sales						

17. Effectiveness of supply chain management in customer services in manufacturing companies

	More Effective	Medium effective	Neutral	Less effective	No effective
Introduce production planning and control system					
Refines the inventory control system					
Insists to follow periodic quality certifications					

	More Effective	Medium effective	Neutral	Less effective	No effective
SCM is the performance measurement indicator					
Helps the organization in involving HR performance					
SCM is performance measurement indicator					
Helps refine the infrastructure development and facilities					
SCM helps to control expenditure in the organization					
Helps to give proper responses to customers on their complaints					
SCM helps to adopt technology and flexibility					
Human behaviour has effectiveness on supply chain and customer services					
A minor change in demand has significant effectiveness on supply chain variation					
Helps to achieve benchmarking against industry leaders					