

**EVALUATION OF SUPPLY CHAIN PERFORMANCE
WITH REFERENCE TO METALLIC INDUSTRY:
A STUDY OF SELECT SMALL AND MEDIUM
ENTERPRISES (SME'S) IN TELANGANA STATE**

A thesis submitted to the University of Hyderabad
in partial fulfilment for the award of

DOCTOR OF PHILOSOPHY

By

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DECLARATION

I, **Praveen Kumar Gali**, hereby declare that the thesis entitled, **“Evaluation Of Supply Chain Performance With Reference To Metallic Industry: A Study Of Select Small And Medium Enterprises In Telangana State”**, submitted by me under the research supervision of **Dr. G.V.R.K. Acharyulu** is an original and independent research work. I also declare that, it has not been submitted previously in part or in full to this University or any other University or Institution for the award of any degree or diploma.

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CERTIFICATE

This is to certify that this thesis entitled, “**Evaluation Of Supply Chain Performance With Reference To Metallic Industry: A Study Of Select Small And Medium Enterprises In Telangana State**”, submitted by **PRAVEEN KUMAR GALI**, Research Scholar enrolled for Ph.D. programme at the School of Management Studies, University of Hyderabad, is a bonafide work done under my guidance and supervision as prescribed under Ph.D. ordinance of the University and UGC.

The thesis has not been submitted previously in part or in full or any other University or Institution for the award of any degree or diploma.

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Abbreviations:

ADC	: Additional Development Commissioner
APICS	: American Production and Inventory Control Society
APIIC	: Andhra Pradesh Industrial infrastructure Corporation
APS	: Advance Planning System
APSFC	: Andhra Pradesh State Finance Corporation
ARI	: Agro and Rural Industries
ATO	: Assemble To Order
ATP	: Available to Promise
BPO	: Business Processing Outsourcing
BTO	: Build To Order
CA	: Competitive Advantage
CII	: Confederation of Indian Industries
COMA	: Competitive Advantage
CRM	: Customer Relationship Management
CSCMP	: Council of Supply Chain Management Professional
CSO	: Central Statistical Office
CSR	: Corporate Social Responsibility
DC (MSME)	: Office Of The Development Commissioner
DIC	: District Information Centre
DO	: Development Office
DSS	: Decision Support System
EC	: Economic Census
ECS	: e-Commerce Systems
EDI	: Electronic Data Interchange

EM-II	: Entrepreneur Memorandum PART-II
ENVT	: Environment
EOQ	: Economic Order Quantity
ERP	: Enterprise Resource Planning
ETO	: Engineer to Order
GDP	: Gross Domestic Product
GPM	: Global Performance Management
GSCM	: Green Supply Chain Management
ICT	: Information and Communication Technology
IS	: Information Systems
ISSM	: Integration of Information System Support for Manufacturing
IT	: Information Technology
JDC	: Joint Development Commissioner
JIT	: Just-In-Time
JS	: Joint Secretary
KM	: Knowledge Management
KMO	: Kaiser-Meyer-Olkin
KVIC	: Khadi Village Industries Commission
MFI	: Micro Financial Institution
MGIRI	: Mahatma Gandhi Institute For Rural Industrialization
MNC	: Multi -National Corporation
MoSPI	: Ministry Of Statistics and Programme Implementation
MOU	: Memorandum of Understanding
MRP	: Material requirement planning
MRP II	: Manufacturing Resource of Planning

M-SME	: Manufacturing SMEs
MSE	: Micro and Small Enterprises
MSE-CDP	: Micro and Small Enterprises Cluster Development Programme
MSME	: Micro, Small and Medium Enterprises
MSMED ACT:	Micro Small and Medium Enterprises Development Act
MSMED	: Micro, Small and Medium Enterprises
MTO	: Make To Order
MTS	: Make To Stock
NBMSME	: National Board for Micro, Small and Medium Enterprises
NGOs	: Non-Government Organisations
NI-MSME	: National Institute for Micro, Small And Medium Enterprises
NSIC	: National Small Industries Corporation
OTOP	: One Tambon One Product
PB	: Bibliographic Portfolio
PPP	: Public Private Partnership
PSM	: Purchasing and Supply Management
RFID	: Radio Frequency Identification
RTC	: Regional Testing Centre
SC	: Supply Chain
SCCOMA	: Supply Chain Competitive Advantage
SCM	: Supply Chain Management
SCP	: Supply Chain Practices
SCPERF	: Supply Chain Performance
SCS	: Supply Chain Simulation
SCST	: Strategies and Systems

SEZ	: Special Economic Zone
SIDBI	: Small Industries Development Bank of India
SIDO	: Small Industries Development Organisation
SISI	: Small Industries Service Institute
SME	: Small and Medium Enterprises
SRM	: Supplier Relationship management
SSI	: Small Scale Industries
TCO	: Total cost Ownership
TOC	: Theory of Constraints
TQM	: Total Quality Management
WIP	: Work-In-Process
WMS	: Warehouse Management System

CHAPTER I

INTRODUCTION

1.0 Introduction:

Aggressive and elastic industrial segment relies on a suitable mix of large, medium and small enterprises, where Small and Medium Enterprises (SMEs) occupy a most important position in generating employment. SMEs occupy a vital position in the industrialization of a developing nation like India. Moreover SMEs need low investment, ensure a high equal spread of countrywide income and make easy the successful movement of funds of assets and skill. It is proven fact that SMEs drive the economy and contributes profits and worth extra accounting for nearly 90% of the production enterprise as well as lies within 40 to 80% of production service, adds 40 per cent to the industrial output to the country, and is the main cause of job opportunities after agriculture. SME segment acquires a permanent position in the societal and financial growth of the nation and emerged as an engine of growth by bringing the industrialization to agricultural and low developed areas, and minimising regional differences. A good SME segment is significant for publicly sustainable growth. The policies applied for developing business and competitiveness among the budding nations includes transforming in the earlier 25years. Trade in exchange has given way to export encouragement; discounts and monetary benefits and protection aimed to promote exacting industries gave opportunities to common policies meant to support aggressiveness throughout human source growth, business development ways, admission to monetary benefits, etc.

The old grounds for SME promotion obviously was employment creation and balanced regional development but in this era of globalization and in the context of new economy, the core objectives need to be interpreted because we were used to explore the potential of SMEs in terms of local resources, local processes and absorption of local labour only but the logic of globalization is different. It refers to the cross-border enterprise activities with focus on commitment, quick response to market signals,

creativity and innovation. SME development has the basic connotation of private sector development. The logic of private sector, especially under globalization, demands the achievement of competitiveness at the local, national and international levels where competitiveness can be achieved only through a continuous process of innovation. SME firms should enhance their competitiveness by adopting new, technologies, through better design features, customer-oriented service, quality distribution and logistics management to set a global quality bench-marking. Their survival depends on responding to the changes taking place around them, and timely response to competition which will assure a long way survival.

The SME's represent a significant section of the Indian financial system with respect to their payment to the nation's industrialized manufacturing, sell abroad, job opportunities and formation of a capitalist support. In past, most industries were from the public sector. The revolution of the privatization gave path for entrepreneurship. In the past there was limited number of products. The prices of the products were also fixed and there was no chance for negotiating the price. The Government recognized the Ministry of Small Scale Industries and Agro and Rural Industries (SSI & ARI) in October, 1999. Later the bureau of SSI & ARI got separated into two called, Bureau of Small size Industries and Bureau of Agro and countryside Industries in September, 2001. Because of heavy competition, most of the multinationals are going for outsourcing the manufacturing of the ancillary units and concentrating on the core product for which their company is famous for and thus reducing their operational costs.

1.1 Development Commissioner (MSME)

The MSME-DO also called Small Industries Development Organisation is lead by the particular Secretary and Development Commissioner (MSME) is a zenith body for inventing and managing the execution of the rules for the growth of the MSMEs in the nation. It is occupying a important position for reinforcement this sector. It operates through the system allotted by the Government and it facilitates services like;

- i. Providing and suggesting the Government in strategy planning for the encouragement and growth of MSMEs.
- ii. It provides technical and financial, and professional consultancy, general services and additional room facilities to MSME units.
- iii. It facilitates services for the technology advancement, transformation, quality upgrading and infrastructure.
- iv. Improving and development of work force in the course of the guidance and expertise Upgradation.
- v. It facilitates financial data services.
- vi. It maintains a secure liaisoning with the Central and state governments and the departments allotted and focussing and anxious with the growth of MSMEs.
- vii. In developing and organizing the strategies and agenda for growth of MSMEs as subsidiaries to large and medium sized industries.

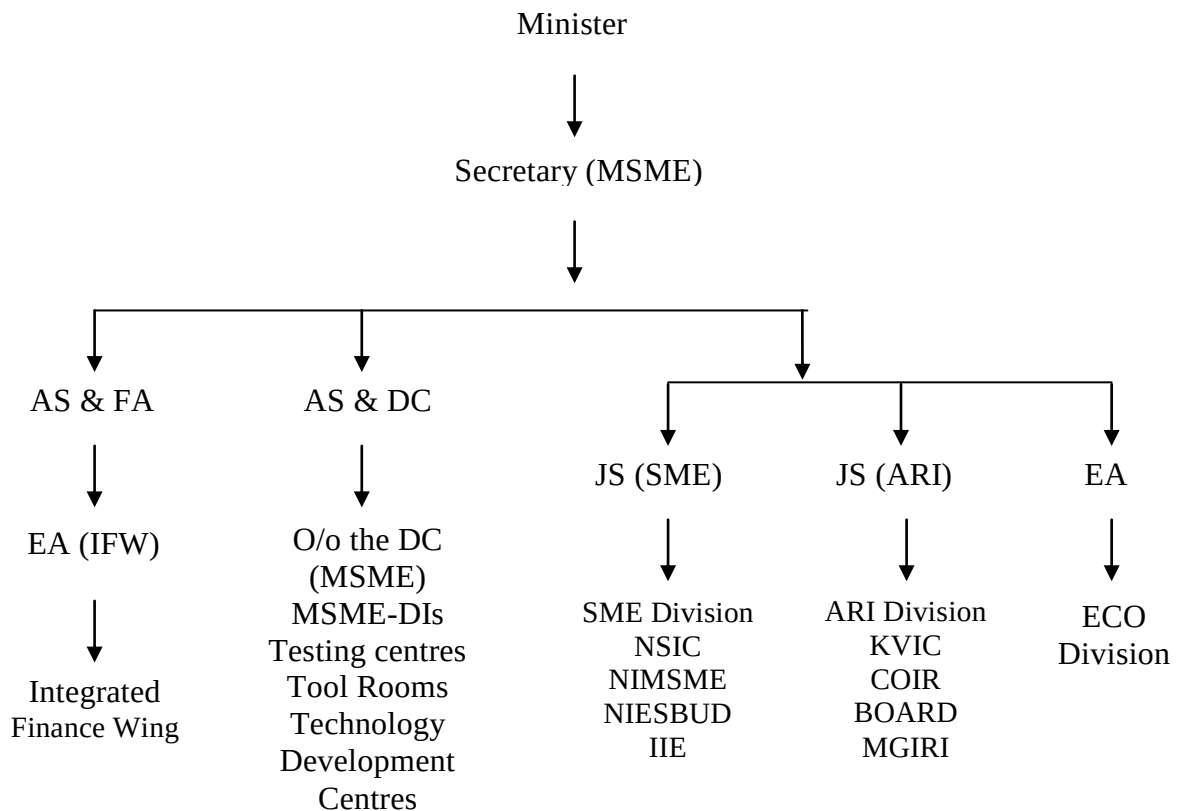
1.2 Organisational Structure

The MSMEDO formed, following the performance of MSMED Act, 2006 was previously called as Small Industries Development Organisation (SIDO) which was in action 1954 to provide as the top and nodal organization for formulating and functioning of the different strategies and plans for the development as well as promotion of MSME segment and is a closely linked office under the organization of Micro, Small and Medium Enterprises. It is being lead by the Special Secretary and Development Commissioner (MSME) or DC (MSME) who is under the control of the Ministry at the centre. It gets its functioning through different field organizations like MSME-DI (Formerly called as Small Industries Service Institutes) (MSME-DIs), Regional Testing Centres (RTCs) etc. The DC (MSME) is the head of the department and is the Chief Advisor to the Ministry of MSME on all matters of the policies related to the MSME sector. The powers of the DC (MSME) are partially delegated to the Additional Development Commissioner (ADC) and Joint Development Commissioner (JDC) or Director (Administration) in head Quarters Office. Each MSME-DI/RTC is

headed by an officer of the rank of Director (Deputy Secretary cadre in the Government of India) and declared as the Head of Office for that particular office.

MSMEDO (formerly SIDO) carries out both technical and non-technical functions and accordingly it recruits both technical and non-technical officers.

Figure 1: Organisational arrangement of the Ministry



Source: Annual Report MSME 2014-15

1.3 Micro Small and Medium Enterprises Development (MSMED) ACT, 2006:

The MSMED Act got into action from October 2nd 2006 where only one rule can be used for complete support, growth and improvement of the aggressiveness of the micro, small and medium enterprises and made them use profits of foreign and global markets.

Salient features of the Act:

The Act facilitates the initial legal support for the credit of the idea for “enterprise” (including the manufacturing and services) and integrates all the three tiers micro, small and medium.

As per the Act, enterprises have been characterized largely into persons busy in manufacturing and giving and facilitating of services. These groups are additionally divided into MSMEs, depending upon the asset in place and tools or in utensils (in case of service enterprises) as shown in the Table 1.1.

Table 1.1 Category of Enterprises

S.No	Type of Enterprise	Investment limit (in Lakhs)	
		Manufacturing	Service
1	Micro	Up to 25	Up to 10
2	Small	>25 and <500	>10 and <200
3	Medium	>500 and <1000	>200 and <500

Source: MSMED Act, 2006

This takes action to provide for constitutional advice-giving instrument at the middle point with large demonstration of all segments of shareholders, mainly the three categories of ventures and with extensive variety of suggested purposes; and an advice-giving board to support the panel and the national/state Governments.

The erstwhile characteristics contain: (i) providing of explicit funds for the encouragement, growth and enrichment of competitiveness of the enterprises, ii) announcement of systems/plans for this reason, (iii) developmental recognition strategies and exercises (iv) inclination towards Government obtainments to merchandise and facilities of the MSEs and also (v) troubles of late payments to MSEs,

(vi) generalization of the method of conclusion of business by all three categories of enterprises.

1.4 MSME Classification

According to the provision of MSMED Act, 2006 the MSMEs are classified in to two Classes:

- a. Production (manufacturing) and
- b. Servicing

a. Manufacturing class: The enterprises involved in manufacturing of goods related to any manufacturing as particular in the agenda to the industries Development and regulation Act, 1951. The Manufacturing Enterprise is defined in terms of speculation in Plant & Machinery.

b. Service Enterprises: The enterprises involved in providing or portrait of services and are defined in terms of investment in equipment.

The limit for asset in plant and machinery / equipment for manufacturing / service enterprises are given as under:

Table 1.2 Limit for Investment in Manufacturing and Service Sectors

Manufacturing Sector	
Enterprises	Investment in Plant & Machinery
Micro Enterprises	Does not exceed twenty five lakh rupees
Small Enterprises	More than twenty five lakh rupees but does not exceed five crore rupees
Medium Enterprises	More than five crore rupees but does not exceed ten crore rupees
Service Sector	
Enterprises	Investment in Equipment
Micro Enterprises	Does not exceed ten lakh rupees
Small Enterprises	More than ten lakh rupees but does not exceed two crore rupees
Medium Enterprises	More than two crore rupees but does not exceed five core rupees

Source: www.laghu-udyog.com

1.5 Macro and micro environments:

The corporate business houses should monitor their external environment prevailing around them. They should acquire a thorough insight into the macro environmental forces (demographic, economic, technological, political, legal, social and cultural) and significant micro environmental factors (customers, competitors, distribution channels and suppliers) by conducting a thorough market research that would result in entrepreneurial ideas within the organization. The environment may be considered favourable or un-favourable depending upon the profile. They should identify the micro and macro environmental scales which range from hostile to benign. The relative lack of exploitable opportunities, precarious industry settings, fierce competition and harsh business climate denote hostile environment. On the other hand, the environment which provides abundant market opportunities and a safe setting for business operations due to richness in investments is said to be a benign environment. The internal sources of corporate entrepreneurship should be implemented by the firms operating in a favourable environment as it would disperse knowledge and technology throughout the firm and would enhance the firm's core competencies whereas the firms that are working in a hostile where intense competition, instability and uncertainty are predominant, external sources of entrepreneurship come into play. Under such hostile conditions the firms, in order to combat their rivals and to have an edge over them, use speed as a weapon. The firms use external sources such as franchising, strategic alliance, external corporate ventures and sub-contracting in these conditions. In other words, external source of entrepreneurship are adopted by organizations performing in a hostile environment where speed is essential to compete with their rivals and thus choosing a faster route to innovation through external sources.

1.6 SME's current scenario:

SMEs are separately possessed and functions are intimately guarded by the proprietor/managers who add substantial operating capital to the business. They have owner/managers, who are principal decision-makers are nimble in terms of responding quickly to customers' requirements. They often function through reactive strategies lack financial resources, bear implementation and training costs for information

technology investments. They have computerized operations at relatively low levels and dependent on external sources for scientific and technological information.

- SME's is a Unorganized sector
- SME's are contributing to the Indian economy
- They are generating employment
- They lack coordination and networking
- They have to concentrate on the quality of services and product
- No IT , the information sharing

1.7 Performance of MSME, employment and investments

Today SMEs in the country produce approximately around 8,000 different goods from conventional to state-of-the-art items which in addition also need to provide wide range of services worth Rs. 4,70,966 crore or 38.55 percent of manufacturing production and 34.38% of export. The census of SSIs 2001-2002 shows only ten million small enterprises, but today there are 12.34 million with a lot more vibrancy creating 30 million employment opportunities. One of the best practices the government has initiated is provision of adequate low cost finance to SMEs. The EXIM Bank is creating a Rs. 50 crore corpus for SMEs; it has been working on an innovative model to finance the SMEs in the country and also help them export their produce to overseas markets. The bank has tied up with a Geneva based international trade corporation for designing the model. (*Hindu Survey of Indian Industry 2006:22*)

1.8 Role of MSME section in the GDP

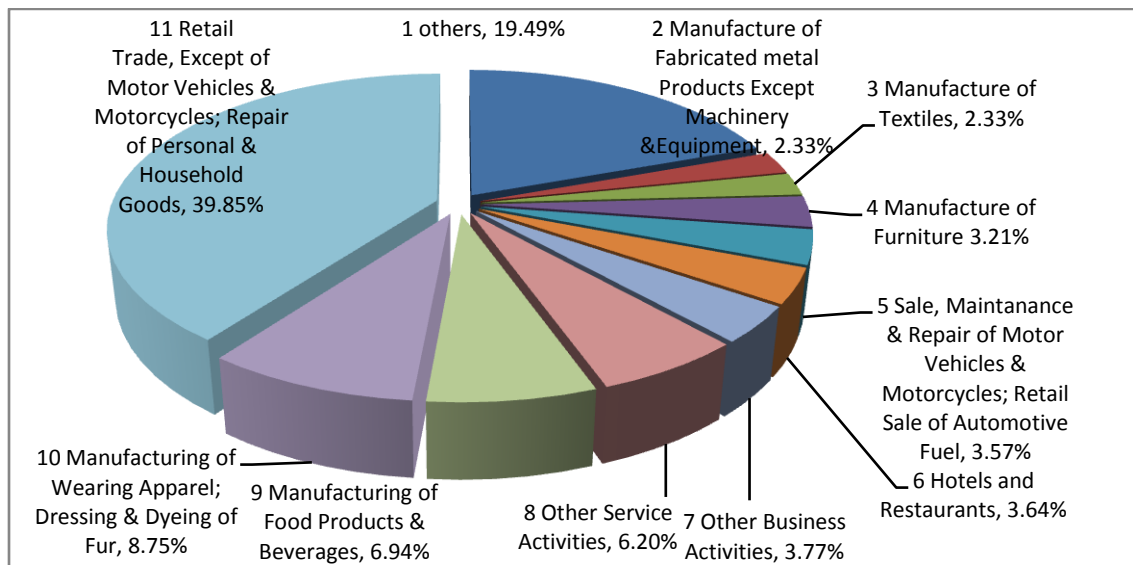
With reference to modified means recommended by CSO, MoSPI, on the source of the Gross Domestic Product (GDP) available by CSO, MoSPI and concluding outcomes of the most recent (Fourth survey) survey the approximate role of MSME segment to GDP and yield, throughout the 2006-07 to 2016-17 are given below:

Table 1.3 Role of developed yield of MSME in GDP

Year	Gross Value of Output of MSME Manufacturing Sector (Rs in Crore)	Share of MSME sector in total GDP(%)			Share of MSME Manufacturing output in total Manufacturing Output(%)
		Manufacturing Sector MSME	Services Sector MSME	Total	
2006-07	1198818	7.73	27.4	35.13	42.02
2007-08	1322777	7.81	27.6	35.41	41.98
2008-09	1375589	7.52	28.6	36.12	40.79
2009-10	1488352	7.45	28.6	36.05	39.63
2010-11	1653622	7.39	29.3	36.69	38.5
2011-12	1788584	7.27	30.7	37.97	37.47
2012-13	1809976	7.04	30.5	37.54	37.33

Source: Annual Survey of Industries, CSO MOSPI

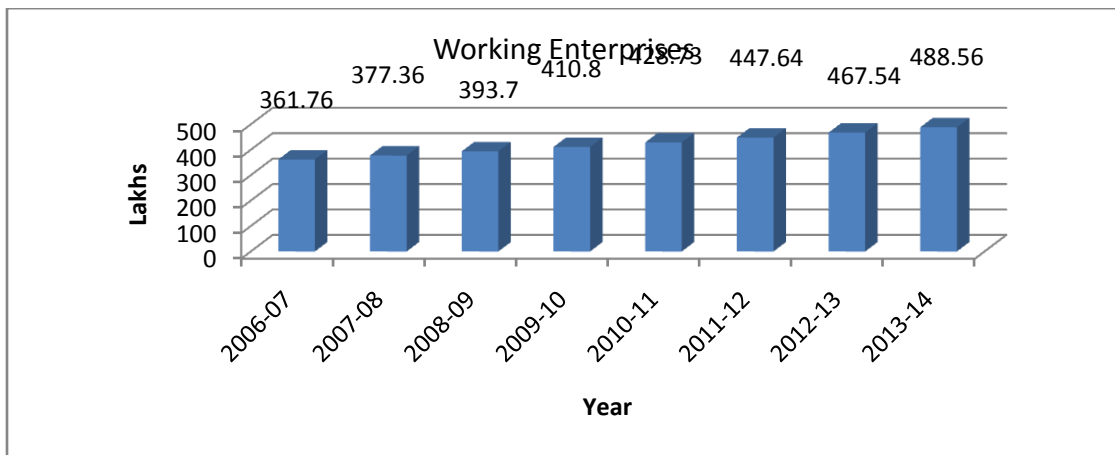
Figure 2 Leading industries in MSME sector



Source: Annual Report 2014-2015

The above figure gives the detailed information about the leading industries with their respective shares.

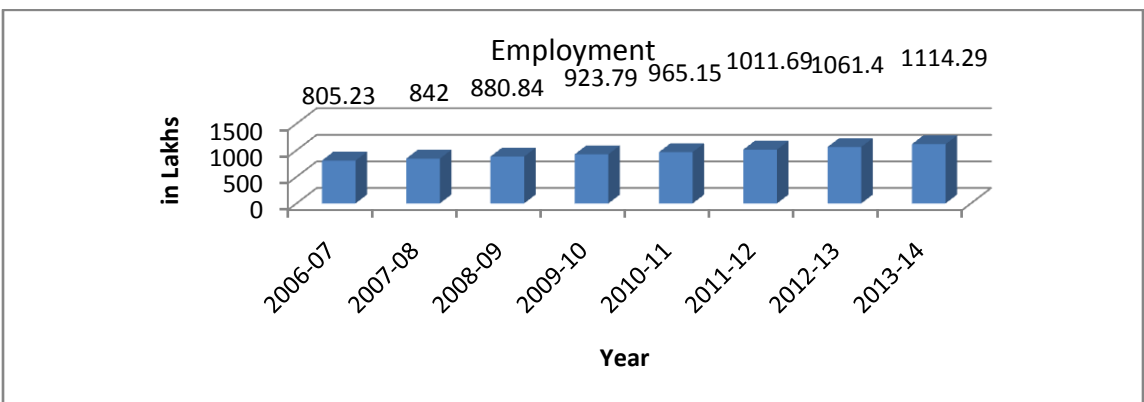
Figure 3: Number of enterprises in MSME sector



Projected data is from the report

The above projected data gives the number of enterprises in MSME sector from 361.76 lakhs in 2006-07 to 488.56 lakhs in 2013-14. It can be empirical that the raise in the number of industries was gradual year after year till 2013-14.

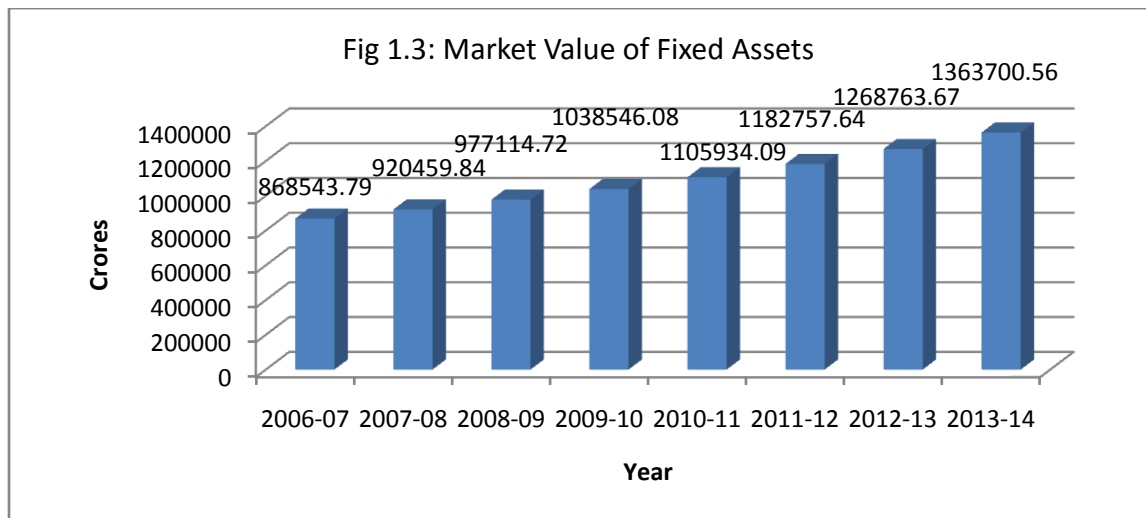
Figure 4: Employment in MSME sector



Estimated facts for the years 2006-07 to 2013-14.

The above figure depicts the employment in MSME sector from 2006-07 to 2013-14. It can be observed that there is a gradual increase in the employment growth rate from 805.23 lakhs in 2006-07 to 1114.29 lakhs in 2013-14.

Figure 5: Fixed Investment in MSME Sector



Projected data for the year 2007-08 to 2013-14

In the above figure it can be observed that the fixed investment in the MSME sector is displayed. It can be observed that there is a gradual increase in the investments from 868543.79 crores in 2006-07 to 1363700.56 crores in 2013-14.

1.9 Definition of dissimilar MSME terms:

a. Registered Sector: Enterprises registered with District Industries Centres in the State/UTs., KVIC/ Khadi and Village Industries Board, Coir Board as on 31.03.2007 and factories under the coverage of section 2m(i) and 2m(ii) of the Factories Act 1948 used for Annual Survey of Industry having investment in plant and machinery up to Rs 10 crore were considered to belong to registered sector.

b. Unregistered Sector: All enterprises engaged in the activities of manufacturing or in providing/rendering of services, not registered permanently or not filed EM with State Directorates of Industries/District Industries Centres on or before 31-3-2007 are called unregistered enterprises.

c. Small Scale Industrial Unit: An industrial undertaking in which the investment in fixed assets in plant & machinery, whether held on ownership terms, or on lease, or by

hire purchase, does not exceed Rs.100 lakhs as on 31-03-2001 is to be treated as a Small Scale Industrial Unit.

d. Micro Small Medium Enterprises (MSME): MSME Sector consists of any enterprise, let it be proprietorship, Hindu undivided family, association of persons, co-operative society, partnership or undertaking or any other legal entity, known by any name, engaged in production of goods related any industry specified in the first schedule of Industries Development and Regulation Act, 1951 & other enterprises engaged in production and rendering services, subject to limiting factor of investment in plant and machinery and equipment respectively as mentioned above.

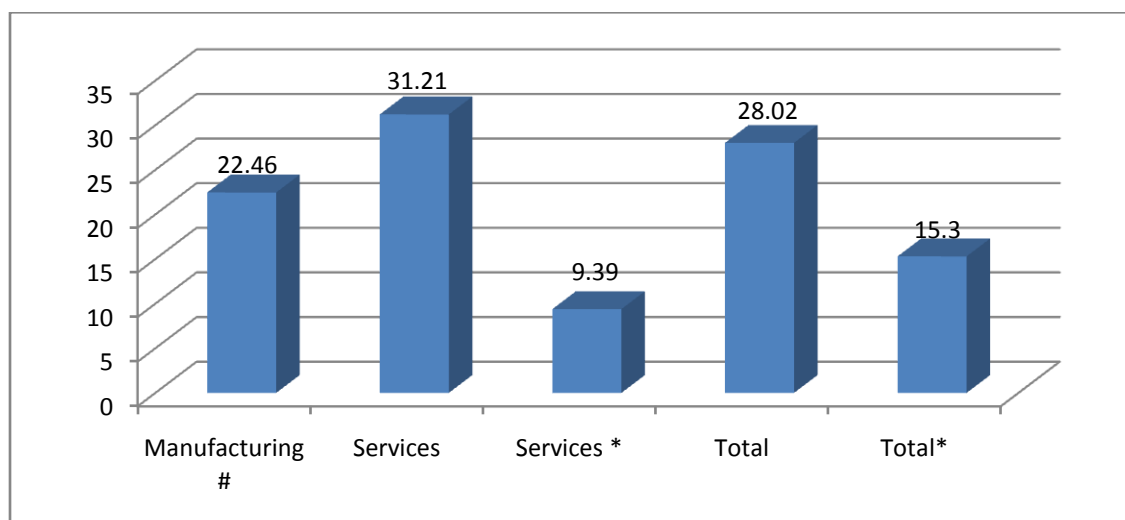
1.10 Growth rate of MSME sector

a) The growth rate of the figure of enterprises and the job opportunities is done on severely basis between 2001-02 to 2006-07 and is taken or recorded as 15.30% and 15.02% and the segment completely recorded the increased rate of 28.02% and 26.42% considering the definitional modifications during the period 2001-02 to 2006-07.

b) The performance carried beneath the MSME division because of definition alterations in 2006-07 were only confined to the service segment, where as manufacturing sector development was similar. The evidence expansion throughout the year 2001-02 to 2006-07 was 22.46% and 18.49% for the figure of projects and employments were estimated.

c) The percent of hike in the approximate digit of activities and job opportunities in the service sector was recorded as 31.21% and 34.00% respectively taking the prolonged exposure of the sector into account; the similar was 9.39% and 10.12% in that order on severe similar basis.

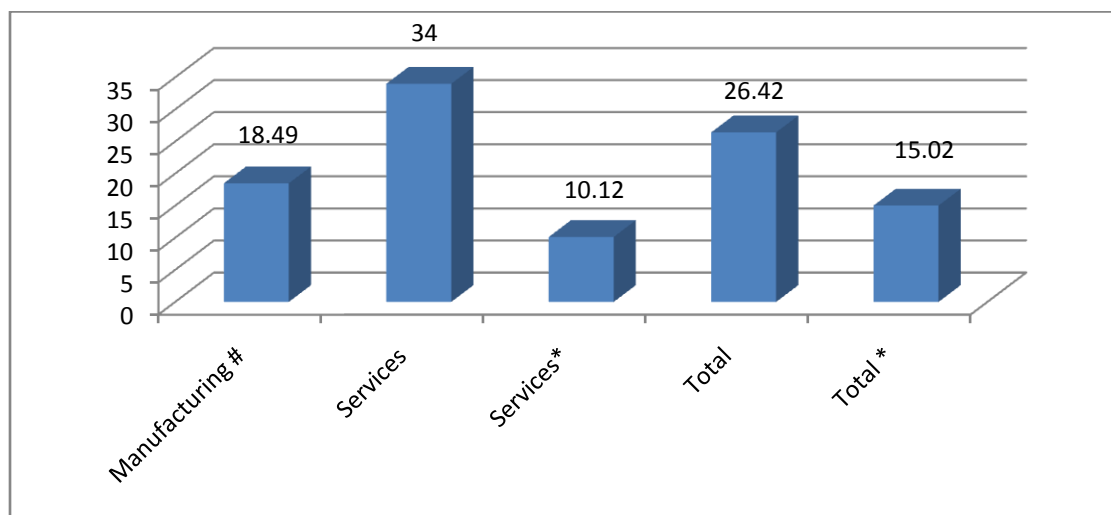
Figure 6: Growth Rate of Number of Enterprises by Sector: MSME Sector



Source: Annual Report 2014-15

The figure displays the raise in the quantity of activities by segment i.e., manufacturing and service sectors. It can be observed that the service sector is having wide range of coverage. If the expansion of coverage is not considered the service sector is very less when compared to the manufacturing sector.

Figure 7: Growth Rate of Employment by Sector: MSME Sector

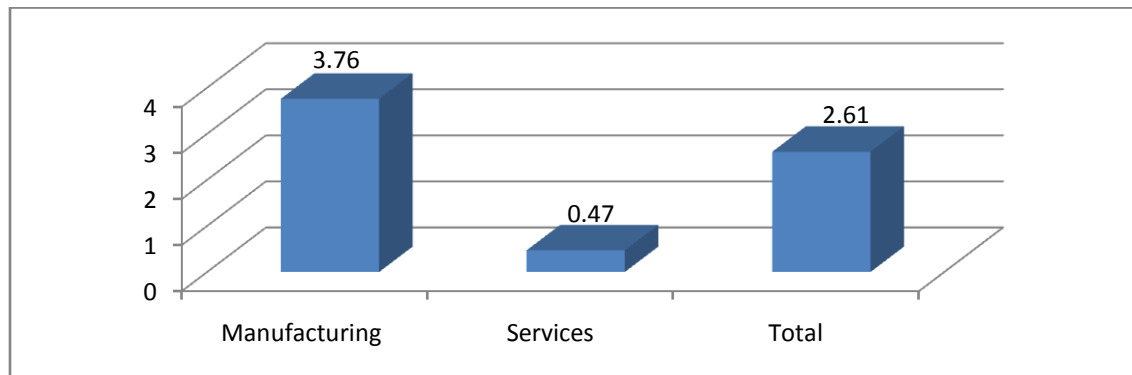


Source: Annual Report 2014-15

1.11 Registered sector growth rate

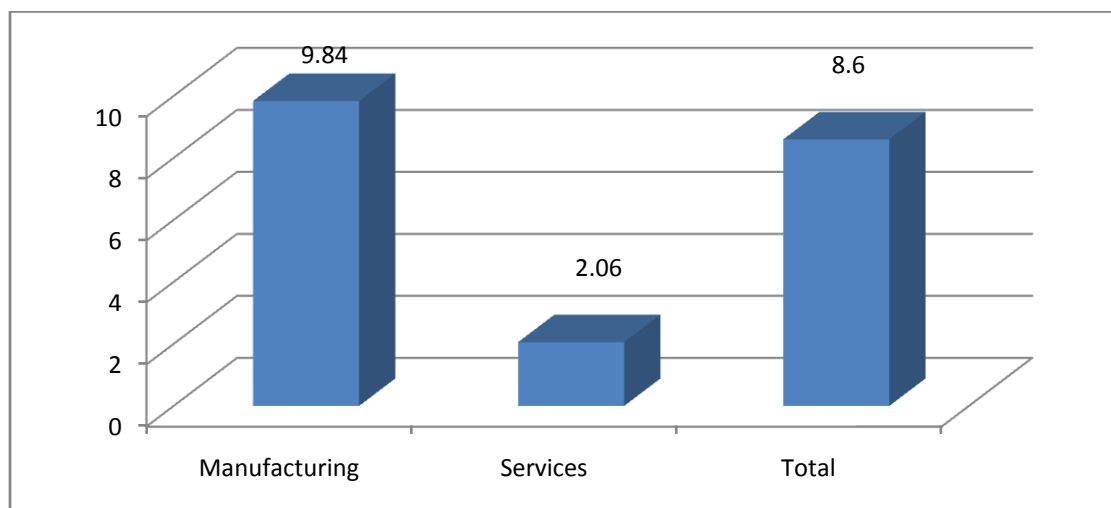
In Registered Sector the manufacturing sector has the estimated number of activities growth annually as 3.76% and for services sector it was 0.47% during the 2001-02 to 2006-07. By taking the manufacturing and services together it can be observed that the increase in the approximate figure of MSMEs was 2.61% for the above mentioned time.

Figure 8: Increase in the Number of activities by Segment: Registered Segment



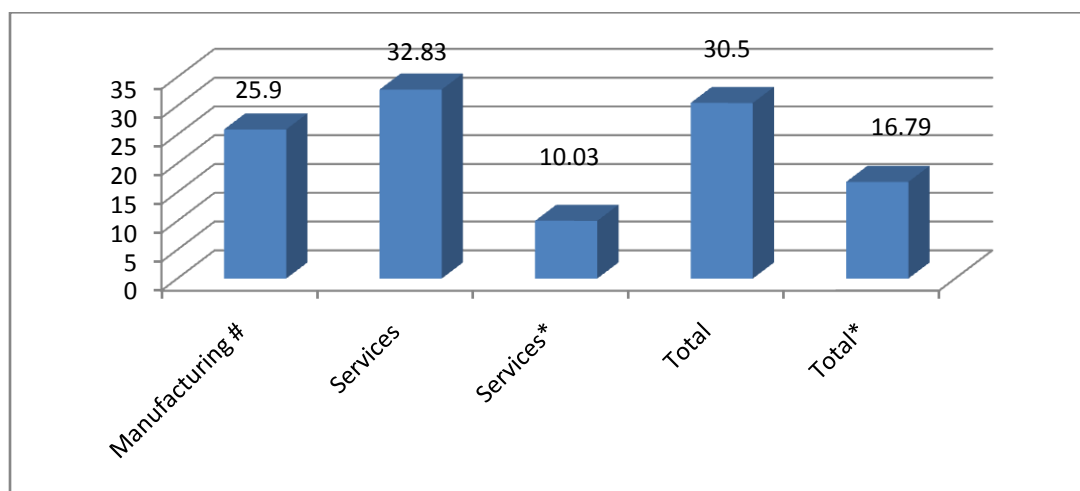
According to the registered sector in the both Fourth and Third All India Census of MSME and SSI of 2006-07 and the 2001-02 had an employment annual increase rate of 9.84% and 2.06 for manufacturing and the services segments respectively.

Figure 9: Increase of Employment by Segment: Registered Segment



According to the census of MSME 2006-07 the employment in the Registered Segment has entire increase at 8.6% per year.

Figure 10: Growth of unregistered sector



Source: Annual Report 2014-15

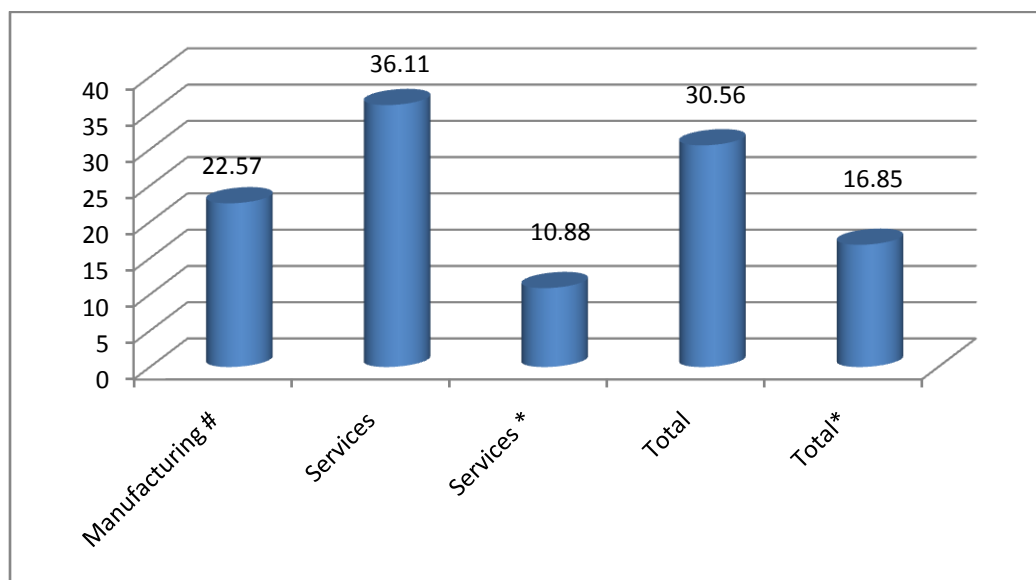
Taking into consideration the quantity of enterprises and employment it generated with highest increase of 30.05% and 30.56%, respectively between the years 2001-02 and 2006-07 are measured by extensive exposure of the segment. The growth in the exposure of MSME Sector follows the acceptance of MSME Act 2006. Performance related to extensive/ vend deal, lawful ,instructive & communal services, hotels & restaurant, convey and storage & warehousing (not considering frozen storage) were considered taking them into MSME segment which intended for 147.38 and 303.31 lakh in conditions of approximate figure of activities and employment respectively as per information taken out from Economic Census, 2005 conducted by CSO, MOSPI for MSME related enterprises. Excluding these additional activities the annual growth rates recorded were 16.79% and 16.85% in approximate figure of venture and job opportunities respectively. As growth rate of manufacturing segment is unaffected and the percentage increase was considered as 25.90% and 22.57%, during the period 2001-02 to 2006-07 in conditions of approximate figure of activities and job opportunities respectively .

The increase in the approximate figure of enterprises and job opportunities considered was 32.83% and 36.11% correspondingly for service segment through the duration of 2001-02 to 2006-07 captivating the prolonged exposure of the segment into account,

the increase was 10.03% and 10.88% in case of approximate figure of activities and job opportunities in that order on severely similar conditions.

1.12 Growth of unregistered sector

Figure 11 Growth Rate of Employment by Sector: Unregistered Sector



Source: Annual Report-2014-15

The chart displays the raise in the unauthorised segment. It can be observed that the growth rate of employment is high in the case of the service sector unless and until the excluding growth on account of coverage is considered.

1.13 Performance of SSI/MSME.

The presentation of the Small Scale Industries/MSME component, Job opportunities, assets and Gross productivity of the Fourth and the Fifth (2005) Economic Census is summarised by taking mutually the Third and Fourth All India Census of the SSI/MSME and the Unregistered segment is measured with the behaviour of the example survey of the segment.

Table1.4 Performance of SSI/MSME Units, Employment, Investments and Gross output

Sl. No	Year	Total Working Enterprise	Employment	Market value of Fixed Assets	Gross Output
		(in Lakh)	(in Lakh)	(in Crores)	(in Crores)
1	2001-02	105.21	249.33	154,349.00	281170
2	2002-03	109.49	260.21	162,317.00	314850
3	2003-04	113.95	271.42	170,219.00	364547
4	2004-05	118.59	282.57	178,699.00	429796
5	2005-06	123.42	294.91	188,113.00	497842
6	2006-07	361.76†	805.23†	868,543.79*	1351383.45*
7	2007-08#	377.37	842	917,437.46	1435179.26
8	2008-09#	393.7	880.84	971,407.49	1524234.83
9	2009-10#	410.82	921.79	1,029,331.46	1619355.53
10	2010-11#	428.73	965.15	1,094,893.42	1721553.42
11	2011-12#	447.66	1011.8	1,183,332.00	1834332.05
12	2012-13#	467.56	1,061.52	1,269,338.02	
13	2013-14#	488.46	1,114.29	1,363,700.54	

Source: MSME Annual Report 2014-15

1.14 Clusters and collective efficiency- SCM in SMEs:

For the past decade, the main strategy prescription for SME growth has focused on the profits of cluster plus collective efficiency to achieve economics and extent and range during collaboration at the limited level. The policy should look at not only reinforcing group of ventures anywhere they exist however should as well seek aggressively to give confidence cooperation among little enterprises. SMEs in the last twenty years were about to develop into one of the major goal of strategies aimed at enlargement and job opportunities creation in the just beginning countries. Evidence suggests that globalised economy demands efficient local business systems like clusters or industrial districts which play a major role in building core competencies to tap global markets. A collection of manufacturers producing alike things in similar locality, it carries little advantages. It doesn't though make them to concentrate it also draws suppliers and buyers and makes a pool of specialized products which in turn give rights to gains, such as easy availability of inputs, new ideas and innovations. The collective efficiency in the joint efforts will enable them in several ways such as overcoming bottle necks in infrastructure, input supply and access to distance markets. The sectorial and

geographical concentration of enterprises may give rise to a host of options such as specialized suppliers of raw material, components and machinery. It can also support the appearance of particular industrial, technological, managerial and monetary services. The clusters can make a conducive position for the progress of inter-firm collaboration and interest in addition to cooperation with community and confidential restricted organization to endorse limited making, improvement and communal knowledge. The collective efficiency and competitiveness are directed at groups of enterprises, with many advantages such as: lower transaction costs than assistance to individual firms; associations between activities, improving their effectiveness during the growth of co-operation in addition to maximizing the possibility of the group during the growth of shared learning. SMEs should exist as a particular replica of business growth and progress in which the appearance of connection and collaboration between SMEs provide greater efficiency; and clusters of SMEs have the benefits of elasticity and openness by which they can be more aggressive than the big firms.

The government may initiate business support policies to promote competitiveness of SMEs as suggested below:

- i. Support of linkages with markets, by providing information on markets particularly overseas markets through the provision of export intelligence services and promotion of products in these markets, particularly through participation in trade fairs.
- ii. Development of human resources and technical capabilities of firms through the support for training and the promotion of technical centres and specialist services.
- iii. Support for investment in physical capital and capabilities through credit and long term investment finance.
- iv. Promotion of linkages between firms, with a view to increasing the efficiency of individual firms and their collective competitiveness through the joint efforts and collaboration.
- v. Promotion of technological assistance aimed at transforming the SMEs to cope with the changes, which can initiate and facilitate a process of change which

creates opportunities for them to engage in continuous development of technology, knowledge, skills and organization.

- vi. Improving the competitiveness of SMEs in face of global competition.

1.15 Need and significance of the study

Most of the SCM strategies reviewed and the profiles of SMEs typically do not match, and research has been attempted to identify important factors that enable SMEs to be successful in SCM and there has been a huge rush for the attention in SCM because of its innovative move towards industry and aggressive benefit. The SMEs are delayed in being grateful for as to how the incorporated supply chain forces or pulls the extraordinary alterations in the trading methods and work with the optimistic outcomes for good and improved excellence services, price decrease and competence. In today's globalised era the SMEs are careful to be the main basis of novelty, flexibility and dynamism in initial countries In order to play a role in contributing to the vertical integration and coordination necessary for their supply chains, SMEs need to consider opportunities to achieve benefits and gain success through supply chain management strategies. As a result SMEs need to balance between focusing on their own firm's competitive advantage, as well as examining and making use of appropriate measures to position themselves and the trading partners to achieve business success. They even contribute to a large extent to the financial growth and service generation (Koh *et al.*, 2007) more than the large enterprises (Peng, 2009).

In the current competitive environment the customers demand to have improved and cheaper goods with advanced facility levels and additional product diversity with quicker release (Chow *et al.*, 2008; Ketchen *et al.*, 2008). The alterations of business of the business types that lead to lower cost, elasticity with superior service and release of still rising client value (Chandra and Kumar, 2000) are generating enormous challenges for the survival of the businesses. In most of the cases the enterprises have identified that the competition is not between the individual firms but is between the supply chain networks (Li *et al.*, 2005; Koh *et al.*, 2007) and the SCM is the efficient tool to attain the competitive advantage (Li *et al.*, 2005; Ketchen *et al.*, 2008).

The prime focus of the supply chain management is to provide the right product to the right customers at the right cost, right time, right quality and right quantity (Basher, 2010). The supply chain management has a small period goal to minimize the series time and the list and hence increase the output of the firm. The extended period goal of the firm is to enhance the profits by increasing customer satisfaction and the market share (Tan, 2002). The advantages of SCM include lesser supply chain costs, inventory reduction, largely productivity, estimate correctness, delivery presentation, completion of cycle time and load rates (Mohanty and Deshmukh, 2005). SCM brings development up to 60 per cent, which choices between 10 per cent and 60 per cent. The acquiring cost creates up the major share in sales income, about 80 percent, as cost efficient SCM is significant for its survival and enlargement (Quayle, 2003). Purchase

SMEs have the benefit of starting- ups and realizing changes when it comes to the organisational structure as it has fewer departmental interfaces and the leader can make easy change plan across the organisation with no trouble.

1.16 SCM in Metallic Industry

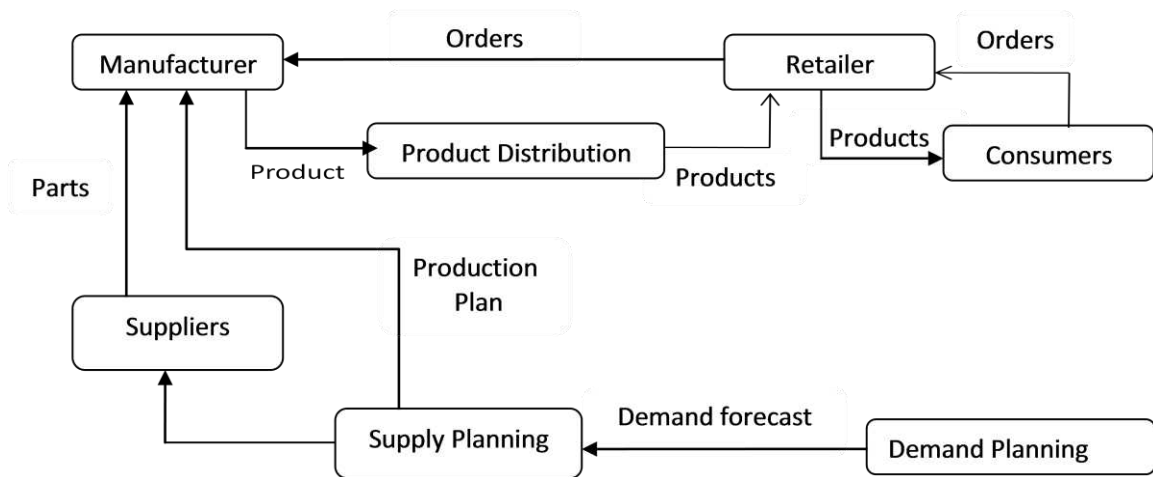


Figure 12 SCM in Metallic Industry

CHAPTER II

REVIEW OF LITERATURE

2.0 Introduction

Review of literature is nothing but literature review where the literature written by other writers related to our topic is reviewed and the important points relevant to our topic are taken as references for our research. Literature review is defined as “a text of a scholarly paper, which includes the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic”. The literature reviews do not account to innovative or unique new job as they are the secondary sources. The purpose of literature review is to convey the superior or guide that we have a good knowledge of the main published work concerning or related to our research.

2.1 Supply chain management

(SCM) is the management of a network of unified business es concerned in the final rider of product and check packages required by end clients (Harland, 1996). SCM covers all movement and storage of raw materials, work-in-process inventory, and completed goods from point of source to point of use (supply chain).

APICS (American Production and Inventory Control Society) describes SCM as the "design, planning, execution, control, and monitoring of supply chain actions with the aim of creating net value, structure a aggressive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and calculating presentation globally."

2.2 Other supply chain management definitions

Generally used definitions are:

SCM is the widespread, designed organization of the straight trade purposes and the plans crossways which trade functions inside a particular company and diagonally deals within the chain, for the standard of getting improved the tough act of the unit company and the supply chain as a complete entity (Mentzer *et al.*, 2001).

Centring the client Hines (2004) defined it as "SC strategies need a whole systems view of the relation in the chain that work jointly well to create client pleasure at the finish point of release to the customer. As a result costs must be subordinated throughout the chain by motivating out needless costs and centring concentration on adding value. Throughput competence must be increased, blocks removed and presentation measurement must centre on total systems effectiveness and even-handed prize allocation to those in the supply chain adding up worth. The SC system must be receptive to client requirements."

Global supply chain forum –defines it as the adding of significant business processes crossways the supply chain for the cause of making meaning for customers and stakeholders (Lambert, 2008).

Council of Supply Chain Management Professionals (CSCMP), explains it as it comprises training and manage of the presentation concerned in origin, procurement, change, and carrying management. It comprises of the important machine of management and cooperation with distributors and vendors, intermediary service supplier, and clients. In strength, SCM incorporates supply and demand management between corporations.

2.3 Supply chain execution in MSME

An easy description of good quality SC performance is to obtain the right product to the right place at the right time at lowest cost. Those who can meet the above definition will be highly valued and treated as a valuable partner in the chain. One of the key aspects of the change that will be beneficial to SMEs is shift from traditional manufacturing to demand driven manufacturing. Moving to a demand driven supply chain requires organization, process, and technology changes. SMEs must be ready to split data with others in the supply chain, not as a routine practice, but as the change occur. The flow is bi-directional. While competing with their competitors, they should recognize their strength and focus on what differentiates them from others. They should have a transparent business practice that is visible to their partners so that in case of any untoward incidents, they can take appropriate decision along with the whole supply chain, thus not affecting their business relationship. They should be responsive in every

aspects of the business including exception handling, demonstrate faster innovation, and reduced cost of the supplied product. All these can be achieved, using efficient manufacturing methods and process improvements.

Existing scenario says that most of the SMEs operate without planned supply chain Management (SCM). As compared to their bigger resource, rich counter parts, SMEs have their task cut out due to various constraints.

2.4 DEMOGRAPHIC FACTORS

Ozbayrak (2006) reveals that the evolving customer command have lead to the appearance of a innovative industry age everywhere and the alter takes part in a leading position, which in turn have raised lot of competencies to be possessed by the supply chain systems to live on and flourish under alter and uncertainty. The plan of this job is to replicate the presentation of a Make-To-Order (MTO) manufacturing system which functions as a wider supplier chain network following different strategies and recognize the best of those. The number of performance metrics such as Work-In-Process (WIP), tardiness, responsiveness and mean flow time has been considered to provide further insight into the impact of these three localized control policies.

Iusoy (2003) seeks to assess the SC and innovation management system in place in the manufacturing industries in Turkey. Research indicates the need for adopting product differentiation, particularly through intensive products as the dominant competitive strategy and also the need for improvement in various areas of supply chain, as well as innovation management. Evolving consumer demand has led to the emergence of a new business era, where change plays a dominant role. This new era has in turn brought to the fore a number of competences that supply chain systems need to possess so as to survive and prosper under conditions of change and uncertainty. The main aim of this work is to model the performance of a Make-To-Order (MTO) production environment that operates as part of a wider supply chain network under various control policies and identify the best performing ones. A simulation model has been created and used as a tool to help quantify the effects of three control policies on the MTO system.

Veenapan (2005) has brought out that the SMEs, in India, in quantifiable terms contribute almost 40% of the whole industrial production and 35% of exports. This segment even adds 7 percent of the GDP. The share of employment in this sector is 45% of the whole employment in the nation and 80% in the industrial sector as well as India the developed economies has the SME sector which has a strong presence. Other than the direct contribution to the economy, the SSI segment plays a major position in the qualitative development of the society. Given the rural drop back of the Indian economy, it is but logical that the small and micro enterprises are the best answer to the growing problem of unemployment. Since at times the SSI is a one man show, the entrepreneur has to face all problems alone. The issues that plague an SSI are difficult access to credit, exposure to vagaries of market and delayed payments.

Lakshminiwas (2008) brings out that the small scale sector contributes more than one-third of the total manufacturing output of the country, which point out the significance of this segment in the national economy. The small scale sector looked for self reliance and self-assistance in the recent proposals of the government to increase the investment range from Rs. 60 lakhs to Rs. 300 lakhs. The growth in the manufacturing segment is more than 35%. It has given job opportunities to more than 95 lakh persons and the rate of growth in employment is found to be over 5%, which is superior than that for the main segments of the economy.

Ardila (2008) believes that most of the governments are interested to know the secret behind the success of micro, small and medium enterprises. Some countries have adopted new attitudes to solve the problem of unemployment and have been formulating conducive policies that help citizens to become economically empowered. The Indian government is being guided by the vision of leading the world by 2020. This requires the understanding of how technology, competitiveness, economic development and social development are going to work and what is going to fit in their improvements in MSME. The MSME segment is significant player in developing countries, with respect to employment generation and economic growth.

Kauremaa et. al., (2009), investigate with help of a case study, the functioning force and execution barrier of customer- start inter-organisational information systems for the

SME suppliers. The paper evaluates the efficiency of organization-to-system and organization-to-human mixing. The result was found that inter organizational system-to-human integration can provide operational benefits for non-initiating SMEs, but not as much as system-to-system mixing.

2.5 Supply chain practices (In-General)

Dawson et. al.(1989) noticed that the management of innovation and change in two different operating units of high technology and the transformation of work in changing from the production for stock to production to order' is analyzed, and the process of changing established patterns of work (as a brown-field operation), and designing new production arrangements from the outset (as a green-field operation) are contrasted and compared. The key features of JIT and TQM standards are identified and the extent to which they represent real innovations in production is assessed.

Julien et. al.(1994) have discussed the effect of globalization of the financial system on little selling. The problems of small exporting firms has been analyzed on a number of occasions and the researchers have recently seen to begun to pay closer attention to the effects of the opening up of national borders of regions on small businesses. The writers end that, evaluated to most large firms, small and medium-sized enterprises (SMEs) are usually less well-resourced to face the challenges posed in increasing the global trade.

Ogbuehi et. al.(1994) stated that the information about global marketing and global markets is frequently not known to the MSEs in U.S. enterprises (Edmunds and Khoury 1986), of which most of them are new in the global marketplace. The victorious representation of the procedure improves the inevitability of export behaviour. Also important variables influence the path, price, and achievement of export growth need to be identified. The revise seeks to look at the insight of the entrepreneurs of SMEs comparative to certain export activities.

Gulledge (2002) states that possible advantages to large organisations are clear where as the profits to dealers (SMEs) are obviously less. This manuscript depicts the author's skill in functioning with Boeing to construct an aerospace centre in Asia, and speaks to

the difficulties that SMEs look as they are solicited to take part in exchanges. The revision reveals the difference between active and designed use of business by big downstream companies, as evaluated to upstream SMEs. They (SMEs) are careful, barely in arranging to spend in e-Business if leading downstream clients force them. But, they do not value the full profits or advantages to be increased from acceptance of e-Business and take in an sketch out for a sensible business case that comprises of supplier thoughts, and finishes with a suggestion to make an replaced surroundings so as to make it comfortable for SMEs to take part.

Sommer (2003) opines that SMEs are no longer just coping with the supply chains, but are also excluded from participating in the lucrative supply-chain transactions generated by much larger manufacturers and suppliers. In most cases, SMEs were unable, or unwilling, to spend the necessary capital for transactional system implementations, or infrastructure upgrades. SMEs were at the mercy of their large customers who dictated the transactional standards and technology interface requirements.

Jüttner (2005) has derived an understanding of the business requirements from a consultant viewpoint. Depending on the rulings from an investigative quantitative survey and qualitative centre group discussions with supply chain managers, some issues of SCRM are arrived at and arranged the length of the three theoretical stages of “philosophy”, “principles” and “processes”.

Li et. al., (2005) opine that rivalries during the 1990s strengthened and marketplaces turn out to be global, as a result did the tasks linked with attaining a produce and check to the correct position at the correct instance and at the least price.

Eng (2006) argues that the organisational norms are examined in terms of the arbitrating position of cross-functional harmonization for studying, the relationship among organisational standards and supply chain performance. SCM philosophy stresses that integration of supply chain connects a company with its clients, dealers and other channel partners. Cross-functional coordination in SCM involves multiple business functions that span departmental and firm boundaries, importance of

information flow, interaction and integration in coordinating different functions to achieve SCM goals. Cross-functional coordination among interdependent functions reflects now a days rising difficulty of handling worldwide systems of supply chains and increasingly global SCM and hyper-competitive business environments.

Bhagawat et. al.,(2007) highlight the need for that a balanced scorecard for SCM so as to measure and assess every day trade processes from the subsequent four viewpoints: finance, customer, inside industry process and educating and expansion. The Balanced Scorecard has been brought up, based on wide range of reassess of literature on SCM performance measures, supported by three case studies, each illustrating the ways in which the balanced scorecard was developed and practiced in SMEs in India. The balanced scorecard developed here provides a helpful guidance for the managers in evaluating and measuring the SCM in a balanced way and proposes a balanced performance measurement system to map and analyse supply chains.

The National Small Industries Corporation limited (2008) brings out that it entered into a system for providing the authorization of loans for small enterprises from mercantile banks. NSIC provided credit facilitation up to the value of Rs. 215.03 crore in the year 2006-07 and Rs 284.63 crore up to December 2007 during the year 2007-08 through tie up arrangement with banks. NSIC support the SMEs, by bringing and providing natural resources like steel, aluminium and copper, etc, besides the monetary support.

Sivalingam, et. al.(2008) state that the MSEs segment occupies a significant position in the total manufacturing sector in India. The importance of micro and small enterprises sector can be seen from the fact that it explains for 95 percent of industrialized units, 40 percentage of the value addition in manufacturing sector and 30 percent of exports. As on 31.3.2008, there were about 5.5 lakhs registered micro and small enterprises spatially distributed through the length and breadth of Tamilnadu, with a total investment of Rs. 19,364 crores and have provided employment to more than 39.46 lakh persons. The study reveals an increasing pattern in the number of units, employment, investment and production.

Kovács (2008) reveals that progressing tendency in outsourcing highlights the difficulty of supply chains. Worldwide supply chains make bigger more than many strata of innumerable companies. Similarly, the company-internal vision on corporate ecological accountability is being questioned, as clients and legislation similarly widen a company's ecological accountability to comprise organizations' both accelerating and decelerating, in the supply chain.

Chatterjee (2008) states that, the MSME segment acts as the back bone of the Indian market, in conditions of the number of entities, job opportunities created and contribution to the nation's producing output and exports. As said recognition of the fact that the SME sector faces crunch the government had declared a- strategy package for moving up praise and recognition to SMEs in August 2005. It even resulted in a significant growth of 20 percent in credit flow from the public sector banks to the MSME sector.

Operational Definition: SC practices define or use the practices which are most generally used to get the required data from the entrepreneurs.

2.6 Supply chain environment

Lefebvre and Lefebvre (1993) have investigated the association among aggressive placing and inventive attempts, as deliberate by R&D spending, procedure innovation, and the utilization of copy right information bases. For this purpose, they studied 455 small manufacturing firms. The output show that a association does survive and that firms which grasp a stronger aggressive place, in words of price, excellence, and variety, usually create better efforts with look upon to novelty. In reality, some dissimilarities have been established to survive in the strength of the range of original attempts among groups of firms having dissimilar understand aggressive strategies. These results support the statement that a relation exists between business policy and original efforts. This relation is toughest in those companies which have the most excellent aggressive positioning.

Sikka (1998) states that, the weak relations among the technology sources and the SMEs as technology consumers. Insufficient inspiration will be for the SMEs for

improving their ability towards entering into contract out and ancillarisation of performance with the well-built firms in India. A particular mechanism needs to be shaped at the nationwide level to allow the SMEs to improve their technical competencies and capabilities for manufacturing superiority products to interrelate with well-built and bigger firms in new and budding fields. The editorial highlights the entrepreneurship capabilities which are being developed by SMEs in India for creating excellence goods in addition to undertake ancillarisation and sub-contracting activities for the big firms in India.

Klassen et. al.(1999) has revealed that management of the natural environment and resources is becoming very important in the case of manufacturing industries. The managers also challenge the implementation of the changes to improve the competitiveness.

Ahmed et.al.(1999) conveys that Knowledge Management (KM) became a element of the ordinary language in educational rings, in addition to the business world. As the rising quantity of companies has boarded upon knowledge management plans, a great proportion of these proposals stay strictly purposeful. The difficulty with this type of focal point is that it keeps out and ignores the factual possible benefits that can be copied from knowledge management.

Ackroyd et. al (2002) have examined the feature kinds and categories of creative performance that the major British firms take on. The writers propose that there is a characteristic prototype of organisation for manufacturing at plant stage, explained as the 'new flexible firm'- the characteristics of which are officially set out. The new firm has a few critical characteristics which facilitate to create intelligence of a rising prototype of place of work business relations in manufacturing. The method, this innovative form of organisation on the plant level exploits labour disagree with, rather than sustains, the prospects of some forecasters about the significance of HRM.

Leveraging Knowledge to better meet client needs (2002) the resource centre is one of the organisation greatest strengths which have the ability to help connect the clients with solutions to meet all of their financial security planning needs. Through the

Resource Centre one can gain access to superior product and marketing support for a complete range of industry-leading, competitive products for individuals, families, businesses and organizations.

Dangayach et. al.(2005) have conducted an investigative study on higher developed skills managed in Indian SMEs of vehicles, electronics, equipment, and procedure divisions to measure the position of higher developed skills, identify them applicable to Indian SMEs, recognize aggressive priorities, their functioning decisive factors, and recognize the degree of asset in them.

Raymond (2005) states that augmented requirements for aggressiveness, improvement, excellence, elasticity and in order processing means has guided a number of SMEs to put into practice superior built-up know-how. The study of the producers be made to decide the presentation results of the “fit”, or position, among the significant achievement factors of process administration in SMEs and their stage of talent in the make use of advanced manufacturing technologies.

Antonucci (2007) explores the neo-Schumpeterian and development flow of logical and experiential literature in association with technical alterations and job opportunities. This document facilitates an econometric representation, using which the multi faceted network of associations between employment expansion, varied improvement strategies and arrangement features like order and manual labour charge dynamics, is experienced. It seems to verify the significance of the manufactured goods and procedure dichotomy to separate the improvement-job opportunity association, and the position of requirement growth, either in approaching employment openly, or in maintaining the re-incorporation of scientific joblessness.

Krause et. al.(2007) highlight that mechanized firms have augmented the quantity of component and services they subcontract, at the same time as changing on their core potentiality. Sub-contracting products and services to self-governing, an outside dealer signifies that dealers' performance is more and more significant to the long-standing achievements of these trading firms. Trading firms are growing using dissimilar supplier growth strategies or plans to get better contractor performance. The plans

comprise of dealer appraisal, offering motivations for better performance, promoting competition between dealers, and involving them directly in the trading firm's workers with dealers involving through actions such as educating of suppliers' workers. The direct participation activities, where the trading firm internalizes important quantity of the dealer development attempt, play a significant role in performance upgrading.

Ghandour et. al. (2007) discusses the function of objective location as a causal factor for the achievement of e-Commerce systems (ECS) in SMEs. The output of this paper is a theoretical model recognizing the pertinent measurements of both achievement and goal setting and the resulting hypotheses that need experiential research to authenticate the future model.

Boone et. al., (2007) bring out that e-Business skills have permeated every supply chain process.

- a. Products are jointly planned on the Web.
- b. procurement software and swaps have streamlined buying and abridged transaction costs.
- c. ERP systems have codified, standardized, and automated data storage and retrieval.
- d. combined technology has improved supply chain visibility and has made the sharing of products and services well-organized
- e. Communication technologies have better client relationships and promotion strategies.

As e-Business techniques carry with them the assurance of inclined and well-organized supply chains, companies that apply them need to speak to several issues before the possibility of such technologies is completely understood.

Lakshman (2008) highlights that, one-third of the India's exports are the products of SSI units. The small units, in 1995-96, provided employment to 15.26 million people. In contrast, the large and medium units put together accounted for 5.45 million jobs. Some products have been selected to be produced only by SSIs as a measure to help the

units thrive. The small scale sector has been encountering a number of problems like lack of finance, infrastructure, lack of technology and delayed payments.

The special issue “Sustainability and supply chain management- An introduction to special issue” (2008) from the Journal of Cleaner Production reflects the rising significance of the theme for the consultants in companies, and educational institutions. The reason of this particular problem is to provide a means to this significant subject. Ecological and communal difficulties and challenges do not end at the entry of a solo company, however should be careful through the supply chains as diagonally which connected matter and data flows are prearranged. The objectives of the journal are to initiate present study themes and give an impression of the solo manuscripts. Articles in the journal include bring in sequence power of areas and local performance as well as presentation taken by SMEs. The articles in this subject also cover the performance pointers and stopped up-circle provides sequence aspects.

The basis and supervision of these ecological and common loads is not the only accountability of one organisation alone. Instead, entire SCs and systems of SCs have to exist concerned. Study in considering the positions, managing, tools, and methods for maintainable SCs have to be supplemented, in turn to assist to overcome these issues.

Thakkar (2009) describes few of the important regions that control management of the SC in the SME segment. It summarizes in an educational and explorative way the study environment of SCM in SMEs in India. It even offers modern researchers in the fields of SMEs and SCM by means of information which help them in: (i) understanding important research problems connected to SCM for SMEs, and (ii) defining constructs, investigate factors and the characteristics of their study.

Esposite and Passaro (2009) call for an inter-industry study approach to evaluate the SC development of the railway and aeroplane built-up manufacturing, stressing in detail so as to these manufacturing industries are passing through a period of huge change, involving the production system as a whole. In particular, the paper identifies the supply relationship evolution in both industries and analyses the vertical relationships,

thus showing how the circulation of information and technology is a crucial factor for supply chain efficiency. The paper synthesizes the outcome of a research programme concentrating on the supply systems of the major Italian corporations in the aircraft and railway production.

As highlighted, the railway and aircraft manufacturing industries are going through a period of change that involves the management of the vertical relationships and the system of supply relationships. With regard to the vertical relationships, this paper has emphasized that the production organizations of both industries develop according to a hierarchical structure including a final assembly area, where parts and components coming from different sub-sectors are assembled. This hierarchical organisation takes the form of a pyramid with a leader firm at the first production level overseeing the assembly of the product (aircraft or train), as well as being responsible for the overall programme.

Testa et. al. (2010) state that Green Supply Chain Management (GSCM) is an increasingly widely-diffused practice between company that are seeking to improve their environmental performance. The motivation for the introduction of GSCM may be ethical (e.g., reflecting the values of managers) and/or commercial. The manufacturing amenities in seven OECD countries as also the determinants and incentives for the functioning of GSCM have been examined. It is found that GSCM is strongly complementary with other advanced management practices, and that it contributes to improved environmental performance. However the effects on commercial performance are more ambiguous.

Nikolaou and Zervas (2016) have examined the affects that are caused in decision making by the owners to include environmental concerns in their SCM because of the environmental information. This is done by keeping some theories which are mainly connected to the familiarity of manager regarding ecological results of SMEs. These also take in to account the limitations and chances faced by SMEs while applying convinced exercises to green their SCM. The results indicate that information and ecology in order plays a significant and vital position in managers' choices to take on environmental exercises diagonally SCM, where as the financial disaster appears to

unenthusiastically influence their purpose in implementing some environmental traditions.

Operational Definition: SC environment in this study is operationalised as the planning and problem solving to improve product quality and to compete with the competitor's to withstand and overcome the competition.

2.7 Supply chain management strategies and systems

Ellram and Cooper (1990) opined on the strengths that have formed the SCM and company associations. The possible advantages and dangers of participation in SCM, company relationships are studied taking the viewpoints of both the transporter and the facility source into consideration. The study gave rise to the issues which comprise will power of whether a firm should use a SCM approach, the organization structure to utilize in the SCM and modelling SCM systems.

Hart et.al.,(1994) have inspected the market place investigating activities of UK industrial exporters. The paper reconsiders the creative writing worried with information for global advertising, in general, and export promotion study, in exacting. The paper explains the means of a research revise, comparing market research activities of exporters in the glow of company dimension and export knowledge. The author find that once companies go on board on export activity, they depend on individual contact with distributors, mediators, consumers and participants to collect information about the markets they serve, and this information is used equivocally to modify decisions.

Lane et. al.(1996) suggest that faith is perceived as a way to decrease doubt and danger in perpendicular inter-firm dealings. Both hypothetically, and by means of position to experiential relative study (Britain and Germany), it is shown that faith-based relationships among purchaser and dealer firms hardly ever change impulsively at the point of personal communication, but are extremely reliant on the survival of steady lawful, political and communal institutions.

Carnoy et. al.(1997) view that the flexible production is closely associated with the new competitive conditions in the global information economy as is marked by a

disaggregation of labour. The fundamental feature of such labour is a shift in the locus of work organisation from permanent, stable collection of jobs to personalized elastic employment as is distinct by personal capital collections. The individual flexible employees move between work places satisfying exacting locations on demand or are self employed as long as the labour facilities on demand. The flexible workers go among place of works satisfying exacting positions on demand or are self-employed.

Tan (2001) has explained the traditional purchase and the logistics functions as the broader strategic approach and called them as the supply chain management.

Baker et. al., (1999) examine how persons act in this admiration. In look for an sufficient method to discover a solution to this query, this donation aspires to demonstrate the possible value of study into insight and social issues and the way they influence supply management. Through interviews and survey, this document investigates an earlier issued theoretical framework, where four issues were found to pressurize insight and supply association management. Exploratory research has indicated different factors which are applicable to understand how dealer relations are handled in exercise. With the location of the buyer, it is also applicable to appear at the place of the buying section inside an organisation, as this can frequently say something about the reputation and acknowledgment of purchasing as a significant purpose in an organisation.

William Keogh (1998) focuses on the importance and the viability of the high technology used in the small firms to the economies in creating the employment and they work as the base to the emerging industrial sector. The methodology applied was the interviewing the top officials who know the each and every step taken or done for the establishment of the firm for its good running. The different problems were identified which arouse in running the firms or formulating the strategies were taken into consideration. The key factors or the issues which the firms have considered important for their strategic growth included innovation, internationalisation, man power and the collaboration. The organisational, local and national level policy implications were highlighted.

Peel (1999) focuses on the preparing, business aims and wealth financial planning in Japanese, German and local SMEs in the production sector and observe that the small firms take franchising as the growth strategy for both economic and idiosyncratic reasons but that the economic reasons tend to exist. The suggestions he put forth are that the franchising is worth the growing strategy for the small firms and it also creates some major problems for the growth oriented small businesses. And he further suggests that research is required into the experiences of the failed franchises and the small firms which encounter the problems for not taking the franchising as a growth strategy.

Carr and Pearson, (1999) use information composed from top intensity purchasing executives at the Director VP level representing a large cross industry sample of 739 firms. The data analysis is rigorous. Using data from 571 of the 739 firms, correlation analysis and exploratory factor analysis have been performed. This is the first attempt to examine a structural model of strategic purchasing and its influence on supplier evaluation systems, buyer–supplier relationships, and a firm’s financial performance. The inferences of this study are that a planned acquiring purpose is significant for the achievement of the organization. Organizations that have a planned purchasing purpose are added probably to put into practice a dealer assessment system. This would provide the purchase department with an improved sympathetic of which dealers are performing healthy and which dealers are not performing well. Increased importance on tactical obtaining and dealer assessment systems are significant for firms looking for to set up long-standing associations with their dealers.

Georges et. al., (1999) bring out that a step-by-step management approach is developing in order to help the Small, Manufacturing Enterprise to reach the basic system and aggregate flexibility and agility, despite their lack of resources. This is justified by the fact that the some of the large firms are lowering their fixed costs, by moving the processing machine towards specialized SMEs, and creating intelligent network of factories, based on the innovation, agility and JIT philosophy. The large factories are also moving towards the strategy of decreasing the investment risk by lowering the fixed cost and keeping them almost in tune with the variable costs. The large factories are moving some of the manufacturing and processing functions to

specialized small and medium factories. The idea of networking relationship between the large factory and its SME suppliers is slowly taking roots.

Gunasekaran et. al.(2000) states that in the modern economies the SMEs participate an significant position as they are flexible and have the ability to innovate. The SMEs participate in a vital position in giving or generating the job prospects and following the big size production organizations. The importance of the SMEs is considered and the experience of the little business busy in non-stop development and a linked theoretical model are considered to emphasize as to how the output can be enhanced by means of inadequate reserves.

Braglia et. al., (2000) highlight that producing associations understand a broad variety of strengths which build it essential for them to endlessly get used to their process and think the consequences of their making actions on consumer expectations, supplier limitations and alterations in the law. The article presents an experiential confirmation of facts levels and the perceived strategic relevance of manufacturing elasticity.

Lee. et. al., (2000) focuses on the tremendous impact of the advances in information technology on the development of SCM. They found that the advances in the technology have improved the coordination between the SC partners to work in tough situation to optimize the chain-wide performance and share the returns among the partners. They found that the essential enabler for tense organization is information contribution, which is greatly made possible by the go forwards in information technology. It explains the information collective for stocks, sales, demand forecast, order status and production schedule. They also focuses on the three alternative models of information sharing like the information transfer model, the third party model and the information hub model

Humphrey et. .al., (2000) argue that automobile manufacturers emphasize that they are building more cooperative, long-term relationships with their suppliers, as hypothesized, and found that buyers are actually pursuing a dual strategy approach, in which they use threats on out-group suppliers while providing help to in-group

members. The hypotheses were based on the exit, voice, and loyalty typology, and on research from leader–member exchange theory.

Lee et al. (2000) suggest that supply chain partners can now work in tight coordination to optimize the chain-wide performance, and the realised return may be shared among the partners. A basic enabler for tight coordination is information sharing, which has been greatly facilitated by the advances in information technology. This paper describes the types of information shared inventory, sales, demand forecast, order status, and production schedule.

Chang (2001) has employed qualitative and quantitative data analysis techniques to examine the implementation and integration of information systems support for manufacturing (ISSM). The preliminary development of the ISSM model was then used to design a questionnaire for case studies analysis to examine ISSM. The comparison suggests that Taiwanese manufacturers have created platforms on which to build the advanced manufacturing systems since they are generally aware of the problems and have the plans to overcome these.

Ha (2001) opined that the problem of designing a contract to maximise the supplier's profit in a one-supplier–one-buyer relationship for a short-life-cycle product. Demand for the finished product is stochastic and price-sensitive, and only its probability distribution is known when the supply contract is written. When the supplier has complete information on the marginal cost of the buyer, it is found that several simple contracts can induce the buyer to choose the order quantity that attains the single firm profit maximising solution, resulting in the maximum possible profit for the supplier. When the marginal cost of the buyer is private information, it shows that it is no longer possible to achieve the single firm solution. Under the optimal contract, the supplier employs a cut off level policy on the buyer's marginal cost to determine whether the buyer should be induced to sign the contract.

Yu et al. (2001) are convinced that the advantages of supply chain joint ventures support on in order contribution can mitigate deficiencies associated with decentralised control and reduce the “bullwhip effect”. This study illustrates the benefits of supply chain

partnerships based on information sharing. For a decentralised supply chain comprising a manufacturer and a retailer, it derives the members' optimal inventory policies under different information sharing scenarios.

Stonehouse et al. (2002) posit that the main SMEs, chosen equally from the facility and production segments, demonstrate a split among the hypothetical thoughts and the sensible truth of planned preparation. As there are tough signs of business setting up between the firms reviewed, there is fewer proof of planned thoughts, except between well-built businesses. Yet in the last group, there are simply a few cases where the documented instruments of strategic management emerge to play a position in setting up, the exemption being inside monetary study, which is extensively undertaken.

Daniel et al. (2002) argue that small and medium-sized enterprises (SMEs) are rapidly adopting the Internet and e-commerce. The paper addresses the research gap by seeking to understand how SMEs in the UK are adopting e-commerce, through an exploration of their level and sequence of adoption. The study was carried out by means of a questionnaire which had four distinct cluster of adoption. The authors have identified a set of sequential stages through which the firms appear to pass during the process of adoption of e-commerce.

Zhang et al. (2002) discusses the quick and spectacular alterations in client expectations, rivalry, and skill which are designing a more and more vague surroundings. The producers are looking to improve flexibility across the value sequence. Production elasticity, a significant measurement of importance chain flexibility, is the skill to create a range of products in the numbers that clients demand-as they keep up high performance. It is deliberately significant for attractive competitive place and fulfilling clients orders. Volume flexibility and mix flexibility have strong, positive, and direct relationships with customer satisfaction.

Hvol (2002) posits that the changes in the market bring up many new demands to production planning and control of companies. The most important pressures on companies are: reduced delivery times, prices, costs, stocks and product life cycles and increased customisation, flexibility and agility. SMEs are playing a greater part in the

global business network and participating in many interlinked supply chains. This makes balanced supply chain management one of the key issues for many companies. The Global Supply chain forum defines SCM as: “the integration of key business processes from end-user through original suppliers who provide products, services and information that add value for customers and other stake-holders”.

Huin et. al., (2003), highlight that manufacturing has been identified as a key pillar of growth in many Southeast Asian Economies. Many countries are trying to improve their total business capabilities by encouraging computerisation of small and medium sized enterprises. Manufacturing SMEs (M-SMEs) are tasked to adopt technologically advanced programmes. With an improving public education system and more literate work force, many SMEs are better positioned to tap into the knowledge-based economy. This improved AI model makes use of the large amount of accumulated knowledge typically found in the M-SMEs, especially those in the electronics and precision engineering sectors.

Huin (2003) says that despite the many advantages of ERP systems, they do not as yet represent a clear and successful management tool to SMEs, or at least it is not as easily implementable by SMEs. The paper highlights a set of organisational, operational and supply chain related interdependencies in SMEs, which in many aspects influence project management success and methodologies deployed in ERP systems in SMEs. An agent-based model for coordinating the management of enterprise resource in SMEs is also introduced in this paper.

Poltrock et .al.,.(2003) suggest that information recovery is normally measured as an individual activity, and information repossession study and instruments reflect this sight. As digitally arbitrated message and information contribute add to, combined information recovery qualities greater attention and support. It describes the field studies of information assembly in two design teams that have very different products, corrective backgrounds and instruments. There are outstanding similarities in the types of information they required and the means used to obtain it.

Rouse et. al.,. (2004) state that outsourcing decisions are not, technically, irreversible, but in practical terms, the organisational disruption and financial costs of bringing services back in house (“back sourcing”) mean that a few organisations revert to the original situation, even when quite dissatisfied with an outsourcing arrangement.

DeLone et. al.,.(2004) argue that information technology and the Internet have had a dramatic effect on business operations. Companies are making large investments in e-commerce applications, but are hard pressed to evaluate the success of their e-commerce systems. The DeLone& McLean Information Systems Success Model can be adapted to the challenges being faced by the new e-commerce world.

Beheshti (2004) states that technical progress and get through have produced remarkable raise in information accessibility and have completed successful utilization of current information technology a significant and aggressive business instrument. In support of this study, a study tool was expanded to measure the collision of information technology on SMEs in the USA. The outcomes give helpful insights into the utilization of information technology by production and service SMEs.

Gunasekaran et. al.,(2004) has brought out that the supply chains specially in the manufacturing industries are better managed by the managers. The supply chain management signifies the mainly higher state in the progress in growth of buying, procurement and other SC performances.

Hirst et. al. (2005) have found out the main reasons for the failure of the British manufacturing industry. Though there is lot of growth in the output, employment and productivity. Most worst is the balance of trade in manufactured goods and its effects on the balance of payments. The domestic firms have failed to regain market share in consumer goods lost in the extensive import penetration of the 1970s. Second, imported semi-manufactures account for a growing proportion of the British final output, leading to lower value added per unit of gross output. Third, the sharp decline of the UK capital goods sector during 1980s means that new equipment required by the recent surge in manufacturing investment cannot be met from domestic sources. These are the macro indicators responsible for the failure of the micro-economic factors i.e., not being

flexible in meeting the new methods of manufacturing which have been the key to industrial success in the main competitor nations

Dwyer (2005) examines the important aspects of governance mode and knowledge exchange in strategic alliances between a multi-national corporation (MNC) and small and medium enterprises (SMEs). A model suggesting the framing knowledge value as the primary predictor of governance model choice as an appropriate framework to evaluate both the knowledge exchange relationships and governance model choice relationships between MNCs and SMEs was developed. In recent years, research on strategic alliance formation has concerned itself with transaction cost economics, with firm and industry level factors receiving considerable attention. However, in order to gain a comprehensive understanding of alliance formation, interacting variables, such as organisational capability and knowledge exchange, must be properly understood.

Liker et. al (2006) reveal that more businesses are counting on their suppliers to lower costs, improve quality, and develop innovations faster than their competitors' suppliers can. To this end, many experts agree that American firms, like their Japanese rivals, should build supplier keiretsu: networks of vendors that learn, improve, and prosper in synchronization with their parent companies. During the past ten years, automakers Toyota and Honda have entered into successful partnerships with some of the same suppliers that are at odds with the Big Three and created effective keiretsu across Canada, the United States, and Mexico.

Ferrin et. al (2006) state that organisational buying models focus on the utilization of total cost of ownership (TCO) to cost to buy chances. The study presents proof that innovative firms in fact use such models. This investigative study offers, for the first time, information on the environment, and utilization of the price drivers on which firms support their TCO computations. The study proposes a general model of TCO is not suitable. The core cost drivers would be present in all TCO computations. Purchasing managers could use different, specific cost drivers from the auxiliary set to tailor the TCO computation for a particular purchase situation.

Kraus (2006) opines that the strategic planning of the smaller and the medium industries has a optimistic crash through the presentation of the firms belonging to the group of the growth firms and other aspects or factors like the strategic instruments and control and the time, doesn't contribute to the performance.

Mula et. al., (2006) opines that models for production planning which do not recognise the uncertainty can be expected to generate inferior planning decisions, as compared to models that explicitly account for the uncertainty. This paper reviews some of the existing literature regarding production planning under conditions of uncertainty. The research objective is to provide the reader with a starting point about uncertainty modelling in production planning problems and is targeted at production management researchers.

Maxwell et. al.(2006) has stated that implementation of the approach was tested in the industry and conclusions reached on the effectiveness of the strategies included in terms of developing an offering with improved sustainability performance, as well as practical use as an industry approach. Two strategies incorporated are functional and systems thinking, as these are seen as keys for increasing the environmental benefits of the offerings.

Li and Lin (2006) have examined the impact of environmental uncertainty, intra-organisational facilitators, and inter-organisational relationships on information sharing and information quality in supply chain management. The top management has a positive impact on information sharing, but has no impact on information quality. The results sharing also show that the information and information quality are not impacted by customer uncertainty, technology uncertainty, commitment of supply chain partners and IT enablers. The understanding and practising of supply chain management has become an essential prerequisite for staying competitive in the global race and for enhancing profitability. The information sharing is the key ingredient for any SCM system. Many researchers have suggested that the key to the seamless supply chain is making available the undistorted, and up to date, marketing data at every node within the supply chain.

Ramsay and Croom (2008) categorically state that a widespread consensus has emerged in the Purchasing and Supply Management (PSM hereafter) field. The authors urge that purchasing and supply activities may be allocated to the categories of 'strategic' and 'non strategic'. While strategic activities are associated with higher inter-organisational status, non strategic activities are regarded as generating low levels of status. Consequently, purchasing functions can obtain more intra-organisational status by focusing their efforts on strategic activities, and they should, thus, be encouraged to undergo this change, which may usefully be described as following an evolutionary, or developmental, path from a clerical to a strategic focus. The paper seeks to demonstrate the strength of the consensus surrounding these ideas by conducting a wide-ranging literature survey, challenges the validity of that consensus and empirically tests its influence on practitioner attitudes and behaviours. The validity of this consensus is challenged in a variety of ways- particularly with reference to the distribution of large and small companies in the economy.

Karjalainen et. al., (2008) opine that the importance of small- and medium-sized enterprises (SMEs) as employers and suppliers is high, and there are studies that evaluate the benefits of having SMEs as suppliers. The challenges of SMEs as buyers have been explored, but there is little research on the obstacles that SMEs encounter as suppliers. This paper focuses on the implications of perceived resources, electronic systems and enterprise size. It uses survey data to analyse what type of resources and characteristics in particular influence the involvement of SMEs in public procurement. The results of hypothesis testing show that perceived lack of resources, especially in legal expertise and administration, is associated with low SME involvement. EU procurement principles of transparency, equal treatment and genuine competition are intended to guarantee that companies of all sizes are given equal treatment in public procurement. Yet, it is unclear what the current position of SMEs is. Therefore, this study has analysed possible reasons for the absence of SMEs in public procurement.

Agndal (2008) posits that the area of importance and concern to managers is the international purchasing, which remains an under-researched phenomenon in the context of small and medium sized firms. The article presents the study of the

international purchasing market entry phenomenon in the context of small and medium sized firms. The article also examines the international purchasing market entry system. The findings indicate that managers of SMEs are often reluctant to source abroad. Purchasing markets entries are generally more reactive than proactive, occurring as a consequence of needs for certain products that cannot be found domestically, high domestic costs, unsolicited opportunities and pressures from the owners and customers. More specifically, it focuses on identifying patterns in the process of foreign purchasing market entry.

Zhou et. al. (2008) investigated the integration of information sharing and supply chain practice in supply chain management. Data from 125 North American manufacturing firms was collected. The results show that

- a. Effective information sharing significantly enhances effective supply chain practice;
- b. Supply chain dynamism has significant positive influence on effective information sharing, as well as effective supply chain practice. Supply chain dynamism has more influence on information sharing than supply chain practice;
- c. Effective supply chain practice becomes more important, when the level of information sharing increases.

The findings show that both effective information sharing and effective supply chain practice are critical in achieving a good supply chain performance.

Kim (2009) examines the fundamental connections between SCM practice, opposition ability, the intensity of SC integration, and definite performance. A organization's SC integration plan can help it to formulate its competitive strategy, and identify how such a linkage can be utilised to improve organisational performance. In the Korean firms case of, well-organized supply chain integration can engage in recreating a more significant position for maintainable SCM aggressiveness, in Japanese industries, the bond relationship among the intensity of SCM practices and rivalry ability can include an additional important result on SCM competitiveness. This judgment gets planned

structure so as to, in the early stage, emphasizing on universal supply chain integration may be additional critical and, in the phase, after locating supply chain integration on its method somewhat, the plan centre can move towards chase of high level of constancy between SCM plan and aggressive plan.

Meng chung et. al., (2009) are convinced that the SCM has become a new model of enterprise management in the 21st century. This model minimises internal friction of the supply chain system, improves the system's overall competitiveness and promotes each members competitive power in the system. As a regional economic phenomenon, industrial cluster require more and more people to pay attention because of unusual regional economic competitiveness. The article also gives counter measures of small and medium enterprises (SME) cluster cooperation, based on supply chain management, combined with the relationship between supply chain and small and medium enterprise clusters, on the basis of the characteristics and cooperation of China's small and medium enterprise clusters.

Ribeiro et. al. (2009) posit that the globalised nature of current business environments led to the emergence of new networked enterprise organisational paradigms to meet changing requirements and tackle the profitable, but volatile, opportunities for which overall agility is required. The shop floor data is increasingly required in business tools that support decision making. The developments in networked information technologies and embedded devices allow enabling intelligence in shop floor level- rendering it an active and live entity that further enhances the dynamics of the supply chain. The goal of the present work, supported by an implemented test case in the assembly domain, is to demonstrate how one is able to seamlessly integrate the shop floor with the external tools and achieve a highly reconfigurable environment that adapts to changing production requirements and disturbances using service oriented technology. However, most of the research effort is concentrated in high level aspects of decision making and supply chain management.

Gunasekaran et. al. (2009) focus on the build-to-order supply chain as the system has received a great deal of attention in recent years because of the success of high-tech companies such as Dell, BMW, Compaq and Gateway. Chains that explicitly address

the problems of BTO-SCM with modelling are rather limited in number. Research on the modelling and analysis of global outsourcing includes optimisation between product variants and the cost of production, the point of differentiation along the production/assembly process, the selection of suppliers, logistics costs, and customer relationship management. Operations research models have been used to solve supply chain management problems.

Martine (2010) states that the relationship with Transocean and Halliburton, which operated and maintained the offshore rig, was of a sub-contractual nature and not a outsourcing one. When subcontracting, the end user, BP in this instance, provides the details and exact specifications of the service (or product) that it needs to be delivered, including the quality standards, pricing, timeframe, etc., that the subcontractor needs to adhere to. These are often called 'input contracts', because every detail is specified. Whether a business partnership involves subcontracting or outsourcing, it is also necessary to have contingency plans in place.

Seuring et. al.,(2010) noticed that issue mirrors the increasing relevance of this topic for both practitioners in companies, and academicians. The purpose of this special issue is to serve as a catalyst to this important topic. Environmental and social problems and challenges do not stop at the gates of single company, but have to be considered along the supply chains as the entities across which related material and information flows are organised. It also covers supply chain strength of regions and regional activities as well as actions taken by small- and medium-sized manufacturing and public organisations. It also takes a look at performance indicators and closed-loop supply chain aspects. Amongst these topics, four papers incorporate social aspects, which have been relatively and significantly less researched than environmental issues.

Khang (2010) noticed that Supply chain management (SCM) is one of the tools used by organisations to improve their business performance. This aims to investigate the relationships between supply chain practices and an organisation's performance. Six supply chain practices are chosen in this research: customer orientation, knowledge sharing, Information Technology (IT) adoption, partnership, leadership and training. Regression analysis was applied to test the model in this research. The findings show

that leadership, IT adoption, customer orientation and training have a significant influence on the performance of the service organisations.

Khan et. al., (2010) study the entire SC of SMEs of Pakistan and how SMEs adopt their way of understanding business from traditional practice to e-business. Implementation of supply chain management will lower costs and increase efficiency and thus lead to the significant gain for SMEs. The SCM implemented in the SMEs of Pakistan in the form of Cloud computing Model developed and maintain by government Ministries and development bodies.

The idea of SCM is an addition of logistics, or as an all-encompassing approach to business integration. Based on a review of the literature and management practice, it is clear that there is a need for some level of coordination of activities and processes within and between organisations in the supply chain that extends beyond logistics. We believe that this is what should be called SCM. This article proposes a conceptual model that provides guidance for future supply chain decision-making and research.

As stated by Editorial in “Interlocking of information systems for international supply and demand chains management”, the increased internationalisation in supply and demand chains now a days have completed the usual traditions of using the information systems almost out of work. The data systems have to stream perpendicularly or straight, loud the interoperability issues between different data systems used by diverse activities in a global supply and order chain. The hyper competitive market place has effected in contributing to the information and collaborates with the consumers, competitors in addition to suppliers.

Somers and Nelson (2006) argue that the crash of Critical Success Factors (CSFs) diagonally the phases of ERP functioning with the answers from 86 organisations to have fully adopted or be in the method of adopting an ERP execution strategy. Results provide recommendation to administration on how most excellent to utilise their inadequate resources to decide those CSFs which are largely likely to positively impact upon the functioning of the ERP system.

Xiong et al., (2006) posit that for SMEs to stay aggressive they must have the skill to measure incoming orders in expressions of their productivity and conclude the top orders that they should accept. The authors propose a Decision Support System (DSS) move towards that would help SMEs to build suitable answers to customer enquiries. First, the consumer query and the general giving out methods are addressed and the structure of the planned DSS approach is discussed. Four basic components of the framework are looked in detail. For one exact enquiry, an Available-To-Promise (ATP)-based heuristic approach is build up for determining a feasible release date and checking its viability.

Yang et. al.(2007) argues that Information technology (IT) subcontracting have been one of the significant subjects in organisational supervision. Business Process Outsourcing (BPO) is a high type of IT subcontracting, which will be the next large gesture in information technology facilities. Previous researches have only looked at problems connected to usual IS subcontracting and there have been little studies which set up and argue the significant factors that have to be believed in the choice of BPO concerning acceptance of BPO.

Harland et. al.,(2007) praise the possible advantages of SC integration with the critical position of included e-Business to bring those advantages. But, acceptance of e-Business in SCs has been slower than usual, exactingly in SMEs. This article accounts the results of a longitudinal research of four SCs in different segments over a 4-year time. Especially it looks at the obstacles to acceptance of e-Business technologies and, hence, to attainment of included information in supply chains. Dissimilarities among firms in SCs and between SCs are looked at.

Sumathy and Paramasivan (2007) classified SSI products into various categories such as agro, chemical, mineral and cement based industries. The cement based industries are the latest and fast growing industries which provide a variety of products such as concrete window frames, spun pipes, concrete water tanks, septic tanks, concrete piles, and concrete slabs to the public. If the SSI adopts the continuous procedure of expanding and put into practice marketing strategies to attain marketing goals, they will, consecutively, lead to the achievements of overall organisation goals. The

marketing is associated with a number of problems and constraints from each and every side. In small concerns, certain problems like transportation, quality and price assume significance.

Zheng (2007) states that business administration is passing through fast outside ecological and interior administrative alterations due to rising globalisation, E-business, and subcontracting, as a consequence, the prospects of buying and providing management—as a purpose inside organisations, as a procedure that distances administration limits and as a occupation—lifts significant anxieties for both organisations and the procuring experts.

Koh et. al., (2007) urge that the need for the level of speculation in educating and consultancy are essential to effectively apply and Activate Small And Medium Sized Enterprises (SME)-specific Enterprise Resource Planning (ERP) systems in SMEs. The existing literature on ERP, in addition to recognized business practices accepted by the mainstream of ERP sellers and instructors, recommends that, in order to apply and operate ERP systems efficiently, a training model including a wide training period, and frequently utilising outside professionals, is an essential condition. An in detail case study has been carried out in this study on a UK-based SME-precise ERP schemes vendor, which continues that their SME-specific ERP systems can be applied and functioned successfully with merely five days of formal training and no extra consultancy. The study has concluded that it is possible to keep away from elevated height of asset in education and consultancy for ERP system implementation specialized in SMEs, and up till now attain a victorious SME systems specialised in ERP functioning and processes.

Kraus et. al., (2008) focuses to recognize the amount and the strategic business planning means in small enterprises. They found out with the past literature that the tactical planning in little enterprises is still in the initial stage plus its reports regarding the association between the successes are not so reliable. With reference to the literature, they used it as a preliminary point for the growth of the hypothesis. If the time possibility of the tactical plans, level of formalisation, and usage of the planning tools and the occurrence of manage relate to the presentation, it is found that the level

of formalization has a optimistic, good and extremely important impact on the firm performance.

Kojima et. al. (2008) studied the JIT manufacturing system with the production-ordering and supplier kanbans and obtained a chance making function of the inactive allocations of the pending demand. They also examined organization to SCM in JIT setting with two types of kanbans under stochastic demand, deterministic processing times and extractions with lead time. An algorithm for the exact performance evaluation of the SCM, such as the stationary distributions of the inventory level, production quantities and total backlogged demand in each stage, was developed using discrete time Markov process. The authors insist that apparently simple concepts, such as low inventories with deliveries supplied Just-In-Time (JIT) for production process has far-reaching effects internal to the firm and externally throughout the supply chain. The algorithm also includes the aspects systems from the point view of manufacturing resources, such as materials, labour and information.

Bose et. al.,(2008) have focussed on the importance of ERP and SCM schemes, as they complete the task in a balancing fashion. Well-organized acquiring and organizing of hardware, software are extremely significant for victorious completion of tasks at hand and bring in some touchable advantages which include decreased lead time and better inventory correctness. ERP and SCM methods addition is still a narrative idea for Chinese mechanized organisations. SCM systems are suitable for these functionalities, since ERP systems are not designed for them. Material, capacity and demand constraints are considered separately. SCM systems consider all constraints simultaneously and develop a higher quality plan relatively quickly.

Worleya et. al. (2008) have, in their article, pointed out that manufacturing information system like ERP systems are more and more becoming complete and incorporated. However, fulfilling all the user needs about data processing or judgment support within a single tool looks still to be impractical. As a result, being able to speedily offer the users with extra pieces of software for following specific conclusions remains more than ever a topic of interest.

Ciliberti et. al., (2008) analyses the traditions accepted and problems faced by SMEs to transfer communally accountable behaviours to dealers that function in developing countries. The companies apply dissimilar plan, in addition to varied managing systems and equipments, to deal with Corporate Social Responsibility (CSR) problems down their supply chains.

Su et. al.,(2010) have evaluated the impact of adoption of ERP systems on firm competences in supply chain management. The useful effects of ERP on the SC do guide to improved overall SCM capability. The ERP enhances the firm's capabilities of SCM in functioning process addition, customer and association integration and setting up and control process integration. The SCM has emerged as a new means in providing goods and services to the end customer at the lowest cost and high service level. The management of material and data, flows both ways in the supply chain management.

Phonsuwan and Kachitvichyanukul (2010) focuses on the relevance of the discrete-event imitation modelling of the active supply chain and the analysis was done on One Tambon One Product (OTOP) plan and the local rules of Thailand. Arena simulation models by means of the rapid-prototype theoretical models are recently offered under expansion and as instruments for preparation and sustain decision-making for micro and small business of rural enterprise management rules depending on the information shaped by Supply Chain Simulation (SCS) experiments. The complex cluster models believed is consisted of six-stage: dealers, manufacturers, warehouses, wholesalers, retailers and the consumer and they evaluated SC production and the effect of lead time reduction.

Operational definition: Supply chain strategies in this study is operationalised as the standardization and cost reduction using external sources.

2.8 Supply chain competitive advantage of the firm:

Bortoluzzi et..al.,(2018) aims to relate different major researches and articles in both national and global articles related to different SME groups to combine different opinions on the benefits and positive outcomes by being the member of the group or

network. A systematic procedure called Bibliographic Portfolio (PB) was implied for the said purpose. The study of expressive and bibliographic character concluded that the benefits revealed by researchers in both similar and balancing advantages in the professional features, combined growth of new creations, price drop, reach to innovative markets, reach to trained labour and critical for the betterment of the SMEs aggressiveness.

Lee et. al (2016) points out that the knowledge management, technology innovation and competitive advantage are having positive relationship between one another. They applied the statistical tools which have provided an important method and could prove that the Knowledge Management has a direct positive relation with Technology Innovation and Competitive Advantage. The Technology Innovation plays the role of the mediator in providing a positive and important or vital role between Knowledge Management and Competitive Advantage.

Christopher (1996) says that they have recently received the questions on the strength of the conventional principles on which the selling idea is based and have recommended that the selling has failed to bring its long assured prize in the form of maintainable aggressive advantage. It still proposes that they want for selling today is as tough as ever. The preparation of selling must change its focal point to go further than a thin anxiety with creation value and in its place to highlight the formation of client worth as the overruling purpose of selling activity.

Woodruff (1997) opines that “driven by more demanding customers, global competition, and slow growth economies and industries, the organizations look for new ways to achieve and retain a competitive advantage”. The major source which is observed for competitive advantage will likely come from the external orientation which leads to clients as pointed by the various names for associations to struggle on better client worth release.

Carson et. al., (1998) have considered the specific SME (small and medium sized enterprises) and reviewed to a extent that the creative writing exactness viewpoints on value preparation in SMEs. The authors have discussed a few experiential judgments

collect from in detail meetings with 40 SME entrepreneur-managers in Northern Ireland. The judgments give confirmation of preceding studies and get bigger the sympathetic of the cost viewpoint for SMEs. This document inspects the genuine inferences of costing in SMEs and demonstrates how costing fits with selling in SMEs.

Lagacé et. al., (2003) highlight that the ability of small developed firms to keep up dependable and uninterruptedly improving production processes emerges to be a main condition for making certain long-term maintainability and the governments have been very vigorous in helping them undertake this challenge, in exacting by following the implementation of world-class production practices. It even offers a way to relate manufacturing development programmes and customs with the aggressive pointing required by SMEs.

Chen et. al., (2004) have examined the connections among planned buying; provide management, and firm presentation. The rising significance of SCM and buying have supposed an rousingly essential planned role, developing from a difficult to appreciate business purpose into a planned dealing associate and promotes cross-functional combination among supply-chain activities, among other things. Moreover, buying plays a main link role among external dealers and internal organisational consumers in making and bringing value to external consumers. However, its role in promoting effectual strategic teamwork among a main firm and its dealers has not yet been thoroughly investigated. The increasing importance on erecting and controlling purchaser–dealer relationships (or supply management) as the source of maintainable competitive advantage is most necessary. The systematic and experiential study is the point to which planned purchasing gives to the growth of supply management capabilities, is also highly permitted.

Simpson et. al.(2004) argue that the SMEs can increase a aggressive advantage and make maintainable trade by accepting ecological high-quality practices. Though, the insights of SMEs and their move towards environmental improvements propose that there are a few basic mistakes and difficulties in attaining these in actual preparation. The authors aim towards measuring the skill of SMEs to generate a competitive advantage by accepting environmental fine practice and creating ecological

developments to their businesses. The achieving of these prerequisites was taken as a expenditure that was not moveable to consumers, in terms of additional benefits and very little organisations could explain that it led to a aggressive benefit.

Buffa (2006) concludes that the US position is eroding with wage cost changes taken into consideration. The competitive quality of American products is not being maintained. There are many cases which indicate the declining of American manufacturing competitiveness- particularly in comparison to that of the Japanese.

Kondaiah & Rao (2007) opine the Indian MSMEs comprise an significant section of the country's financial system. They argue that the procedure of financial liberalisation and market place improvements has unlocked up several potentials of admission to well-built markets and tougher and deeper marketplaces of SMEs by means of global ventures. They conclude that the sustainable growth of SMEs depends on formulating the right policies and taking the right initiatives that are need- based and making their presence felt in the global value chains, which implies that the SMEs should continue to strengthen their competitive character by creating opportunities afresh for sustained growth in the changing business environment.

Prasad (2007) reveals that one would rarely find a two wheeler or an electrical and electronics products repair / service centre and even tailoring shop closer to consumers in the local market and residential areas in metros. Instead, what finds, today, are either company/ dealer owned service facilities, or company authorised service centres. The author feels that the ever expanding ready-to-wear apparel market had its adverse impact on tailoring services and the flashy showroom- cum-service outfits, often owned by large players in metros, cities and towns are increasingly easing out small one-man service enterprises in such activities.

Knudsen (2007) focuses on the internationalisation arrangements described by import and export share of firms. The spiritual distance, danger and manage are insignificant issues evaluated to conservative findings. First consideration is: The final success of exporters depends on the degree of overseas purchases and on the purchasing process itself. The buyer-seller relations have altered considerably in current years; from seller

start to more and more active look for process by the buyer (reverse marketing). The second consideration is: global sourcing performances add significantly to firm presentation and prospect aggressiveness.

The article identifies configuration of associations between import and export activities of firms and seeks to analyse the differentiating characteristics of the resulting arrangements. The main motivating factor for this article is the need of study on both global sourcing activities and, in particular, the relationship among a firms import and export activities. The choice procedure by which formal organisations set up the need for imported products and services include identification as well as evaluation of substitute international suppliers, selection of a dealer situated in one more country and management of the import-export association.

Chang et.al.,(2008) has utilised theoretical representation to assess the presentation and aggressive advantage linked with ERP from a SCM perspective. The resulting model can be used to assist an enterprise in evaluating the potential partnerships. The models were based on the strategic thrust theory and used the back propagation network as an evaluation tool, which also plays a significant role within establishing a firm's competitive advantage.

Kim (2009) examines the fundamental relations between SCM preparation, rivalry ability, the height of SC integration, and organization performance. A organization's SC incorporation plan can help them to formulate their aggressive plan, and identify how such a connection can be utilised to improve organisational performance. In the view of Korean firms, well-organized SC integration can participate in additional significant position for maintainable SCM aggressiveness, in Japanese firms, the strong interrelationship among the intensity of SCM practices and opposition ability may have a additional important outcome on SCM aggressiveness. This judgment gains a planned structure that, in the before time period, the importance on total SC integration perhaps more crucial and, in the period, following location for SC integration on its means somewhat, the policy focal point can move towards search of elevated level of reliability involving SCM approach and aggressive approach.

Jabbour et.al.(2011) focused on factors that affect the acceptance of SCM practices which expands four hypotheses support on the creative writing reconsideration, and checks them by means of review statistics of Brazilian electro-electronic firms. The consequences disclose that related issues such as size, position and good deal power influence the acceptance of SCM practices, which are too additional client oriented. The division characteristics are very significant in examining SCM practices and opposing to the judgments of literature, the connection among reasonable main concern and SCM practices be not hold up statistically.

Subhan et.al. (2013) have admitted the fact that encouraging entrepreneurship is a key to improve competitiveness, boost the trade volume, fostering economic activities and generating the employment opportunities. By taking the economic and social variables into study it is observed that the results are in favour of the positive correlation between the process innovation and SMEs growth and hence SMEs growth rate has positive linkage with economic development.

Operational definition: Supply chain competitive advantage in this study is operationalised as to customize the product characteristics to introduce & compete in the market.

2.9 Supply chain performance of the firm

Zaefarian et.al., (2017) explain that business association because of resource-dependence problems are some of the vital topics to study in management and strategy investigation. Such business associations with clients and dealers are essential to the achievement of combined improvement activities and finally firm performance. End of dealing affairs as a professional movement with planned significance, and the fundamental managerial means allowing such association ending, have not been at the centre of study in this region. Hence the study highlights on relations concluding ability and the collision on product improvement success and the whole firm presentation

Awheda et.al.(2016) opines that competitive advantages or climates require the supply chain officials requires to take rapid actions on the issues related to competition, stock

shortages, imprecise demand processing, buyer complaints, unreliable delivery activities etc. and the producers have the problems from the customers like item customization , order responsiveness, quality improvement, etc. They also face the problems pertaining to lowering the manufacturing cost, reduce the cycle times, decrease the inventory ranges to attain profitability.

Taschner (2016) explains that logistics performance as the key success factors for SMEs. The high logistical performance level can not only reduce costs like lowering inventory levels, but also contributes to customer satisfaction and acts as a competitive differentiator (Keebler and Plank, 2009). It too has an important contact on the company's on the whole flexibility and its ability to adapt to customer requirements and customization demands. This is further increased by joining forces with other partners through the value chain. More and more companies no longer compete with one another but act as integrated supply chains (Lambert et al., 1998). From one side the SMEs are a part of comprehensive supply chains that are dominated by bigger partners and on the other side they are faced with reduced entrance barriers and entrance of new competitors in the local markets which had a limited but stable base for business. This parallel development forces SMEs to compete globally and take the logistics performance as key success factors for them which hence deserve the high attention.

Li et. al., (1999) brings out that models have been established for optimising supply chain (SC) costs. It is focused on improving SC efficiency and effectiveness under four criteria: profit, lead-time performance, delivery promptness and waste elimination. The model established in the paper analyses the SC performance at two levels, the chain level and the operations level. At the Chain level, objectives associated with the criteria are set for each SC stage so that the SC performance can meet the customer service target and the best SCM strategy is selected. At the operation level, manufacturing and logistics activities are optimised under the given targets.

Gunasekaran (2004) has posited that the organisational performance measurement and metrics has major role in locating purposes, assess presentation and influential prospect routes of achievement.

Garg et.al., (2004) develops a method that facilitates variability reduction and business process synchronization for supply chains in a cost effective way. The method founded is developed on an analogy between the mechanical design tolerance and the supply chain lead time reduction. Initially the motivating sample is presented to describe the analogy. Later the process capability indices are used and a new index of delivery performance called delivery sharpness is used with the classical performance index called delivery probability which indicates the accuracy and the precision with which the products are delivered to the customers.

Wang et. al.,(2004) offer beneficiaries and consultants experiential proof that connections sequence subjects and the point of presentation in UK-based SME relations businesses. The paper begins with a reconsideration of the theoretical structure that tells to the significant things influencing the sequence process, pursued by an opening of the methodology adopted for the study. The editorial concludes with a set of hesitant advices. It is felt that this revise will trigger a bottomless discussion of the subjects nearby the sequence practice and lift wide consciousness of the significant issues determining the possession change.

Bradley et. al.,. (2005) feel that Small And Medium Size Enterprises (SMEs) that have gained experience in a supplier-customer relationship with multinational companies in the domestic market may be able to leverage that relationship to attract new customers abroad. Is it possible to internationalize such supplier-customer relationships is the research question addressed in this paper. The tested five hypotheses, derived from the internationalisation and inter-organisational literature, using non-parametric tests and regression analysis with data provided by customers and suppliers in the computer industry. It was found that, while customers initiate the first supplier-customer relationship, additional relationships, formed with the objective of internationalizing the firm are often initiated by SME itself.

Hong and Jeong (2006) argue in their paper, that SMEs have important collisions on SC presentation. They may take the positions of dealers, manufacturers, dealers, and consumers. In this article, huge companies and SMEs are evaluated, in conditions of planned and functioning options.

Li et.al.,(2006) have looked at the collision of ecological doubt, intra-organisational facilitators, and inter-organisational associations on data sharing and data quality in SCM. It is found that both information sharing and information quality are influenced positively by trust in supply chain partners and shared vision between supply chain partners, but negatively by supplier uncertainty. Top management has a positive impact on information sharing, but has no impact on information quality. The results also show that information sharing and information quality are not impacted by customer uncertainty, technology uncertainty, commitment of supply chain partners, and IT enablers.

Fisher et. al., (2006) consider a common variant of the vehicle routing problem in which a vehicle fleet delivers products stored at a central depot to satisfy customer orders. Each vehicle has a fixed capacity, and each order uses a fixed portion of vehicle capacity. The routing decision involves determining which of the demands will be satisfied by each vehicle and what route each vehicle will follow in servicing its assigned demand in order to minimise total delivery cost. The authors found a solution for this problem in which an assignment of customers to vehicles is obtained by solving a generalised assignment problem with an objective function that approximates delivery cost. It will always find a feasible solution if one exists, something no other existing heuristic can guarantee.

Haan (2007) opines that administrative methods in SMEs alter together with their expansion and logistics organization and continually gets improved support, commensurate with the prerequisites of smaller companies, if monetary and substance benefits are at their removal. Those alterations are reflected by different expansion models of firms, viewing that to attain greater efficiency organisational forms should be in line with the number of the firm's processes. In those models, segments consist of points symbolized by a specific type of separation of labour and of coordination. These effects give experiential hold up to the theoretical enlargement models and give the account of managerial setting for choice creation in logistics.

O'Regan et.al., (2007) seek to assess the link between strategic-planning, aspects of the external environment and overall corporate performance in manufacturing SMEs. A

self-reported postal survey was used to collect data from an initial sample of 1,000 randomly selected small and medium sized UK electronics and engineering firms. Prior to its deployment, a staged approach was used to validate the questionnaire with a number of adjustments made, following the pilot stage.

Vaart (2007) has called for focusing further research on supply chain integration within individual buyer-supplier relationships and examining the impact of this relationship on organisational performance. The supply chain management literature has the role of integration as a key factor in achieving the improvements. Many authors argue that integrative practices and a high level of integration have a positive impact on corporate and supply chain performance.

Kim (2007) has categorised the organisation types for supply chain management according to the formalisation and centralisation level of an independent department responsible for supply chain management (SCM) activities, and hierarchical relationship in organisational position and operational responsibility between the SCM department and other existing functional departments. He also identifies organisational characteristics, which have a significant influence on SCM performance, by investigating the difference in performance across the proposed organisation types

Zhou et. al.,. (2007) highlight that the effectual information contribution considerably improves successful SC practices and the SC dynamism has important positive authority on effective information sharing as well as the effective SC practices. The SC dynamism influences mostly on the information sharing rather than SC practice. The effectual SC practice gets prioritised while the intensity of data sharing increases. Hence it can be observed that the effective information sharing and effective SC practice are important in achieving the good SC performance.

Julien (2008) argues that SMEs' narrow ability to gain information and make use of sources is a key factor that explains their short level of participation and performance in the export marketplaces. A little volume of practical research has been taken on this topic. The paper presents the consequences of an inquiry into the impact of information look for and competencies on the aggressive strategy and export presentation of 346

exporting manufacturing SMEs. The research model assumes that the presentation of these SMEs is determined by their general aggressive plan, which, in turn is described by the aptitude of the business to obtain and manage overseas market information. The results of an analysis confirmed three of the four hypotheses.

Trkman et. al.,(2009) caution that the supply risk or the livelihood of supply disrupted is rising as a important challenge to SCM. The skills to recognize which dealer has better potential of a disruption are a critical first step in controlling the incidence and impact of these disturbances. The evaluation and categorization of dealers is based on: the suppliers characteristics, performance and SC characteristics. The challenges created to supply chains because of confused surroundings are examined. As the SCRM is a field of rising significance, the present move towards it only recommend a partial opinion of the danger of dealer non-performance. The frequently ignored reality is that dealers work in unlike surroundings and even dealers with a like characters and presentation can cause significantly dissimilar risks.

Saiz et. al.,(2010) argued that all of these frameworks present a common gap regarding the information treatment needed that support these frameworks. This issue is even more important in the case of Small and Medium-sized Enterprises (SMEs) due to their special characteristics. This presents an approach called Global Performance Management (GPM) Framework composed of a methodology, information architecture and a technological solution, focusing mainly on the information architecture. The information architecture consists of a set of elements that support the tasks of collection, treatment and analysis of the used information, which complement the methodology to build a real model for the GPM framework.

Bayrak et. al., (2010) view that experientially hardened framework recognizing the fundamental relations with SCM and information systems (IS) preparation SCM–IS related slow down factors and functioning presentation depending on a example of 203 manufacturing SMEs functioning in the maker of fabricated metal products and universal point machinery inside the superior metropolitan region of Istanbul in Turkey. The reasonable result of SCM and IS-related allowing features on the above mentioned associations has as well been examined in this study. Investigations of hypotheses point

out that both SCM and IS practices absolutely and considerably pressure the functioning performance of the sample firms considered.

Leng et. al., (2012) have analysed the impact of three dissimilar kinds of flows like information flow, material flow and the financial flow on the performance of the supply chain management and found that the information flow and the material flow don't have much impact on the performance of the supply chain management while the financial flow has the significant impact on the performance of the supply chain management.

Operational definition: SC performance in this revise is operationalised as the supplier and logistic performance which leads to the delivery performance.

2.10 Research gap

After going through the literature review on SMEs it is found that there is not much research done or carried out on metallic industries in the area of supply chain. Hence there is a gap exist in studying the environment, strategies and systems, supply chain performance and competitive advantage. In this study an attempt has been made to provide insights for the SME manufacturers to overcome the supply chain issues.

2.11 Research questions

1. How do SCM practices influence on Supply chain performance in metallic industry?
2. How does the product type and process characteristics influence supply chain performance?

2.12 Research objectives:

Depending on review of literature the broad objectives outlined of the proposed study is to assess the SCMs in SMEs in the Telangana state. Specific aims of the study are

1. To explore the variables of SCM Practices on SC Performance.

2. To examine the impact of SCM Practices (environment, strategies and comparative advantage) on SC performance (supplier performance, logistics performance and delivery performance).
3. To analyze SC performance in metallic industries with respect to product type and process type.

2.13 Research Hypotheses

SCM Practices on SC performance -

H₁: Environment practices positively influence on supplier performance

H₂: Supply chain strategies and systems positively influence on logistics performance

H₃: competitive advantage positively influence on delivery performance

SC Performance practices in metallic industry:

Product type-

H₄: there is a positive relationship between product type and frequent meetings with suppliers.

H₅: there is a positive relationship between product type and time required for supplying the product to the supplier

H₆: there is a positive relationship between product type and the way they get orders from customers.

H₇: there is a positive relationship between product type and a general business strategy of the firm

Process characteristics-

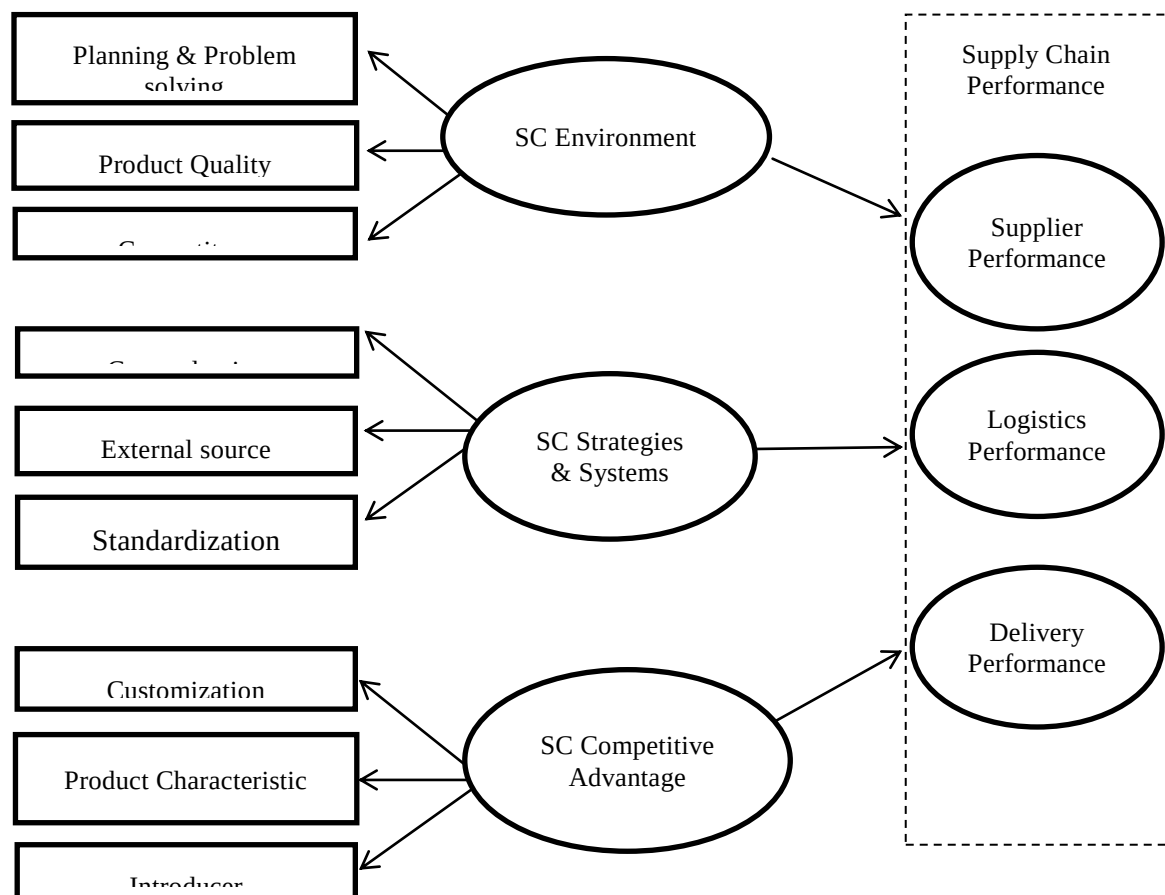
H₈: there is a positive relationship between process characteristics and frequency of meetings with suppliers

H₉: there is a positive relationship between process characteristics and with percentage of transportation cost incurred as a component of total cost.

H₁₀: there is a positive relationship between process characteristics and total distribution cost as a percentage of total cost.

H₁₁: there is a positive relationship between process characteristics and with the way they get the orders from the customers

Figure 13 Proposed SME-SCM Model



CHAPTER III

METHODOLOGY

3.0 Introduction

The section explains in detail about tactic and sampling technologies applied with the beneficiary in conducting the study work. The section gives the details about the design used for the study. It provides details about the research design that are used for the study, the type and the source of the data collected for the study and about the research instruments used for the study. Further it provides the brief description of the variables used for the study and gives the details about the different tests used to establish the reliability and the validity of the statistics collected for the reason of the study. It even provides the details of the statistical packages and the tools used for data analysis to test the hypotheses developed from the literature.

3.1 Research design

The main reason of the revise is to analyse and explain the existing features and the required changes if any in the nature of the manufacturing enterprises in the small and medium category in the supply chain management context with respect to the metallic industry. The characteristics or the features include the demographic factors like the age of the company (as it is with respect to the company or enterprise and not a individual), the type of industry, type of products they look into, the manufacturing processes they deal with, like casting, moulding, forging, machining (like lathe, drilling, etc), the type of product include make-to-order, make-to-stock, assemble-to-stock, engineer-to-stock, etc, the processes they include job order, batch order, etc. SC practices in general which comprise of the practices which are in regular use like frequency of meetings, time duration for the supply of product, how many suppliers in use, etc. The next comes the SC Environment factors like different product combinations over a year, Competitors introduce new products unexpectedly, etc. Then next comes Strategies and systems which include planning, information sharing, purchasing as a strategic activity, delivery speed, etc. And the technologies we use for statistical purposes. Next comes the factors pertaining to Competitive advantage of the firm like price offered, SC customised

products, delivery of the products ordered, etc. Next comes the SC Performance like firm related, supplier related and at last the logistics providers etc. This also plans to test the relationship among SC management related variables plus the SC and the managerial performance of the built-up industries which indicates that the given research is descriptive in nature.

3.2 Justification for selecting the state of telangana and metallic industry

The manufacturing segment in the metallic sector is playing a vital position in the competitive environment and the large industries are not in a position to directly face the competition in reducing the prices of the products to the maximum possible extent. In order to reduce the prices of the products as per the prices quoted in the tenders by manufacturing the products in their own company, they are outsourcing the ancillary parts and the products which are not that important. The companies are thus concentrating on the core products which are the primary products of the firms and the firms are known by the quality and the effectiveness of that product.

3.3 Nature and source of the data

The revision is based on the main and the minor information. The main data is connected to the variables of the SC along with the organizational performance. The profiles of manufacturing companies in the Telangana state have been collected by using the survey method considering the structured questionnaire to the top management and the owners of the firms located in the districts of Hyderabad, Medak and Ranga Reddy Districts.

3.4 Sampling

The sample is selected based on the purposive sampling technique. The manufacturing company's selected are from metallic industries of which the population of the moulding industries is 29,367, forging industries is 46,702 and casting industries is 51,189. The total population of the metallic industries is around 127,258 industries. The

sample size taken is above 0.3 percent which is nearly 500. Visiting 500 numbers of industries or companies the data that could be collected was around 0.1 percent of the population which is around 128 companies but it was a bit more than that which is owners of companies. The major drawback from the industry is that none of them are willing to disclose the information about the industry.

3.5 Research Methodology

The proposed study is descriptive and is done using survey method. The data collection is dependent on both main and secondary sources. Primary information needed for the research will be taken from entrepreneurs, industrialists, various functional heads and customers by administering structured questionnaire and also by interviewing the officials of industries departments.

The secondary data will be collected from the records of Laghu- Udyog department, National informatics centre, MSME website, Supply Chain Management and industrial journals, reports of commissions appointed by state and central governments, Andhra Pradesh State Finance Corporation (APSFC), Small Industries Development Bank of India (SIDBI), Andhra Pradesh Industrial Infrastructure Corporation (APIIC), Confederation of Indian Industries (CII), National institute for Micro, Small and Medium Enterprises (Ni-MSME), journals, newspapers, magazines, annual reports etc.

The primary data is collected from the top management of the enterprise who has a clear knowledge about the business. The first part of the questionnaire consists of the questions related to the demographic factors and the second part of the questionnaire has the questions related to different functional areas.

3.6 Research instrument

A structured questionnaire is designed which is used to collect the primary data. The questionnaire is personally administered to the top management of the manufacturing metallic firms in the districts of Hyderabad, Medak and Ranga Reddy in the state of Telangana. To collect the data the personal interview method is used. The questionnaire

has the questions related to both qualitative and quantitative aspects whereas most of the weight age is given to quantitative aspects. The questionnaire is made depending upon the requirement. In most of the cases the Likert's scale is used where as the other method where the questions are based on the objectives pertaining to the questions are also involved.

The questionnaire is prepared into different sections like the demographic section and the functional section.

The questionnaire is divided into six different parts like Demographic factors, SC practices, SC Environment, SCM Strategies and Systems, Competitive advantage and SC Performance. From these the important factors related to the one which make an important impact are considered.

Part-A consists of demographic factors of the respondents.

Part-B consists of supply chain practices, divided into two parts; (i) supply chain practices in general having 13 items where in the respondent has to choose from the given choices. (ii) supply chain practices having 8 items on three point scale (1-Less, 2-Moderate and 3-More).

Part-C consists of 14 items on five point scale (1-5 strongly disagree to strongly agree), relating supply chain environment.

Part-D consists of 21 substances on five point scale (1&2 - no emphasis, 3 - moderate emphasis, 4&5 - extreme emphasis), 14 items on support supply chain management i.e, technology using three point scale (1-custom-made, 2- standard package and 3 - not in use).

Part – E consists of 15 items on five point scale (1-5 strongly disagree to strongly agree), relating supply chain competitive advantage.

Part – F consists of 13 items on five point scale (1-5 strongly disagree to strongly agree), relating supply chain performance.

3.6.1 PART A: Demographic Factors:

The demographic section consists of the queries associated to the owner of the company or the representative of the firm who responds to our survey like the experience they have in running the company, the age of the person and the company, the sex of the respondent, marital status of the person, the education of the respondent, the year of establishment of the company, the investment invested in the company, the revenue generated by the company and the number of employees employed etc. The next question is the type of industry i.e., as to which products this is dealt with. As most of the industries are dealing with the metallic industry they look into the type of products and their manufacturing processes they deal like casting, moulding, lathe, forging etc. Then next are the product characteristics which deal with the type of the product which has to be produced like Depending on order, Depending on Stock, Assemble-to-Order and Design-to-Order etc. Next is the process characteristics which indicates the process as to which should be followed to manufacture the product like depending upon the job order or to produce in different batches as per the requirements or to produce the products in continuously until it is mentioned or depending upon the requirement to follow different processes. The next is the annual sales of the company which is in terms of crores as per their orders. The next is the coverage area of the commercial operations of the firm like they cover it within the state, or within South India or Entire Country or International like the exports where the firms in the special economic zones (SEZs).

The next is the functional section where the questionnaire is further divided into sub sections depending upon their services.

3.6.2 PART B: Supply Chain Practices (In-General)

1. SC Practices (general)
2. SCM Practices

The SC practices in-general has the questions which have the options that vary from question to question so it doesn't follow the Likert scale. The each and every question has options which are unique for them and the solution has its importance for itself.

The SCM practices on the also has options from less to more and this follows the Likert's scale where the options for the question are similar i.e., less, moderate or more where they can be grouped to one another knowing who have opted for less, or moderate or more so that it can be observed as to which type of questions are less prioritized or most prioritized.

This section includes the following items

1. How frequently you have meetings with the supplier? (Specify number of meetings held in a month)

a) 1-2 times b) 3-4 times c) 4-6 times d) 7-8 times e) More than 8 times

2. What is the time duration for supply the products which are ordered to your suppliers?

a) Within a day b) within 2-3 days c) Within a week d) 8-15 days e) More than 15 days

3. What is the time duration for supplying the products which are ordered by your customers?

a) Within a day b) within 2-3 days c) Within a week d) 8-15 days e) More than 15 days

4. How many suppliers do you manage in order to avoid the break in supply of materials under any circumstances?

a) 1-3 suppliers b) 4-6 suppliers c) 7-9 suppliers d) 10-12 suppliers e) More than 12 suppliers

5. What is the total percentage of transportation cost you incur as a component of the total cost?

a) 1 to 3% b) 4 to 6% c) 7 to 9 % d) 10 to 12% e) more than 12 %

6. What is your suppliers fill rate with respect to your purchase orders?

a) 75-100% b) 75-65 % c) 65-55% d) 55-45% e) less than 45%

7. What is your suppliers fill rate with respect to customer's orders

a) 75-100% b) 75-65 % c) 65-55% d) 55-45% e) less than 45%

8. What is the total distribution cost (including marketing, transportation, packaging and handling as a percent of total cost?

a) 10 to 20% b) 20 to 30 % c) 30 to 40% d) 40 to 50% e) More than 50%

9. What percent of defects you will observe in a single production order?
a) 0-5 b) 5-10 c) 10- 15 d) 15- 20 e) 20 and above
10. How do you get the orders from your customers?
a) Personal contact b) Internet based c) Telephonic d) Postal e) Any other
11. How much time you need to respond to your customer's queries?
a) Instantaneously b) Within one hour c) 1-6 hours d) 6-12 hours e) More than 12 hours
12. Which material management method do you follow in your firm?
a) ABC b) EOQ c) JIT d) Any other e) Not specific
13. What according to you is the general business strategy of your organisation?
a) Pure cost b) Primary cost c) Primary emphasis d) Pure differentiation e) Not Specific

Table 3.1 Items for SCM Practices

S.No.	Description
1	What is the level of ease with which you can design and modify new and existing products?
2	How much is the cost effectiveness of your logistics with the change of supplier?
3	How flexible are you to alter the labour manufacturing practices to meet the demand?
4	Ease of your SME to cater to the IT requirement with the changing requirement in the market
5	What is the raise in the market share since last year?
6	How much do you give preference to packaging?
7	How frequent you grade the performance of your SME ?
8	How do you grade the quality of your product?

3.6.3 Part-C: Supply chain environment (ENVT)

This section deals with supply chain environment which deals with the customers and the types of products they prefer, the changes in the technology and their impact, the different suppliers and their selection criteria, product quality, planning and goal setting, problem solving etc. The Likert's scale is used from strongly differ to strongly have the same opinion.

Table 3.2 Items for SC Environment

S.No.	Item	Description
1	ENVT1	Different product combinations are ordered by customers within a year
2	ENVT2	Customer's product preferences alter over the year
3	ENVT3	The material properties can differ very much from suppliers within the same batch
4	ENVT4	Competitors are from different industries
5	ENVT5	Competitors introduce new products unexpectedly
6	ENVT6	Technology is changing significantly in our industry
7	ENVT7	Technological changes provide opportunities for enhancing competitive advantage in our industry
8	ENVT8	Technological penetration results in lots of new product ideas in our industry
9	ENVT9	New products frequently emerge with improving technology in our industry
10	ENVT10	Quality is considered as the main decisive factor in choosing suppliers
11	ENVT11	Problems are regularly solved jointly with the suppliers
12	ENVT12	We involve ourselves to improve the product quality of our suppliers
13	ENVT13	We include our key suppliers in our uninterrupted improvement programme
14	ENVT14	Our key suppliers are included in our planning and goal-setting programmes.

3.6.4 Part-D: Supply chain management strategies and systems (SCST)

This section is further divided into different sections like the strategies, the systems used and the benefits we get in actually using these systems. The strategic factors cover the topics like giving emphasis or importance, or no emphasis or extreme emphasis which again puts forth the factors which are important to us and which are the factors which are independent to one another. In these there are the queries related to information sharing between the entrepreneurs and the suppliers and the customers and outsourcing and sub-contracting, strategic activity, etc which are of high importance.

The systems that are in use to support the supply chain management is the one which are the software's that are in use to reduce the manual work and give the results as early as possible. Most of the software's are new to the SME world and they don't even have

the idea about the software because the SMEs are established by those who are having the education qualification either 10th pass or diploma. So they don't have much knowledge about the software's or the technologies. Hence it is difficult for us to see the SMEs using the software and hence they are unable to gain the advantages that arise of them.

Table 3.3 Items for SCM strategies and systems

S.No	Item	Description
1	SCST1	Planning strategically
2	SCST2	Information sharing with the suppliers
3	SCST3	Information sharing with the customers
4	SCST4	Outsourcing and sub-contracting
5	SCST5	Purchasing as a strategic activity
6	SCST6	Extending supply chain beyond first tier suppliers
7	SCST7	Manufacturing flexibility
8	SCST8	Manufacturing cost reduction
9	SCST9	Production standardisation
10	SCST10	Reduction of inventory
11	SCST11	Increase of capacity utilization
12	SCST12	Delivery speed
13	SCST13	Third party logistics
14	SCST14	Customer service
15	SCST15	Cycle time reduction
16	SCST16	E-commerce
17	SCST17	Process benchmarking
18	SCST18	Development of core competencies
19	SCST19	Business process outsourcing
20	SCST20	Employee training
21	SCST21	Team work

3.6.5 Part-E: Supply chain competitive advantage (SCCOMA)

Competitive Advantage of the firm has the questions pertaining to the different advantages related to the steps taken to overcome the competition, the prices maintained to attract the customers, to provide customised products, execution of customer orders, dependable delivery, reliability, durability, time to market compared to industry, quality of the products offered, etc which clearly can be applicable to find

out the areas which should be taken care of, to get the advantages or improvement in the competitive world. The correlation and regression analysis are applied to analyse the association among the variables.

Table 3.4 Items for Supply Chain Competitive Advantage

S.No.	Item	Description
1	SCCOMA1	Offer competitive price
2	SCCOMA2	Are able to offer price as low or lower than that of
3	SCCOMA3	Provide customised products
4	SCCOMA4	Change our product contributions to meet client needs
5	SCCOMA5	React well to customer demand for “new” features
6	SCCOMA6	Bring the kind of products needed
7	SCCOMA7	Execute customer orders punctually
8	SCCOMA8	Provide dependable delivery
9	SCCOMA9	Able to compete based on quality
10	SCCOMA10	Offer products highly reliable
11	SCCOMA11	Offer products highly durable
12	SCCOMA12	Offer high quality products to our customers
13	SCCOMA13	Deliver products to the market quickly
14	SCCOMA14	Are first in the market in introducing new products
15	SCCOMA15	Have our time-to-market lower than the industry average

3.6.6 Part-F: Supply chain performance (SCPERF)

SC performance is divided into the following:

- i. Delivery performance: The delivery performance is considered with respect to the firm’s point of view. In this customer orders full filling the customers orders on time, the order to delivery time, customers response time etc., are considered
- ii. Supplier performance: The suppliers performance time to deliver the materials or components or the products to the firm are considered.
- iii. Logistics performance: The logistics performance has the queries with respect to the delivery time to customers, the degree of reliability, and adaptation to sudden changes in delivery schedules and quantities, services provided at competitive costs, material tracking facility, service provided to the customers within short period, etc.

For each and every subsection there are queries related to them separately which makes them identical so that there is no need to do any analysis like the factor analysis etc.

Table 3.5 Items for SC performance

S.No.	Description
Our firm:	
1	fills customer orders on time
2	has short order-to-delivery cycle time
3	fast customer response time
Our Suppliers:	
4	deliver materials/components/products to us on time
5	provide dependable delivery to us
6	provide high quality materials /components /products to us
Our logistics providers are able to:	
7	deliver to customers on time
8	deliver to customers with a high degree of reliability
9	adapt to sudden changes in delivery schedules
10	adapt to sudden changes in delivery quantities
11	provide services at competitive costs
12	provide material tracking facility
13	address all complaints within 24 hours

CHAPTER IV

DATA ANALYSIS

4.0 Introduction

The interpretation of the data collected from the SME industrialists in different areas of the regions is done using the frequency analysis and by looking at the outcome of the data. The questionnaire is prepared by dividing the different activities of the industries in to different sections. The industries are divided into five broad sections. The broad sections contain the topics like:

- The Demographic factors
- SC Practices
- SC Environment
- SCM Strategies and Systems
- Systems to Support SCM and Actual benefits got from using these systems
- SC Performance and Competitive Advantage.

These sections contain the questions that are relevant to the metallic SMEs in common. This data is the primary data and is collected from the owners or the top management of the enterprise who have the full knowledge of the company as per the questionnaire. The observations can be seen from the tables and Charts given below:

4.1 Demographic factors

It contains the questions which are relevant to the details of the company like the Name of the company, Owner of the company, Title of the respondent, Experience in years, Year of establishment, total investment, Revenue generated per year, Number of employees, Type of industry, Product Characteristics, Process Characteristics, Annual sales of the company and the Coverage area of commercial operations. These are the basic data of the company which gives the details about the company.

4.1.1 Type of Industry

The type of industry is mainly concentrated on the metal industry. This is done looking at the importance of the emerging trends in outsourcing where the parent companies are concentrating on the core part of the product. By doing so the main companies don't have to think much on the pricing of the product. The metallic industries related to lathe, casting, forging and moulding etc are taken into consideration.

4.1.2 Number of Employees

The number of employees used by the business unit signifies the size of the organization. As the units studied are within the range of SMEs, the organisations are categorised depending on number of employees. Here the different categories are employing 0-15, those employing between 16 to 30, 31-45, 46-60 and above 60 have been shown in the below table

Table 4.1 Number of Employees

Number of Employees	Frequency	Valid Percent	Cumulative Percent
0-15	47	34.1	34.1
16-30	63	45.7	79.8
31-45	13	9.4	89.2
46-60	13	9.4	98.6
>60	2	1.4	100
Total	138	100	

Source: Survey Data

As of the above table 4.1 it can be inferred to facilitate the number of enterprises employing within 0 to 15 are 47 which is 34.1 percentage of the total sample. The number of units employing between 16 and 30 employees is 63 in number and is 45.7 percentage of the total sample. The units employing between 31 and 45 employees is 13 which is 9.4 percentage of the total sample. The units employing between 46 and 60 is 13 which is 9.4 percentage of the total sample. The units employing above 60 are very few which is 2 and with the valid Percent of 1.4.

4.1.3. Age of the Company

The age of the company gives us the information about the enterprise as to when it is started and the status of the enterprise can be found. As the study is done on the small and medium business units the age group is taken with a period of 10 years. The table 4.2 explains about the age group of the unit.

Table 4.2 Age of the Company

Age of the Company	Frequency	Valid Percent	Cumulative Percent
0-10years	17	12.3	12.3
11-20years	76	55.1	67.4
21-30years	33	23.9	91.3
31-40years	11	8	99.3
>40years	1	0.7	100
Total	138	100	

Source: Survey Data

It can be observed that the age group started from the initial stage of the company i.e., starting stage of the company. The first age group is 0 to 10 years and the frequency of the companies studied in this group is 17 which are with a valid percent of 12.3. The second group is 11 to 20 years and the frequency of the units studied is 76 which are 55.1 percent of the total study. This is the age group within which most of the business units belong to. The next group is 21 to 30 years with a occurrence of 33 with a suitable percent of 23.9 percent. The next collection is 31 to 40 years with a occurrence of 11 and the suitable percent of 8. The other category is with the age group of above 40 years merely one in number and is with a valid percent of 0.7.

It is experiential that most of the companies are between the period of 11 to 30 years with a frequency of 109 of the total of 138 and a valid percent of 78.9.

4.1.4 Product Characteristics of the Company

The product characteristics of the company give the details of the products which the company manufactures. There are different characteristics which the companies follow like the make to order, make to stock, assemble to order, engineer to order. In the

make-to-order system the companies start the manufacturing process only after they receive the order. This is done to avoid the over expenses and to even minimize the inventory cost because the raw material they order will be as per the ordered quantity with the allowances and there won't be any excess raw material ordered. Most of the firms are following this method. The next one is the make-to-stock where the firms manufacture the products as per certain stock. This is done for the products which are of standard specifications which don't alter that frequently. These are also the one where the customer requires the products immediately after they order and there shouldn't have any break in the running process of the main industry. These are also not that costly items but they require some inventory cost as they have to be manufactured and kept in stock till they get the order. The next one is assemble-to-order. These are the products which are the semi finished goods and they need some assembling of these products to become the part of the final product in the actual cycle. These also have some inventory costs as they have to maintain the stock of the semi finished products which should be assembled to prepare the product the main customer asks for. The next one is the engineer-to-order. This is the one where the ordered products are of different specifications as per the requirement of the customer and may vary from product to product. These products are very low in quantity and the technical specifications vary for each and every order. The operator working in manufacturing these products should be technically sound. These are some of the most frequently used product characteristics in the manufacturing industry.

As per the survey the different products characteristics applied or used in the metallic manufacturing industry are tabulated as per their data in table 5.3

Table 4.3 Product Characteristics

Product Characteristics	Frequency	Percent	Cumulative Percent
MTO	69	50	50
ATO	11	8	58
MTS	40	29	87
ETO	18	13	100
Total	138	100	

Source: Survey data

Table 4.3 depicts the picture where the 69 industries surveyed i.e., 50 percent of the industries surveyed follow the make-to-order characteristics. This indicates that majority of the industries start the manufacturing process only after receiving the order from the customers. The next is the case of make-to-stock where 40 of the manufacturing industries i.e., 29 percent of the industries follow these characteristics where they manufacture the products to stock and deliver the products as soon as they get the order. The next is the case of engineer-to-order where 18 of the firms i.e., 13 percent of the industries surveyed follow this method. Next comes the case of assemble-to-order where 11 of the firms surveyed i.e., 8 percent of the firms follow this method.

4.1.5 Process Characteristics

The process characteristics are one of the important factors to be considered which indicates as to which method they follow in order to produce the product as per the requirement. There are many different processes which can be followed depending upon the quantity, cost, size, volume, etc. The most frequently used processes are the batch, continuous, job order, not specific and others. The batch processing is the one where the products are manufactured in different batches depending upon the quantity and the sizes. This is followed when the products manufactured are of different sizes and specifications and depending upon the market. The next process is the continuous process where the change in the size and specifications of the product are very rare. Hence whenever the orders are placed by the customer the production is started with the same settings which were previously used. The quantity of the ordered products will be very high in this process. The next process is the job order processing where the processing starts after receiving the order. This is the one which is applicable for heavy products whose order quantity is very less in number but the cost of the product is very high. These types of products are the internal parts of heavy projects where the products are very few but the specifications are many. The next process is not specific where a specific process is not followed. As per their requirements the processes are altered and the required changes in the settings are done to go for the batch process or the

continuous process or the job order. In this case most of the one used are the batch and continuous process. The next process is the others which the firm uses which are other than the above mentioned processes.

Table 4.4 Process Characteristics

Process characteristics	Frequency	Percent	Cumulative Percent
Batch	37	26.8	26.8
Continuous	43	31.2	58
Job order	49	35.5	93.5
Not specific	5	3.6	97.1
Others	4	2.9	100
Total	138	100	

Source: Survey Data

The table 4.4 gives details of the data acquired from the survey of the SMEs. First comes the batch processing where the frequency is 37 of the 138 industries which is 26.8 percent of the total. Next is the continuous process where the frequency is 43 of 138 which are 31.2 percent. Next is the job order process with the frequency of 49 which is 35.5 percent of the total. Next is the process of not specific where they don't follow a specific process regularly and it is with the frequency of 5 which is 3.6 percent of the total. Next is the process of others where they follow the process which is different from the above mentioned one and is with the frequency of 4 which is 2.9 percent. From the above data it can be observed that the job order process is having the maximum frequency which indicates that the SMEs take job orders most often as their investment and the equipment for doing the jobs are very low. Next come the continuous process with the second highest frequency as the SMEs have the investment limited for the machinery which is applicable for regular jobs.

4.1.6 Annual Sales of the Company

The annual sales of the company give the details of the financial status of the firm. The different ranges of the sales are used to find out to status of the firm. The different ranges are first below 10 lakhs where the annual sales of the companies are below 10 lakhs. The second option is 10 to 50 lakhs where the annual sales are between 10 to 50

lakhs. Third option is 50 to 100, Fourth option is 100 to 1000 lakhs and fifth options are above 1000 lakhs.

Table 4.5 Annual Sales of the Company (Lakhs of Rupees)

Annual Sales (in lakhs of Rs)	Frequency	Percent	Cumulative Percent
<10	23	16.7	16.7
Oct-50	108	78.3	94.9
50-100	3	2.2	97.1
100-1000	3	2.2	99.3
>1000	1	0.7	100
Total	138	100	

Source: Survey Data

In the table 4.5 it can be observed that the study of the annual sales within 10 to 50 is 108 and the percentage of 78.3. The next one is less than 10 lakhs which is up to the frequency of 23 and the valid percent of 16.7. The next observation is with the annual sales of 50 lakhs and 100 lakhs is with a frequency of 3 which is with the percentage of 2.2. The next one is with the annual sales of 100 to 1000 with frequency of 3 and the annual sales of 2.2 percent. The next one is with the annual sales of 1000 and above lakhs with the frequency of 1 and the percent of 0.7 percent.

4.2. Supply chain practices

It consists of the different points to be concentrated upon. Some of the points which are to be highly focused upon are considered.

4.2.1. Frequency of meetings with the suppliers

Frequency of meetings with the suppliers gives the number of meetings the suppliers have with the entrepreneurs' in-order to find out any of the changes to be made or any differences are found. The table gives the clear picture of the frequency of the meetings that are conducted and the difference in the period of the meetings conducted and its validity in the availability of the material.

Table 4.6 Frequency of Meetings with the Suppliers

No. of Months	Frequency	Percent	Valid Percent	Cumulative Percent
1-2 months	93	67.4	71	71
3-4 months	16	11.6	12.2	83.2
4-6 months	15	10.9	11.5	94.7
7-8 months	1	0.7	0.8	95.4
More than 8 months	6	4.3	4.6	100
Total	131	94.9	100	
Missing (0)	7	5.1		
Total	138	100		

Source: Survey Data

*Indicates the missing system where the respondents didn't respond.

Out of the 138 respondents Table 4.6 shows the 131 respondents who have responded and 5.1 percent didn't have a response to the question. Of the responses given the response of 71.0 percent have their meetings with the suppliers in 1-2 months and 12.2 percent of the respondents have their meetings within the 3 to 4 months. 11.5 percent of the respondents have their meetings within 4 to 6 months and 0.8 percent of the respondents where with the frequency of 7 to 8 months. The valid percent of 4.6 percent are more than 8 months in the order. It can be observed that the periods from 1 to 2 months is having good frequency of 93 and with a percent of 71 and we can see that most of the respondents are willing to respond with in this first 71 percent and it is the advantageous time where the customers can get the benefits of the product. It can also be seen that the frequency of the 7 to 8 months and more than 8 times is the one where most of the industries are trying to reduce their period so that they can avail the benefits of the initial months. Looking at the different respondents we can see that 93 of the respondents were in the percentage of 71 and the meetings were conducted within one to two months which helps the suppliers in regularly keeping the track of requirements of the company and if any changes and modifications required the suppliers can supply the products with the specifications so that the company can supply the products to the customers with the specifications they have asked for within a small and short stipulated time period with which we can increase the customer satisfaction.

4.2.2 Time required for supplying the Products to the Supplier

Knowing the availability of the material the time taken to supply the products to the supplier is also the important factor. The different intervals of time taken to supply the material are considered. This indicates the type of material and the duration it takes to reach the destination with which it can be checked or tried out to find out the method or chance to reduce the time or to find out the supplier who is near by and can be replaced with the old one.

Table4.7 Time required for supplying the Products to the Supplier

No. of Days	Frequency	Percent	Valid Percent	Cumulative Percent
Within a day	37	26.8	29.6	29.6
Within 2-3 days	33	23.9	26.4	56
Within a week	32	23.2	25.6	81.6
8-15 days	9	6.5	7.2	88.8
More than15 days	14	10.1	11.2	100
Total	125	90.6	100	
Missing (0)	13	9.4		
Total	138	100		

Source: Survey Data

Of the responses from the above Table 4.7 it is seen that the response within a day is with maximum of 29.6 percent saying that the response can be within a day. The response period within 2 to 3 days is 26.4 percent and within a week is 25.6 percent. The response period is 8 to 15 days with a frequency of 7.2 percent. It can be observed that the response time for the frequency of 7.2 valid percent. Of the responses it can be seen that the frequencies within a day to within a week are more appropriate because they are with a valid percentage of 29.6 percent and the percent and within a week are 25.6 percent. It can be observed that the reason for increasing the duration is something which may be because of the distance between destinations and the supplier. It can be seen that the 90.6 percent of the total population responded to the question on time duration for supplying the products which are ordered to your supplier.

4.2.3 Time duration for supplying the Products ordered by the Customer

Time duration for supplying the products ordered by the customer is one of the prime criteria as this indicates the level of customer satisfaction. The time required to supply the products should be as minimum as possible, as the customers will stick to our products and will not shift to other products.

Table 4.8 Time duration for supplying the Products ordered by the Customer

No. of Days	Frequency	Percent	Valid Percent	Cumulative Percent
Within a day	13	9.4	11.4	9.9
Within 2-3 days	35	25.4	26.5	36.6
Within a week	52	37.7	38.6	76.3
8-15 days	11	8	8.3	84.7
More than15 days	20	14.5	15.2	100
Total	131	94.9	100	
Missing (0)	7	5.1		
Total	138	100		

Source: Survey Data

The above Chart 4.8 represents the time taken to supply the products ordered by the customers. The general perception of the customer is to get the products as soon as they order and they don't have patience to wait for some time.

It can be observe that the response for the time duration for supplying the products which are ordered by the customers is a larger percent of 39.7 where the time duration for supplying the products is within a week. It can be also observed that supplying the product within 2 to 3 days is 26.7 percent which is taking the second largest position. It can also be observed that the time duration for supplying the material is around 15.3 percent and the time for supplying the material is more than 15 days. It can be observe that the time duration for supplying the material is within a day and the valid percent around 9.9 percent and the supply of material within the 8 to 15 days is 8.4 percent. It can be observe that there are some systems where the issues for which the numbers are missing are around 5.1 percent. Now it can also be tried to improve the supply of

material by supplying the material with some importance and avoiding the missing materials so that the material is sent with good efficiency.

4.2.4 No of Suppliers managed to avoid the break in supply of materials

Each and every industry will look for the suppliers in such a way that there should not be any break in supply of the material in the supply chain process. Hence more number of suppliers is maintained to avoid the breakage or delay in the supply of the material.

Table 4.9 No. of suppliers managed to avoid the break in supply of materials

No of Suppliers	Frequency	Percent	Valid Percent	Cumulative Percent
3-2	15	10.9	11.4	11.4
6-4	35	25.4	26.5	37.9
9-7	51	37	38.6	76.5
12-10	11	8	8.3	84.8
More than 12	20	14.5	15.2	100
Total	132	95.7	100	
Missing(0)	6	4.3		
Total	138	100		

Source: Survey Data

The supply of material is one which should be concentrated, in order to avoid the break in supply of the material. As in this case it can be observed that the number of suppliers is very important factor in order to avoid the supply of material. If the dependence is much on a single supplier then it should try to see to it that the supply of material should not be interrupted under any circumstances. So it can be seen that the number of suppliers also gives the indication that the supply of material should not be interrupted under any circumstances. In the above table it can be observed that the number of suppliers being 7 to 9 is having good indication about the suppliers with 38.6 percent. In the case of 4 to 6 suppliers it can be observed that 26.5 percent of the suppliers are supplying the material effectively. It can also be observed that more than 12 suppliers are supplying the material effectively with 15.2 percent. The case where the suppliers are 1 to 3 there the supply of material is done with 11.4 percent and the suppliers who

are supplying the material with 8.3 percent are supplying the material continuously without any miss matches but it should be observed that the material is getting some breaks in the cases where the number of suppliers is increasing. So to avoid the breaks in the supply of material it should be seen that the suppliers should organize the material without any such interruptions and it should also be tried to see that the number of suppliers should be minimized or kept between 7 to 9 suppliers in order to keep the material supply in smooth condition and also without any breaks where it can be reduced or optimized the number of customers.

4.2.5 Percentage of Transportation Cost Incurred as a Component of Total Cost

The transportation is one of the important factors which should be considered, to finalize the price of the product. It should be observed that the transportation cost should be kept in such a way that the price of the product shouldn't be very high for the far of places and very less to the nearby places. This will have a negative impact on the customers and they'll be trying to shift over to the new service provider.

Table 4.10 Percentage of transportation cost incurred as a component of total cost

% of Trans. Cost	Frequency	Percent	Valid Percent	Cumulative Percent
1-3%	31	22.5	22.6	22.6
4-6%	52	37.7	38	60.6
7-9 %	36	26.1	26.3	86.9
10-12%	9	6.5	6.6	93.4
More than 12%	9	6.5	6.6	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

It can be seen that the total percentage of transportation cost is coming effectively to 4 to 6 percent with a valid percent of 38 percent and the percent of transporters who are with 7 to 9 percent are running with 26.3 percent. It can even be observe that the transporters with 1 to 3 percent are going up by 22.6 percent. The transportation cost to incur the component of total cost is coming to around 6.6 percent each for 10 to 12

percent and also more than 12 percent is around 6.6 percent. So it can be seen that the percentage of transportation cost is minimal with around 10 to 12 percent with 6.6 and more than 12 percent. It can also be tried to increase the valid percent by minimizing or decreasing in the 10 to 12 percentage and also more than 12 percent by observing the losses.

4.2.6 Supplier fill rate with respect to the Purchase Orders

Purchase order plays a significant role as it shows ability of the supplier to supply the products which has an impact on the fulfilment of the orders placed by the customers.

Table 4.11 Supplier fill rate with respect to the Purchase Orders

Supplier Fill Rate w.r.t Purchase Orders	Frequency	Percent	Valid Percent	Cumulative Percent
100-75%	42	30.4	30.4	30.4
75-65 %	31	22.5	22.5	52.9
65-55%	35	25.4	25.4	78.3
55-45%	9	6.5	6.5	84.8
Less than 45%	21	15.2		100
Total	138	100		

Source: Survey Data

It can observe that the suppliers fill rate with respect to the purchase orders is around 30.4 percent with respect to 75 to 100 percent. It is observed that the 25.4 percent with respect to 55 to 65 percent with a valid percent. The fill rate with respect to the purchase orders is around 22.5 percent and also we have to see the fill rate with respect to the 65 to 75 percent. We can also observe that the main number of the frequency of less than 45% is coming to 15.2 percent and the one with 55 to 45 percent of the fill rate is coming to 6.5 percent and the fill rate is coming to be around 15.2 percent. It can be observed that most of the frequency is coming to be around 31 to 42 percent within the range of 55 to 100 percent. It can be even tried to reduce the supplier fill rate to a large extent by minimizing or controlling the suppliers fill rate within the frequency of less than 45 to 55 percent.

4.2.7 Suppliers fill rate with respect to Customer's Orders

Customer orders and the suppliers fill rate of the customer orders are the vital factors for the achievement of the firm. Customers are the one who are the end users of the products and hence the effective way with which the suppliers fill rate is maintained. It also helps us to regain the customers when the orders are fulfilled within the given time.

Table 4.12 Suppliers fill rate with respect to Customer Orders

Supplier Fill Rate w.r.t Customer Orders	Frequency	Percent	Valid Percent	Cumulative Percent
75-100%	41	29.7	30.1	30.1
75-65 %	43	31.2	31.6	61.8
65-55%	15	10.9	11	72.8
55-45%	12	8.7	8.8	81.6
Less than 45%	25	18.1	18.4	100
Total	136	98.6	100	
Missing (0)	2	1.4		
Total	138	100		

Source: Survey Data

It can be observed that the valid percent for the purpose of the suppliers fill rate is 31.6 percent with 75 to 65 percent suppliers accepting the products that are with the frequency of valid percent and the next value between 75 to 100 % which is coming to 30.1 percent. It can be even observed that the valid percent is 18.4 which are for the frequency of less than 45%. It can even be said that the percentage of fill rate is 8.8 percent for the frequency of 45 to 55 percent. The percentage of fill rate is 11 for the 65 to 75 %. Only the data which has the valuable data is considered. So only the data of the 136 industries is considered for this particular question.

4.2.8 Total Distribution Cost as a percentage of Total Cost

In this total distribution cost is observed as the percentage of the total cost. In this it can be observed as to what are the distribution costs of the industries and their frequencies and check the highest and lowest range of different distribution costs of the firms.

Table 4.13 Distribution Cost as a Percent of Total Cost

Dist Cost as % of Total Cost	Frequency	Percent	Valid Percent	Cumulative percent
10-20%	47	34.1	35.3	35.3
20-30 %	37	26.8	27.8	63.2
30-40%	26	18.8	19.5	82.7
40-50%	10	7.2	7.5	90.2
More than 50%	13	9.4	9.8	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

It can be observe that the total distribution cost including marketing, transportation, packing and handling costs are with a maximum of 35.3 percent. And it can observe that the value with 27.8 percent of the valid percentage as a 20 to 30 percent of the total cost. It is also observed that the valid percent for 19.5 percent for the 30 to 40 percentage is observed. It is also observed that the valid percentage is 9.8 percent for more than 50 percent and the overall percent is 7.5 percent for the 40 to 50 percent. So it can be observed that most of the observations are nearby to 10 to 20 percent and for 20 to 30 percent. So now it is observed that the total percentage of the transportation cost, handling cost has a greater impact on the price of the product.

4.2.9 Percentage of defects observed in a Single Production Order

In this case the table gives the percentage of defects in a single production order which can be used to reduce the defects to the maximum possible extent. By reducing the

percentage of defects it can be used to reduce the cost of production which in turn will reduce the cost of the product.

Table 4.14 Percentage of defects observed in a Single Production Order

Defects Observed in Single Purchase Order	Frequency	Percent	Valid Percent	Cumulative Percent
0-5%	35	25.4	26.5	26.5
5%-10%	39	28.3	29.5	56.1
10- 15%	34	24.6	25.8	81.8
15- 20%	6	4.3	4.5	86.4
20% and above	18	13	13.6	100
Total	132	95.7	100	
Missing(0)	6	4.3		
Total	138	100		

Source: Survey Data

It can be observed that the number of defects is mostly within the range of 0-5% and 10-15%. It is observed that the maximum number of defects is observed with 5 to 10% with 29.5 percent. The second largest number of defects is observed within the percentages of 0 to 5 percent with a percentage of about 26.5 percent. The third largest number of defects is observed with in the valid percentage of about 25.8 percent for 10 to 15 percent. It can also be observed that the number of defects in the single production order may even exceed 13.6 percent within the range of 20% and above, and can go up to 4.5 percent for 15 to 20 percent. So with these observations it can be seen that the number of defects can vary with different defects in a single production order and if rectified it can also be reduced in the total number of defects by taking the required steps of action.

4.2.10 Ways to get the Orders from the Customers

This table gives the different ways of getting the orders from the customers. There are many ways of getting the orders like manually placing the order, orders placed by telephone, orders being placed by internet, ordering the order by post and some other ways of getting the orders which are not regularly used.

Table 4.15 Ways to get Orders from Customers

Types of Orders	Frequency	Percent	Valid Percent	Cumulative Percent
Manual	46	33.3	34.1	34.1
Internet based	30	21.7	22.2	56.3
Telephonic	35	25.4	25.9	82.2
Postal	16	11.6	11.9	94.1
Any other	8	5.8	5.9	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

It can be observed that the values for the question are mostly within the range of manual and telephonic ordering. It is observed that the most appropriate solution for the question is manual with the 34.1 percent. The second appropriate value for getting the orders from the customers is telephonic and it can be seen that the total number of the customers ordering by telephonic means is around 25.9 percent. The third means of ordering the orders is internet based and it is around 22.2 percent. It is having the postal based of ordering and is coming to around 11.9 percent. The other means of ordering is coming to around 5.9 percent.

4.2.11 Time required to respond to the Customers Query

This gives the time taken to respond to the customer query and to solve the issue and to improve the response time if the time taken to respond is very high then it is required to reduce the response time and make the customers satisfied.

Table 4.16 Time taken to Respond to the Customer Query

Response time	Frequency	Percent	Valid Percent	Cumulative Percent
Instantaneously	40	29	29.9	29.9
Within 1 hour	26	18.8	19.4	49.3
1-6 hours	41	29.7	30.6	79.9
6-12 hours	21	15.2	15.7	95.5
More than 12 hours	6	4.3	4.5	100
Total	134	97.1	100	

Response time	Frequency	Percent	Valid Percent	Cumulative Percent
Missing(0)	4	2.9		
Total	138	100		

Source: Survey Data

The time allotted to respond to customers query is given much importance. Most of the responses are coming within 1 to 6 hours with 29.7 percent with the valid percent of 30.6 and the frequency of 41. The next response is being with 29.9 percent which is for instantaneously responding to the query. The third response is for 19.4 percent for responding within one hour with the response being close to the frequency. If the response is within 6 to 12 hours the response is fourth with the frequency being 15.7 percent. If the case is for more than 12 hours the response is 4.5 percent. It can be observed that the customer satisfaction will be more if the queries are responded within instantaneously to 1 to 6 hours which can even increase the customer base also.

4.2.12 Material Management Method followed in the Firm

In this method it gives the details of the material management method which is used to minimise the expenses related to the purchase of the excess material, or blocking the funds in the stock storage expenses or the material getting disturbed or damaged. Hence the material management method followed also plays an important role in minimizing costs of the company.

Table.4.17 Material management method followed in the Firm

Material mgmt Method	Frequency	Percent	Valid Percent	Cumulative Percent
ABC	24	17.4	18.3	18.3
EOQ	39	28.3	29.8	48.1
JIT	25	18.1	19.1	67.2
Any other	26	18.8	19.8	87
Not specific	17	12.3	13	100
Total	131	94.9	100	
Missing(0)	7	5.1		
Total	138	100		

Source: Survey Data

It can be observed that the material management method is the one of the most important factor to be considered when we are looking into the company's expenses with respect to material management or inventory management techniques. There are many material management methods in order to consider the investment in the industry. It is to be observed that the most appropriate method for the material management method depends on the way as the technique is used in maintaining the stock of the material. It can be observed that the optimum quantity is the Economic Order Quantity is given the high voting with the frequency of 39 with 29.8 valid percentages. The next one is the option of any other of the different material management techniques with 19.8 percent and the other one being the Just-in-time with 19.1 percent with the frequency of 25 with the valid percentage. The next is the case of ABC analysis which is cost based and the preference is given to the products where they are given preference with respect to the cost of the product with 18.3 percent. In some cases where the material management technique is not specific i.e., they doesn't follow any specific or fixed method continuously and apply the technique which is applicable for that particular instant. The valid percent in this case is 13 percent with the frequency of 17.

4.2.13 General business strategy of the Firm

This deals with the general business strategy that our firm follows. These are like the pure cost, primary cost, primary emphasis, pure differentiation and the one like the not specific which are based on the method that is followed and there is no compulsion that a single particular method is followed.

Table 4.18 General business strategy of the firm

Business Strategy	Frequency	Percent	Valid Percent	Cumulative Percent
Pure cost	25	18.1	18.8	18.8
Primary cost	40	29	30.1	48.9
Primary emphasis	34	24.6	25.6	74.4
Pure differentiation	4	2.9	3	77.4
Not specific	30	21.7	22.6	100
Total	133	96.4	100	

Business Strategy	Frequency	Percent	Valid Percent	Cumulative Percent
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

The general business strategy of the organization will depend on different factors. It can be observed that the major factor considered for the general business strategy is the primary cost with the frequency of 40 and the valid percent of 30.1. It also shows that the next preference is given to the primary emphasis with the frequency of 34 and the valid percentage of 25.6. The other one is the frequency of 30 and the valid percent of 22.6 in the case of the not specific area where the exact cases are not mentioned and which may be varying with the type of the industry and the frequency. The next is the business strategy with the valid frequency of pure cost where the pure cost is given the preference and the frequency of 25 with a valid percentage of 18.8. The other one is for the category of pure differentiation with a frequency of 4 and the valid percent of 3.0.

4.2.14 Level of ease to Design and Modify the New and Existing Products

This indicates the status of the work in designing or modifying the existing or new products and explains the level of ease with which the designing or modifying the existing products or the new products can be done.

Table 4.19 Level of ease to design and modify the new and existing products

Level of Ease	Frequency	Percent	Valid Percent	Cumulative Percent
Less	50	36.2	36.8	36.8
Moderate	55	39.9	40.4	77.2
More	31	22.5	22.8	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

In this it can be observed that out of the given options for the level of ease with which you can design and modify the existing and new products is maximal with a moderate

level of 40.4 percent and the one with less level of ease is with 36.8 percent. It can also be observed that the one with more number of responses is 22.8 percent. With this it can be concluded that the ease with which it can be designed and modified the new and existing products is very tough. It is so because modifying the existing product is similar to design a new product and designing a new product is costly by itself where it takes the one time investment till the sample product is produced.

4.2.15 Cost effectiveness of your Logistics

This indicates the cost effectiveness of the logistics. This indicates the cost effectiveness as to whether it is less, moderate or high. Depending upon this it can be assessed as to how we can go with the reduction in the costs.

Table 4.20 Cost effectiveness of your logistics

Logistics -Cost effectiveness	Frequency	Percent	Valid Percent	Cumulative Percent
Less	32	23.2	23.7	23.7
Moderate	61	44.2	45.2	68.9
More	42	30.4	31.1	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

It can be observed that the cost effectiveness of the logistics is high with moderate number of the responses as it is with 45.2 percent with a frequency of 61. It can be observed that the next response is for more effective responses with a reading of about 31.1 percent with the frequency of 42. The next response is with less percent which is with 23.7 percent with a frequency of 32. It can also be observed that it can be tried to increase the cost effectiveness of the logistics by reducing the less frequency and increasing the more frequency by looking into the necessary steps to be taken.

4.2.16 Flexibility to alter the Labour Manufacturing Practices to Meet the Demand

It indicates the flexibility to alter the labour manufacturing practices to meet the requirement. Depending upon the demand the flexibility to alter or make changes in the labour manufacturing practices can be done and it may be either low moderate or high.

Table 4.21 Flexibility to alter the labour manufacturing practices to meet the demand

Flexibility	Frequency	Percent	Valid Percent	Cumulative Percent
Less	38	27.5	27.5	27.5
Moderate	52	37.7	37.7	65.2
More	48	34.8	34.8	100
Total	138	100	100	

Source: Survey Data

It can be observed that the flexibility to alter the labour manufacturing practices to meet the demand is moderate with 37.7 percent and the one with more flexibility is with more percent coming around 34.8 percent. It can also be revealed that the flexibility in altering the labour manufacturing practices is also around 27.5 percent with the chances of less flexibility. So it can also be observed that the flexibility in altering the labour manufacturing practices can be maximised by taking the necessary steps and implementing the required techniques so that the labour can be used to assigned to different jobs so that the labour are affectively managed.

4.2.17 Ease of the SME to cater the IT requirements with changing Demand

This gives the ease of the SME to cater to the IT requirements with the changing demand. This indicates the level of the ease with which the IT requirements demanded by the changes in the market are catered.

Table 4.22 Ease of the SME to cater the IT requirements with changing demand.

Ease to Cater IT requirement	Frequency	Percent	Valid Percent	Cumulative Percent
Less	26	18.8	19.5	19.5
Moderate	45	32.6	33.8	53.4
More	62	44.9	46.6	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

The ease of the SME to cater to the IT requirement with the changing demand in the market is split as per their requirement. It is observed that these requirements are divided into three with less, moderate and more. It is observed that the maximum value is with more with a percent of 46.6 and the next value goes with moderate value of 33.8 percent and the other one being with 19.5 percent. Now it is observed that the responses are with a maximum of 46.6 and 33.8 percent for more and moderate cases. Hence the ease of the SMEs to cater, provide or give the IT requirements as per the changing demand is high.

4.2.18 Increase in market share since last year

This indicates the increase in the market share since last year. This makes it to find out the different reasons for which the increase in the market share is low, average or high and to analyse the reasons.

Table 4.23 Increase in market share since last year

Previous Year Market share increase	Frequency	Percent	Valid Percent	Cumulative Percent
Less	30	21.7	22.1	22.1
Moderate	58	42	42.6	64.7
More	48	34.8	35.3	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The increase in the market share since last year is moderate in most of the industries with a frequency of 58 and the valid percentage of 42.6. It is more than the average in the case of the industries with the frequency of 48 and the valid percentage of 35.3. It is also observed that the market share is less than the average in the case of the industries with the valid percentage of 22.1 percent and the frequency of 30. So it can be observed that in most of the industries it is above the average with the frequency of 106 and the valid percentage of 78. The increase in the market share can also be increased by reducing the frequency of the less frequency and increasing the market share of the more frequency which is more advisable for the increase in the demand of the company.

4.2.19 Preference given to Packaging

The packaging of the products also plays a vital role. In most of the cases as we dealt with the metal products the packaging plays an important role. If the products are some fabricated products they may not have much requirement of the packaging. In cases where the metallic products are manufactured and they are the internal parts of other big products then they have much preference for packing.

Table 4.24 Preference given to Packaging

Packaging preference	Frequency	Percent	Valid Percent	Cumulative Percent
Less	26	18.8	19.1	19.1
Moderate	55	39.9	40.4	59.6
More	55	39.9	40.4	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The packaging is one of the vital factors which most of the industries prefer to send their products to the customers in good condition. The preference is given to more with the industries preferring to send the information with the frequency of 55 and the valid percent of 40.4 percent for packaging. The same is given with the preference being for the moderate packaging with the frequency of 55 and the valid percent of 40.4 percent.

It is observed that the preference is given less to the one where the frequency is of 26 and the valid percent is 19.1 percent. It can also be observed that in the metallic industries the packaging is given importance with respect to the delivery of the material and not the standard of the material used for packaging as the material delivered to the customer should be of the given dimensions and the quality as per the requirements of the customer.

4.2.20 Frequency of Grading the Performance of the SME

The grading the performance of the SMEs is very important, as it keeps the SMEs under high observation. The more the frequency of grading the SMEs performance the high will be the productivity of the SMEs. Hence the reduction of grading the performance of the SMEs may lead to decrease in the productivity.

Table 4.25 Frequency of grading the performance of the SME

Frequency of performance grading	Frequency	Percent	Valid Percent	Cumulative Percent
Less	26	18.8	19.3	19.3
Moderate	52	37.7	38.5	57.8
More	57	41.3	42.2	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

The grading the performance of the SME is done as it is required. Most of the customers will be interested in purchasing the products as per the grading. The grading also increases the interest in the customers about the product. It can also be observed that the frequency for grading the performance of the industries is high with the more in the industry with the valid percent of 42.2 percent. The frequency for grading the industries is moderate with 38.5 percent with the frequency of 52 and the response for the frequency with less frequency is 19.3 percent and the frequency of 26.

4.2.21 Grading the Quality of the Product

The grading the quality of the product very frequently will always keep the products under observation. The entrepreneurs are being asked with the same statement and it can found out that who will give the different priorities for this i.e., low moderate and high.

Table 4.26 Grading the quality of your product

Quality Grading	Frequency	Percent	Valid Percent	Cumulative Percent
Less	28	20.3	20.6	20.6
Moderate	50	36.2	36.8	57.4
More	58	42	42.6	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

Grading the quality of the product is one which has the priority as most of the products are graded based on the quality? It is observed that the quality of the product is given the first preference with the more response and the frequency of 58 out of the 138 responses with a valid percent of 42.6. It can also be observed that the valid percentage for moderate responses is 36.8 percent and the frequency being 50 out of the 138 responses. It is also given that 20.6 percent of the responses are with a frequency of less response.

4.3 Supply chain environment

4.3.1 Customer Product Preferences Change within the Year.

The customer product preferences change within the year. This statement is being said to the different industrialists and it can be found out as to who accepts the statement and who doesn't agree with the statement. It can be founded out that majority of the industrialists who accepts what.

Table 4.27 Customer product preferences change over the year

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	13	9.4	9.4	9.4
Disagree	26	18.8	18.8	28.3
Neutral	53	38.4	38.4	66.7
Agree	28	20.3	20.3	87
Strongly Agree	18	13	13	100
Total	138	100	100	

Source: Survey Data

It is observed that the one with the frequency of 53 in the neutral and the valid percent of 38.4 is the neutral option. Secondly the frequency of 28 with a valid percentage of 20.3 is the option of agree. Thirdly the frequency is 26 with a valid percentage of 18.8 with the disagree category. The next comes the category of the strongly agree category with the frequency of 18 and the valid percentage of 13. The least is with a valid percent of 9.4 and the frequency of 13. So it can be observed that the high preference is given to the neutral item and the least preference is given to the item where the percent is very low and the next preference is given to the strongly agree item.

4.3.2 Properties of the material from suppliers alter greatly within the same batch

The properties of the material from suppliers change greatly within the same batch. It is one of the features which happen regularly but the responses from the clients may vary from one to other. So it is very important to check for the response whether it is strongly disagree to strongly agree and depending upon the responses what is the change it can be done.

Table 4.28 Properties of the material from suppliers differ greatly within the same batch

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	11	8	8.2	8.2
Disagree	21	15.2	15.7	23.9
Neutral	43	31.2	32.1	56
Agree	32	23.2	23.9	79.9
Strongly Agree	27	19.6	20.1	100
Total	134	97.1	100	

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	11	8	8.2	8.2
Missing (0)	4	2.9		
Total	138	100		

Source: Survey Data

The properties of material can differ greatly within the same batch. This is possible because most of the materials are with the similar properties and in some cases the slight variation in the properties is also applicable. The response for this query is neutral with the frequency of 43 and a valid percentage of 32.1 percent. The next response is for agreed with a valid percentage of 23.9 percent and a frequency of 32 which are giving the option as agree. The next option is the strongly agree option where the response is 27 with the valid percentage of 20.1. The next value comes for the valid percentage of 15.7 with reading of frequency 21 with the available options of disagrees. The next reading is for the strongly disagree where the frequency is 11 and the valid percentage is 8.2.

4.3.3 Competitors are from Different Industries

The competitors are from different industries. This statement is mostly correct in mostly all the industries. In this case as most of the industrialists agree with the statement there are the responses from strongly disagree to strongly agree where as in most of the cases it is towards the strongly agree option as most of the industrialists try to intrude in to different industries and to sustain in the market by earning some profits even though they are facing some losses in their other businesses.

Table 4.29 Competitors are from different industries

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	13	9.4	9.6	9.6
Disagree	18	13	13.2	22.8
Neutral	38	27.5	27.9	50.7
Agree	38	27.5	27.9	78.7
Strongly Agree	29	21	21.3	100

	Frequency	Percent	Valid Percent	Cumulative Percent
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The competitors are from different industries. As it is seen that in the market situation none of the industrialists are inclined to only one product rather than to overcome the competition most of the industrialists are taking part in many of the products where the competition can be minimized and the investment of the industry can be split into some different industries so that the risk can be minimized. Now from the responses it can be observed that the option with agree is having the frequency of 38 with a valid percentage of 27.9. It is the same case with the option Neutral where the valid percent is 27.9 with the frequency of 38. The next case is with respect to the Strongly agree where the frequency is 29 and the valid percent is 21.3. The next is the case of Disagree where the valid percent is 13.2 with the frequency of 18. The next case is the one where the function is strongly disagree with the valid percent of 9.6 with the frequency of 13.

4.3.4 Technology is Changing Significantly in the Industry

Technology is altering significantly in the industry. The level of research and development in the industry is changing in such a way that the technology on one day is changing within a short period with the advancement and new technologies development with which the old technology is getting outdated.

Table 4.30 Technology is changing significantly in the industry

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	6	4.3	4.4	4.4
Disagree	14	10.1	10.3	14.7
Neutral	52	37.7	38.2	52.9
Agree	38	27.5	27.9	80.9
Strongly Agree	26	18.8	19.1	100
Total	136	98.6	100	

	Frequency	Percent	Valid Percent	Cumulative Percent
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The technology is changing significantly in our industry irrespective of the type of industry. It is observed that the maximum change can be observed in the neutral category where the frequency is 52 and the valid percent is 38.2 percent. The next reading can be found for the option with the frequency 38 and the valid percent of 27.9 for the option agree. The next comes the option of Strongly agree with the valid frequency of 26 and the valid percent of 19.1. Now the valid percent of 10.3 and the valid frequency is of 14 and the option for this frequency is Disagree. Now comes the option of the strongly disagree with the frequency of 6 and the valid percentage of 4.4.

4.3.5 Technological changes provide opportunities for enhancing competitive advantage

The above statement explains that the companies which upgrade their old technologies with the new technological advancements can have the competitive advantage. There are different entrepreneurs who give different opinion where as it can be observed that most of them go with the options of neutral, agree and strongly agree options.

Table 4.31 Technological changes provide opportunities for enhancing competitive advantage

Technology influence competitive adv	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	7	5.1	5.1	5.1
Disagree	17	12.3	12.4	17.5
Neutral	42	30.4	30.7	48.2
Agree	35	25.4	25.5	73.7
Strongly Agree	36	26.1	26.3	100
Total	137	99.3	100	

Technology influence competitive adv	Frequency	Percent	Valid Percent	Cumulative Percent
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

It is observed that in the case of technological alters give chances for enhancing competitive advantage. It is the case where the Neutral response has been given the priority with most of the frequency in the range of 42 with the valid percentage of 30.7 and is in the leading role. The next comes the frequency of 36 which is with the option of Strongly agree which gives preference for the statement and accepts that the technical changes provide opportunities for enhancing the competitive advantage with a valid percentage of 26.3. The next come the case where the valid percent is 25.5 with the frequency of 35. The next come the frequency of Disagree with the valid frequency of 17 and the valid percent of 12.4. The next comes the option of strongly disagree with the frequency of 7 and the valid percentage of 5.1 percent.

4.3.6 Quality is considered as the main criteria in selecting the suppliers.

The quality is one of the important factors which the customers look in to when they want to purchase any of the products. Hence the most important criteria which the customers consider while selecting the suppliers is “Quality”. If the quality is neglected while purchasing the raw material and if the final product is also of low quality then the final customer will not accept the product then the firm will be in losses. Hence in the competitive scenario the quality is one of the important factors which the manufacturers consider if they want to sustain themselves in the market.

Table 4.32 Quality is considered as the main criteria in selecting the suppliers

Need for quality supply	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	9	6.5	6.6	6.6
Disagree	16	11.6	11.7	18.2
Neutral	33	23.9	24.1	42.3
Agree	47	34.1	34.3	76.6
Strongly Agree	32	23.2	23.4	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The quality is considered as the main criteria in selecting the suppliers as the suppliers with the quality are considered for the selection process so that they will be given the preference. The main criteria in selecting the suppliers is done with respect to the quality of the material supplied so that it'll give us the material with high quality and indicates the supplier who are supplying the material with high quality. In this case it is observed that the supplier with the frequency of 47 and the valid percent of 34.3 percent in the case of the agree option. The second case is with respect to neutral category with the frequency of 33 and the valid percent of 24.1. The other case is with respect to the strongly agree with the frequency of 32 and the valid percent of 23.4. The next case comes with the frequency of 16 and the valid percent of the 11.7 and in the category of Disagree. The other case is with regard to the Strongly disagree with the frequency of 9 and the valid percent of 6.6.

4.3.7 Problems are solved regularly and jointly with the suppliers

This point focuses on the problem solving ability of the product manufacturer. Hence if any problems are raised by the end consumer the problems should be solved within a short period with which the customer gets satisfied and will not try to shift to any other service provider.

Table 4.33 Problems are solved regularly and jointly with the suppliers

Mutual coordination for problem solving	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	5	3.6	3.6	3.6
Disagree	8	5.8	5.8	9.5
Neutral	27	19.6	19.7	29.2
Agree	42	30.4	30.7	59.9
Strongly Agree	55	39.9	40.1	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The problems are solved regularly jointly with the suppliers so that the suppliers can understand the problems while supplying the material and if any remedial action to be taken can be done then and there itself with which we can minimise the problems. When it comes the case of the responses it can be observed that the strongly agree option has the frequency of 55 and a valid percent of 40.1 percent. The other valid frequency is for the option of Agree with the frequency of 42 and a valid percent of 30.7. The next is the option of neutral with the frequency of 27 and the valid percent of 19.7. The next comes the option of disagree with the valid percent of 5.8 percent and the frequency of 8. The other option is with the frequency of 5 for the valid percent of 3.6 and for the category of strongly disagree.

4.3.8 Suppliers are helped to improve their product quality

Suppliers should have a clear knowledge of the quality of the products which they supply to the mediator. If they supply the raw material of low quality then the final product which the manufacturer manufactures will be of low quality which the end users will not accept. Hence the suppliers should be given the feedback of the raw material which they supply with the quality of the product and the changes which they have to make if any, which will help them to provide the material of required quality to make them survive in the market.

Table 4.34 Suppliers are helped to improve their product quality

Help to supplier for product improvement	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	5	3.6	3.7	3.7
Disagree	6	4.3	4.5	8.2
Neutral	24	17.4	17.9	26.1
Agree	60	43.5	44.8	70.9
Strongly Agree	39	28.3	29.1	100
Total	134	97.1	100	
Missing(0)	4	2.9		
Total	138	100		

Source: Survey Data

The customer feedback is applicable for the company and in many cases the feedback responses are given back to the industrialists. It is observed that the option agree has the frequency of 60 with the valid percent of 44.8. The next comes the option of strongly agree with the valid percent of 29.1 and the valid frequency of 39. Now the next option comes with the frequency of 24 and the valid percent of 17.9 and it is applicable for many of the suppliers who are in the case of neutral category. The next comes the option of disagree with the valid percent of 4.5 and the frequency of 6 where the valid percent is 4.3. The next option is for the option of strongly disagree and the frequency is 5 and the valid percent of 3.7. Hence this will lead to the improvement of industries where the feedback is applicable for the industries.

4.3.9 Key suppliers are included in the continuous improvement programs conducted

The key suppliers are the one who play a vital role in supplying the raw material. The key suppliers are treated as the members of the firm who play a vital role in the firm. The key suppliers are hence included in the continuous improvement programs conducted so that they'll have a clear idea of what are the changes which the firm is trying to make and what are the changes they should make in order to make the required improvements or changes.

Table 4.35 Key suppliers are included in the continuous improvement programs conducted

Involvement of suppliers for process improvement	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	7	5.1	5.1	5.1
Neutral	44	31.9	31.9	37
Agree	39	28.3	28.3	65.2
Strongly Agree	48	34.8	34.8	100
Total	138	100	100	

Source: Survey Data

The main key suppliers have a continuous improvement program where the number of strongly agree customers are with the frequency of 48 with the valid percentage of 34.8. It can also be observed that the neutral option is given the frequency of 44 and the valid percentage of 31.9. The next come the option of Agree with the frequency of 39 and the valid percent of 28.3 which is very much less when compared to the neutral value and it has and the valid percent of 5.1. So we can observe that the values of the frequency are very closer to the neutral and strongly agree and the one with disagree option can be neglected.

4.3.10 Key suppliers are included in our planning and goal setting activities

The key suppliers play a vital role in the material supply and are treated as the members of the firm and are built-in in the preparation and aim setting activities as they know about the firm.

Table 4.36 Key suppliers are included in our planning and goal setting activities

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.2	2.2
Disagree	9	6.5	6.5	8.7
Neutral	34	24.6	24.6	33.3
Agree	56	40.6	40.6	73.9
Strongly Agree	36	26.1	26.1	100
Total	138	100	100	

Source: Survey Data

The inclusion of our key suppliers in planning and goal setting is the area where the suppliers will be very much interested in supplying the products of high quality. So hence it can be said that the suppliers also have much interest in our industry planning and they will come forward for giving the required suggestions. It can be observed that the high priority will be given for the Agree option with 40.6 percent with the frequency of 56 out of 138, and 26.1 percent are for strongly agree are 36 out of 138 responses. It can be observed that the responses for the neutral are 34 out of 138 responses with 24.6 percent of the observers in neutral position. It can also be observed that the valid percent of 6.5 percent and the frequency of 9 out of 138 are there with the Disagree position and the valid percent of 2.2 with the frequency of 3 out of 138 are in the strongly disagree position.

4.4 Supply chain management strategies and systems:

4.4.1 Outsourcing and sub-contracting

Out sourcing and sub-contracting are the important factors to be considered in the competitive scenario. The firms are going for outsourcing and sub-contracting to reduce their manufacturing cost where they can reduce the head count and also reduce the warehouse cost etc.

Table 4.37 Outsourcing and sub-contracting

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	7	5.1	5.1	5.1
Low Emphasis	14	10.1	10.1	15.2
Moderate Emphasis	48	34.8	34.8	50
High Emphasis	39	28.3	28.3	78.3
Extreme Emphasis	30	21.7	21.7	100
Total	138	100	100	

Source: Survey Data

The outsourcing and the sub-contracting are the main functions in the case of SMEs. Most of the SMEs are emerging because the big companies are not focussing on the whole product but rather they are going for the concept of outsourcing where they will

be concentrating on the core product which is the only part manufactured by the company and others are the products which are outsourced to the other industries. In this case it can be observed that the modern emphasis is given high preference with the frequency of 48 and the valid percent of 34.8. The above average emphasis is the next option where the frequency is 39 and the valid percent is 28.3. The next comes the extreme emphasis where the valid percent is 21.7 with the frequency of 30 and many of the industries are not giving preference to extreme emphasis. The other one is with the minimum emphasis with the frequency of 14 and the valid percent of 10.1 percent. The next one is the one where there is no emphasis which means that the importance is nil and the frequency is 7 with a valid percent of 5.1.

4.4.2 Purchasing as a strategic activity

The purchasing is treated as a strategic activity where the purchase quantity or the order quantity should be strategically calculated.

Table 4.38 Purchasing as a strategic activity

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	2	1.4	1.5	1.5
Low Emphasis	4	2.9	2.9	4.4
Moderate Emphasis	38	27.5	27.9	32.4
High Emphasis	58	42	42.6	75
Extreme Emphasis	34	24.6	25	100
Total	136	98.6	100	

Source: Survey Data

Of the 138 respondents it can be observed that we have the responses of frequency 58 for the category of above average emphasis with the valid percent of 42.6 and the modern emphasis is with the frequency of 38 with the valid percent 27.9 percentage. The next come the case of extreme emphasis with the frequency of 34 and the valid percent of 25. The next come the case of minimum emphasis with the frequency of 4 and the valid percent of 2.9. The case of the no emphasis is with the frequency of 2 and

the valid percent of 1.5. As the purchasing is the primary activity where they'll be looking into the investment and the products they want to purchase for the design of the product. The maximum preference is given to the above average emphasis because they cannot directly give the preference to the maximum emphasis as they don't have the investment in that case as they also give preference to the average and above.

4.4.3 Manufacturing flexibility

Manufacturing flexibility is one of the important factors where the dimensions of the products can be altered as per our requirements and the shapes and quantities.

Table 4.39 Manufacturing flexibility

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	3	2.2	2.2	2.2
Low Emphasis	11	8	8.1	10.3
Moderate Emphasis	38	27.5	27.9	38.2
High Emphasis	48	34.8	35.3	73.5
Extreme Emphasis	36	26.1	26.5	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The manufacturing flexibility is very important factor as it is easy to manufacture the products if there are any changes done by the customers, as the preference is given to the option of above average emphasis with the frequency of 48 and the valid percent of 35.3. This is important because the priority is given to the case where the above average emphasis is very close to the average case and most of the industries can be covered under this list. The second preference is given to the modern emphasis where the frequency is 38 and the valid percent is 27.9. The next comes the case of extreme emphasis with the frequency of 36 and the valid percent is 26.5. The other one is with the frequency of 11 and the valid percent of 8 and is in the case of minimum emphasis. The other one is the case of no-emphasis with the frequency of 3 and the valid percent of 2.2.

4.4.4 Cost reduction in Manufacturing

In order to compete in the competitive world all the manufacturers will try to reduce their manufacturing cost to the maximum possible extent which cannot exceed the production cost.

Table 4.40 Cost reduction in Manufacturing

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	8	5.8	5.8	5.8
Low Emphasis	7	5.1	5.1	10.9
Moderate Emphasis	40	29	29.2	40.1
High Emphasis	56	40.6	40.9	81
Extreme Emphasis	26	18.8	19	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The manufacturing cost reduction is one of the important factors as it will be looking at the minimal or the economic cost of the product. So it is taken as the above average or the high emphasis with valid percentage of 40.9 with a frequency of 56. This makes it clear that manufacturing cost reduction is of more emphasis for SMEs. There were only 5.1 percent responses who did not show any emphasis for reduction of manufacturing cost. The second preference is given to the modern emphasis with the frequency of 40 and the valid percent of 29.2 and in the modern emphasis. The other one is the case of extreme emphasis where the frequency is 26 and the valid percent is 19. The next come the case of no emphasis where the preference is given to the frequency with the no emphasis with the frequency as 8 and the valid percent is 5.8 with no allotment to the available frequencies. The other one is for the frequency of 7 with the minimal percent of 5.1.

4.4.5 Standardising the Production

The products that are manufactured are of particular dimensions as per the requirement of the customers. Hence in order to make the products as per the market products they standardise the production. The different firms that have been surveyed have different opinions which are marked in the below table.

Table 4.41 Standardising the Production

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	2	1.4	1.5	1.5
Low Emphasis	7	5.1	5.2	6.7
Moderate Emphasis	44	31.9	32.8	39.6
High Emphasis	48	34.8	35.8	75.4
Extreme Emphasis	33	23.9	24.6	100
Total	134	97.1	100	
Missing(0)	4	2.9		
Total	138	100		

Source: Survey Data

The production standardisation is given the much preference with the above average emphasis with the frequency of 48 and the valid percent of 35.8. The second is given preference to the moderate emphasis with the frequency of 44 and the valid percent of 32.8. The next preference is given to the extreme emphasis with the frequency of 33 and the valid percent of 24.6. The next come the case of minimum or low emphasis where the frequency is 7 with the valid percent of 5.2. And the last one is from the no emphasis with the frequency of 2 and the valid percent of 1.5 percent.

4.4.6 Reduction of Inventory

In order to minimise the production cost the firms should even try to minimise their inventory cost. This is so because much of the capital is blocked in the inventory management if the cost of the inventory is high and the inventory quantity is bulk.

Table 4.42 Reduction of Inventory

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	2	1.4	1.5	1.5
Low Emphasis	12	8.7	9	10.5
Moderate Emphasis	48	34.8	36.1	46.6
High Emphasis	43	31.2	32.3	78.9
Extreme Emphasis	28	20.3	21.1	100
Total	133	96.4	100	
Missing (0)	5	3.6		
Total	138	100		

Source: Survey Data

Now the reduction of inventory is the major factor which is used in reducing the inventory costs so that the cost can be reduced and the manufacturing costs can be minimised. The major reason for reducing the inventory cost is to minimise the inventory cost so that much of the money is not blocked in the inventory and where the cost of the material can be reduced. The prime emphasis is given to the moderate emphasis where the frequency is 48 and the valid percent is 36.1. The other option is with the above average emphasis or the high emphasis where the frequency is 43 and the valid percent is 32.3. Then the extreme emphasis with the frequency of 28 and the valid percent of 21.1 is given the preference. The next option is the one of minimum emphasis with the frequency of 12 and the valid percent of 9.0. Lastly comes the case of No-emphasis with the frequency of 2 and the valid percent of 1.5.

4.4.7 Increasing the capacity utilisation

Increasing the capacity utilization means increasing the output of the machinery or the employees. Hence it implies that the total capacity of the firm has increased from the current status to higher value. The acceptance of the statement is given in the below table.

Table 4.43 Increasing the capacity utilisation

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	3	2.2	2.2	2.2
Low Emphasis	4	2.9	2.9	5.1
Moderate Emphasis	54	39.1	39.7	44.9
High Emphasis	46	33.3	33.8	78.7
Extreme Emphasis	29	21	21.3	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The increase of capacity utilisation has good response as most of the industries will be looking for the increase in capacity utilisation and to maximize the capacity effectiveness. It can be observed that the modern emphasis will be giving much preference. So the moderate emphasis has the frequency of 54 and the valid percentage of 39.7. After this is the high emphasis with the frequency of 46 and the valid percent of 33.8. The extreme emphasis has the frequency of 29 and the valid percent of 21.3. The minimum emphasis has the frequency of 4 with the valid percent of 2.9. The other is the one with the no emphasis with the frequency of 3 and the valid percent of 2.2. how many of the suppliers have no change

4.4.8 Delivery Speed

The delivery speed of the material by the supplier is given any preference or not is given in the next table. It indicates as to how many of the suppliers will give the preference and how many doesn't give any priority to the delivery speed.

Table 4.44 Delivery Speed

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	3	2.2	2.2	2.2
Low Emphasis	8	5.8	5.9	8.1
Moderate Emphasis	32	23.2	23.7	31.9
High Emphasis	41	29.7	30.4	62.2
Extreme Emphasis	51	37	37.8	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

The delivery speed is another important factor where it depends to attract the customers. If the delivery speed is good enough and if you are able to deliver the products as mentioned with the quality of the goods promised, definitely the customers will be with your company. It can be observed that the extreme emphasis is given the preference with the frequency of 51 and the valid percent of 37.8. Then the preference is given to the above average emphasis where the frequency is 41 and the valid percent is 30.4. The modern emphasis is given the frequency of 32 and the valid percent of 23.7. The minimum emphasis is given the frequency of 8 and the valid percent of 5.9. The no-emphasis case is the one where the frequency is 3 and the valid percent is 2.2. The next comes the case of no-response where the frequency is 3 and the valid percent is 2.2. Whereas the case of no emphasis implies that there are some respondents who gave preference for this but it is with no-emphasis or no preference.

4.4.9 Third party logistics

The manufacturing industry looks after the manufacturing part of the products and the third party logistics is the one where the logistics part i.e., inbound and out bound logistics where the movement of the raw material from the ware house to the machinery

and the finished products from the machinery to the retailer and the end customer is carried out. The logistics part is not maintained by the manufacturing unit but this is outsourced and this is called the third party logistics.

Table 4.45 Third party logistics

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	5	3.6	3.7	3.7
Low Emphasis	5	3.6	3.7	7.4
Moderate Emphasis	43	31.2	31.9	39.3
High Emphasis	41	29.7	30.4	69.6
Extreme Emphasis	41	29.7	30.4	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

In the current day scenario it can be observed that most of the industries are not relying on their self-transport but rather the logistics works are all outsourced so that the company can concentrate on the core business. It can be observed that the modern emphasis is given much preference with the frequency of 43 and the valid percent of 31.9. The extreme emphasis is given much preference with the frequency of 41 and the valid percent of 30.4. The above moderate emphasis is given much preference where the frequency is 41 and the valid percent is 30.4. The minimum emphasis is given the preference of the frequency with 5 and the valid percent of 3.7. The no emphasis is also given the frequency of 5 with the valid percent of 3.7.

4.4.10 E-commerce

The E-commerce is nothing but electronics commerce where the each and every step is done electronically by using the computers or the electronics devices like the telephones or the internet sources.

Table 4.46 E-commerce

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	5	3.6	3.8	3.8
Low Emphasis	9	6.5	6.8	10.6
Moderate Emphasis	23	16.7	17.4	28
High Emphasis	38	27.5	28.8	56.8
Extreme Emphasis	57	41.3	43.2	100
Total	132	95.7	100	
Missing(0)	6	4.3		
Total	138	100		

Source: Survey Data

The E-commerce is the latest technique where the industries are concentrating in order to earn anything which is going for computerisation of the industry. The industries are looking at the extreme emphasis with the frequency of 57 and the valid percent of 43.2. The next is the option of high emphasis with the frequency of 38 and the valid percent of 28.8. The next comes the moderate emphasis where the frequency is 23 and the valid percent of 17.4 percent. The next is the case of Minimum/low emphasis with a frequency of 9 and the valid percentage of 6.8. The next is the case of No emphasis with the frequency of 5 and the valid percent of 3.8.

4.4.11 Process Bench Marking

The process bench marking is the one which is providing the process with the standard dimensions or the method which is set as the process accepted by the clients and which provides the products as per the requirements.

Table 4.47 Process Bench Marking

	Frequency	Percent	Valid Percent	Cumulative Percent
No Emphasis	3	2.2	2.2	2.2
Low Emphasis	12	8.7	8.8	11
Moderate Emphasis	39	28.3	28.7	39.7
High Emphasis	37	26.8	27.2	66.9
Extreme Emphasis	45	32.6	33.1	100
Total	136	98.6	100	
Missing(0)	2	1.4		
Total	138	100		

Source: Survey Data

The process bench marking is the process where we will be deciding the standards for the operations to be performed. The extreme emphasis is given the frequency of 45 with the valid percent of 33.1. The next come the case of moderate emphasis where the frequency is 39 with the valid percent of 28.7 percent. The next is the case of High emphasis where the valid frequency is 37 and the valid percent of 27.2. The next come the case of low emphasis where the frequency is 12 and it comes in the case of 8.8 percent. The next come the case of the no emphasis with the frequency of 3 and the valid percentage of 2.2.

4.4.12 Material requirement planning (MRP)

Material requirement planning is the method which is used to maintain the material with optimum cost and effective time.

Table 4.48 Material requirement planning (MRP)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	15	10.9	10.9	10.9
Standard package	22	15.9	16.1	27
Not in use	100	72.5	73	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The material requirement planning (MRP) is one of the important factors where most of the industries are focusing on. By doing so it can be focused on what are the different factors which have to be considered in order to maintain the supply chain management more efficiently and effectively. It can be observed that the one with the standard package are with the frequency of 22 and the valid percent of 16.1. The custom made items are with the frequency of 15 and the valid percent of 10.9. Now the not in use is the case with frequency of 100 with the valid percent of 73.0.

4.4.13 Manufacturing resource planning (MRPII)

The manufacturing resource planning is the method which is used to use the available machinery in the effective way and optimised time.

Table 4.49 Manufacturing resource planning (MRPII)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	15	10.9	10.9	10.9
Standard package	20	14.5	14.6	25.5
Not in use	102	73.9	74.5	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The manufacturing resource planning is the one which should be considered and it is the one where the standard package is with the frequency of 20 and the valid percent of

14.6. The other one is with the frequency of 15 in the case of custom made products with a valid percentage of 10.9. It can be observed that the not in use system is with the frequency of 102 where the valid percent is 74.5. The not in use can be concentrated and see to it that the most of the operations are running correctly generating the profits.

4.4.14 Enterprise Resource Planning (ERP)

This is the method which is used to effectively use the resources that are available in the firm, it includes the material, machines and manpower etc.

Table 4.50 Enterprise Resource Planning (ERP)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	10	7.2	7.2	7.2
Standard package	14	10.1	10.1	17.4
Not in use	114	82.6	82.6	100
Total	138	100	100	

Source: Survey Data

The enterprise resource planning is one of the important methods which we have to consider. Most of the industries are focusing on the enterprise resource planning by minimising the expenses with the overall expenditure. It can be observed that the standard package is with the frequency of 14 and the valid percent is of 10.1. The custom made frequency is 10 and the valid percent is of 7.2. Now it has the not in use package and it is with the frequency of 114 where the valid percent is of 82.6. As it is observed that the products with the not in use category should be considered for the usage category.

4.4.15 Warehouse Management System (WMS)

It is the method which is used to effectively manage the warehouse by optimising the inventory of raw material and finished goods stock so that the warehouse expenses can be minimised.

Table 4.51 Warehouse Management System (WMS)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	9	6.5	6.5	6.5
Standard package	8	5.8	5.8	12.3
Not in use	121	87.7	87.7	100
Total	138	100	100	

Source: Survey Data

It can be observed that the maximum value is at 121 which are with a negative frequency of not in use with the 87.7 percent. The other two are custom made with 6.5 valid percent and the frequency of 9 and the standard package with the frequency of 8 and the valid percent of 5.8. It is observed that most of the frequency is in the not in use category. The frequency with the not in use is the one where most of the industries are concentrating much on the usage factor.

4.4.16 Customer Relationship Management (CRM)

This is the method where the means for retaining the customer is applied. In the competitive environment if the customer gets dissatisfied with the service and the product they may try to shift over to other competitor. The Customer Relationship Management team will discuss with the customer as to why are they trying to shift to other firm and what are they dissatisfied with and try to see to it that these draw backs are fulfilled.

Table 4.52 Customer Relationship Management (CRM)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	21	15.2	15.2	15.2
Standard package	19	13.8	13.8	29
Not in use	98	71	71	100
Total	138	100	100	

Source: Survey Data

The CRM is one of the area where most of the industries are focusing in order to attract the customers. The custom made is the one where the frequency is of 21 with the valid percent of 15.2. The standard package is the one where the frequency is 19 with the

valid percent of 13.8. It can be still observed that the frequency of 98 and the valid percent of 71 with the not in use category is the one where we should be concentrating in order to increase the productivity of the package.

4.4.17 Supplier Relationship Management (SRM)

This is the method which is used to retain the suppliers who supply the raw material to the firm. This method looks into the purpose or reason as to why the suppliers are not interested in supplying the material and try to find the cause for that and retain the suppliers.

Table 4.53 Supplier Relationship Management (SRM)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	14	10.1	10.2	10.2
Standard package	26	18.8	19	29.2
Not in use	97	70.3	70.8	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

It can be observed that the usage of standard package is 19.0 percent and frequency of 26. The Custom made package is with 10.2 percent with a frequency of 14. It can also be observed that the package not in use is coming to something around 70.8 percent with the frequency of 97 where much effort should be made on the type of package like custom made or standard package so as to avoid the confusion and also to apply some standard method.

4.4.18 Advanced Planning System (APS)

This method is the one where the system follows costs based on the performance that are accountable for driving costs in the making of manufactured goods. An APS assigns unprocessed materials and making capacity optimally to balance demand and plant capacity.

Table 4.54 Advanced Planning System (APS)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	7	5.1	5.1	5.1
Standard package	25	18.1	18.2	23.4
Not in use	105	76.1	76.6	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

It can be observed the Advanced Planning System is with the Standard package of frequency of 25 with the valid percent of 18.2 percent. The same for the custom made method is with a frequency of 7 and the valid percent of 5.1 percent. It can also be observed that the case of Not in use is with the frequency of 105 and the valid percent of 76.6.

4.4.19 Just In Time (JIT)

The Just-in-Time is one of the factors where the ordering of the raw material is done as per the requirement and much of the stock is not purchased heavily and much of the space for the inventory is also minimised.

Table 4.55 Just In Time (JIT)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	4	2.9	2.9	2.9
Standard package	13	9.4	9.5	12.4
Not in use	120	87	87.6	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The Just in Time is the new concept where it'll be looking at the available sources in an area within the specific distance so that they don't have to stress or focus on most of the factors. The just in time is the concept where the industries have to order or take care of the products and supply the ordered products within a stipulated time. The main

concept of the Just-in-Time is to reduce the material cost and the inventory and the ware house cost. The standard package is the one with the frequency of 13 and the valid percent of 9.5. The custom made package is the one where it is with the frequency of 4 and the valid percent of 2.9. It can be observed that the not in use category is with the frequency of 120 and the valid percent of 87.6.

4.4.20 Theory of constraints (TOC)

This is one technique where the whole company's data is focused at a single point and the concentration is done to find out the solution for the constraints.

Table 4.56 Theory of constraints (TOC)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	7	5.1	5.1	5.1
Standard package	19	13.8	13.9	19
Not in use	111	80.4	81	100
Total	137	99.3	100	
Missing(0)	1	0.7		
Total	138	100		

Source: Survey Data

The theory of constraints is one of the important factors where the conditions are declared based on the single or particular element or point where all the forces and external factors act up on. Using the method of the finite element analysis the point where the actual forces or the stresses are applied can be found out to minimise the breakage of the parts and can try to increase the life span of the product. In the data it can be observed that the industries are looking into the standard package with a frequency of 19 which is with a percentage of 13.8 with a valid percentage of 13.9. Then next comes the custom made option which is coming with a frequency of 7 which is with a percentage of 5.1 with a valid percentage of 5.1. The maximum is with the option of not in use where most of the industrialists are not aware of the product or its usage. It is with a frequency of 111 which is with a percent of 80.4 and a valid percentage of 81.

4.4.21 E-Commerce

The electronic commerce is one of the factors where the firms are planning to go for computerisation. The firms are going for computerisation so as to computerise the information and to keep the whole information in a secured way.

Table 4.57 E-Commerce

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	10	7.2	7.5	7.5
Standard package	13	9.4	9.8	17.3
Not in use	110	79.7	82.7	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

E-commerce is one of the significant factors where the electronic commerce comes into action. The E-commerce is the latest technique where the industries are concentrating in order to earn anything which is going for computerisation of the industry. The industries are looking at the standard package with a frequency of 13 and the percent of 9.8. The next come the case of custom made with a frequency of 10 and the valid percent of 7.5. The next one is not in use with the frequency of 110 and the valid percentage of 82.7.

It can be observed that the frequency in many of the cases is just around 10 to 13 and it comes around the custom made and the standard package where the valid percentage are below the least possible and the average frequency is something around the least possible values and the chance of improving it within the acceptable values is enormous and the tries can be made to reduce the percentage of the frequencies of the expected values.

4.4.22 Decision Support and expert System

The decision support and expert system used is the system which is applicable with the experts practical know how and the experience of the experts.

Table 4.58 Decision Support and expert System

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	7	5.1	5.3	5.3
Standard package	14	10.1	10.5	15.8
Not in use	112	81.2	84.2	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

The decision support and expert system is one of the methods where the experts can take the decision based upon their experience and the system know-how. The decision support system in the standard package is having the frequency of 14 and the valid percent of 10.5. The Custom made is having the incidence of 7 and the suitable percent of 5.3. The not in use is the one where the frequency is 112 with the valid percentage of 84.2. So it can be tried to reduce the not in use percentage with the application so that much of the percent can be converted into the usable operation.

It can also be observe that the outcomes from the decision support system are around the values of 7 and 14 in the frequencies and it can also be tried to improve the probability of the success in the case of the custom made and the standard package and see to it the quantities of the frequencies get improved.

4.4.23 Radio Frequency Identification (RFID)

This is a device which is used to identify the status of the product and location as to where they are placed and to find out the life of the product.

Table 4.59 Radio Frequency Identification (RFID)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	8	5.8	5.9	5.9
Standard package	17	12.3	12.6	18.5
Not in use	110	79.7	81.5	100

	Frequency	Percent	Valid Percent	Cumulative Percent
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

The Radio Frequency Identification is the new technique where the items can be traced out in the retailing industry and find out where they are placed where and whether the items are with the condition of usability. In this it can also be seen that the cases of not in use with the frequency of 110 and the valid percent of 81.5. The next comes the case of Standard package with the frequency of 17 and the valid percent of 12.6. The other one is the case of Custom made with the frequency of 8 and the valid percent of 5.9.

It can also be observed that the minimum average of the accepted is around the custom made and the standard package is around the 8 and 17 percent with the 113 frequency is in the total of the range of the usage of the useful package material where the re-usage of the packaged material can also be used and see to it that it'll not get disturbed with the arrangement of material handling and packing.

4.4.24 Electronic Data Interchange (EDI)

This is the device where the data regarding the firms is changed as per the data requirements.

Table 4.60 Electronic Data Interchange (EDI)

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	12	8.7	9	9
Standard package	10	7.2	7.5	16.4
Not in use	112	81.2	83.6	100
Total	134	97.1	100	
Missing(0)	4	2.9		
Total	138	100		

Source: Survey Data

The electronic data interchange is one of the factors which the companies are focusing on to maintain their company's data. In this case it can be observed that the custom

made with the frequency of 12 and the valid percent of 9.0. The other one is with the standard package with the frequency of 10 and the valid percent of 7.5. The next is the case of the not in use with the frequency of 112 and the valid percent of 83.6. So it can be tried to improve the case of not in use where it can improve the case of industries where they concentrate on their output.

4.4.25 Bar Coding

Bar coding is the process of coding by small image of lines or bars of different width with spaces which is affixed to retail store items or identity cards, postal mails or individuals to identify a particular product number, person, or location etc.

Table 4.61 Bar Coding

	Frequency	Percent	Valid Percent	Cumulative Percent
Custom-made	7	5.1	5.1	5.1
Standard package	17	12.3	12.3	17.4
Not in use	114	82.6	82.6	100
Total	138	100	100	

Source: Survey Data

The bar coding is one of the method where the items or material can be traced out under the condition of misplacement or loosing. It has the case of the standard package where it concentrates on the products and the frequency is 17 with the valid percent of 12.3. The next is the case of custom made where the frequency is 7 and the valid percent is of 5.1 percent. It also has the case of not in use where it can be concentrated on the not in use case where the cases are with the frequency of 114 and the valid percent of 82.6.

4.5 Supply chain performance and competitive advantage.

4.5.1 Firm fills the customer orders on time

The firm fills customer orders on time. The different responses are given of which most of them respond from neutral to strongly agree which is nearing up to 130 of the 138 population.

Table 4.62 Firm fills the customer orders on time

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	1	0.7	0.7	0.7
Disagree	5	3.6	3.6	4.3
Neutral	29	21	21	25.4
Agree	51	37	37	62.3
Strongly Agree	52	37.7	37.7	100
Total	138	100	100	

Source: Survey Data

Our firm fills the customer orders in time. It has the frequency of 52 with the strongly agree option with the valid percent of 37.7 percent. The agree option has the frequency of 51 with the valid option of 37.0. The other option is with the neutral option with the frequency of 29 and the valid option of 21.0 percent. The next option is with the case of disagree option where the frequency is of 5 and the valid percentage is of 3.6. At last is the case of the strongly disagree with a frequency of 1 and the valid percentage of .7.

4.5.2 Firm has short order-to-delivery cycle time

The firm has short order-to-delivery cycle where the cycle of taking order, forwarding it to the manufacturing process and getting it to the delivery section and delivering it to the customer takes the short time where the customer need not have to wait for a longer period.

Table 4.63 Firm has short order-to-delivery cycle time

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.2	2.2
Disagree	5	3.6	3.6	5.8
Neutral	35	25.4	25.4	31.2
Agree	63	45.7	45.7	76.8
Strongly Agree	32	23.2	23.2	100
Total	138	100	100	

Source: Survey Data

The company has short order-to-delivery cycle time. If the order to delivery time is short then the customers will get attracted as the customers are looking for the delivery of the order to be instantaneous. Hence it makes the customers satisfactory if the delivery time is short. It has the optimum frequency with 63 and the valid percent of 45.7. The neutral category also has the frequency of 35 with a valid percent of 25.4. The order to deliver cycle time is with the frequency of 32 with the strongly agree category with the valid percent of 23.2. The other one is the case where the frequency is of 5 with a valid percent of 3.6 percent. The other one is the category of the strongly disagree category with the frequency of 3 and the valid percent of 2.2 percent.

4.5.3 Firm has fast customer response time

The firm has fast customer response time where the queries and their replies are given within a short period.

Table 4.64 Firm has fast customer response time

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	9	6.5	6.5	6.5
Disagree	9	6.5	6.5	13
Neutral	34	24.6	24.6	37.7
Agree	54	39.1	39.1	76.8
Strongly Agree	32	23.2	23.2	100
Total	138	100	100	

Source: Survey Data

The firm has the fast customer response time and it is important as you have the faster response time which has the ability to regain the old customers. It can be observed that the industries are giving preference to the companies where the response time is fast and it can be observed that the frequency of the agree option is 54 with the valid percent of 39.1. The next come the case of neutral category where the frequency is of 34 with the valid percent of 24.6. The next comes the option of strongly agree category with the frequency of 32 and the valid percent of 23.2. It also has the option of disagree category where the frequency is 9 and the valid percent is of 6.5. It also has the category of strongly disagree where the frequency is of 9 and the valid percent is of 6.5.

4.5.4 Supplier delivers the material/components/products on time.

Supplier delivers the material or component or products on time. Here the data related to the customers who agree with the statement can be observed in the bottom table.

Table 4.65 Supplier delivers the material/components/products on time.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.2	2.2
Disagree	8	5.8	5.8	8
Neutral	42	30.4	30.4	38.4
Agree	54	39.1	39.1	77.5
Strongly Agree	31	22.5	22.5	100
Total	138	100	100	

Source: Survey Data

The supplier delivers the material/components/products on time. The agree option is with the frequency of 54 and the valid percent is 39.1. The neutral option is with the frequency of 42 and the valid percent of 30.4. The strongly agree option is with the frequency of 31 and the valid percent is of 22.5. Disagree option is with the frequency of 8 and the valid percent of 5.8 percent. The strongly disagree option is with the frequency of 3 and the valid percent of 2.2. It can be observed that most of the cases are getting locked at the agree point level but if it is considered it can be observed that the improvement in the package can be improved to the strongly agree position and it can be made flexible with good percentage of the targets reaching the goals with the high percentage of acceptance.

4.5.5 Suppliers provide Dependable Delivery.

Suppliers provide the dependable delivery to us. This means that the suppliers provide the material that we have asked for and there won't be any requirement for doubting about the quality and quantity of the product.

Table 4.66 Suppliers provide dependable delivery.

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	5	3.6	3.8	3.8
Neutral	25	18	18.8	22.6
Agree	51	37	38.3	60.9
Strongly Agree	52	37.7	39.1	100
Total	133	96.3	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

Our suppliers provide dependable delivery to us where we can give the address of the customer and the order quantity so that they will deliver the products on time. It has the strongly agree option with the frequency of 52 and the percent of 37.7 with the valid percent of 39.1. It has the agree option with the frequency of 51 and the percent of 37.0 and the valid percent of 38.3. It has the neutral case where the frequency is of 25 and the percent is of 18.0 with the valid percent of 18.8. Then comes the case of disagree with the frequency of 5 and the percent of 3.6 and the valid percent of 3.8. So the total no of systems is 138 and the valid numbers of systems after removing the missing systems are 133.

The suppliers produce dependable delivery to us but it can be observed that the maximum of the data can be adjusted in the strongly agree position and see to it that the most of the data is in the useful position and the data can be productive which will again be helpful in creating the data with the optimum solution for the problem.

4.5.6 Suppliers provide high quality materials/components/products to us.

The suppliers provide high quality materials or components or products to us. If the materials they provide are of low quality or below their expectations they may loose

their customers. In this point the responses we may get will give us the percentage of the suppliers who give the material as per the customer expectations.

Table 4.67 Suppliers provide high quality materials/components/products to us

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.2	2.2
Disagree	5	3.6	3.7	5.9
Neutral	44	31.9	32.6	38.5
Agree	51	37	37.8	76.3
Strongly Agree	32	23.2	23.7	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

The suppliers provide high quality of materials/components/products to us. They are providing it with the following frequencies. It has the option of agree with the frequency of 51 and the percent of 37 with the valid percent of 37.8. The other option is the neutral option with the frequency of 44 and the percent of 31.9 and the valid percent of 32.6. The other option is with the strongly agree category where the frequency is 32 and the percent is of 23.2 with the valid percent of 23.7. The next comes the case of disagree with the frequency of 5 and the percent of 3.6 with the valid percent of 3.7. The next comes the case of strongly disagree where the frequency is 3 and the valid percent of 2.2.

It can be observed that the maximum frequency is with the agree option.

4.5.7 Logistics providers are able to deliver to customers on time

Logistics providers should be able to deliver to customers on time without which the logistics providers may lose their customers.

Table 4.68 Logistics providers are able to deliver to customers on time

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.5	1.5
Disagree	4	2.9	3	4.4
Neutral	27	19.6	20	24.4
Agree	69	50	51.1	75.6
Strongly Agree	33	23.9	24.4	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

Our logistics providers are able to deliver the customers on time. In this case it has the agree category where the agree option is with the frequency of 69 with the percent of 50 and the valid percent of 51.1. The other one is with the option of strongly agree category with frequency of 33 and the percent of 23.9 with the valid percent of 24.4. The other one is with the neutral category where the frequency is of 27 with the percent of 19.6 and the valid percent of 20.0. The next comes the case of disagree with the frequency of 4 and the percent of 2.9 with the valid percent of 3.0. The next comes the case of strongly disagree with the frequency of 2 and the percent of 1.4 with a valid percent of 1.5.

4.5.8 Logistics providers are able to deliver to the customers with a high degree of reliability.

The customers depend on the logistics providers depending upon their trustworthiness with a high degree of reliability. If the logistics providers don't be so trust worthy the customers don't have faith in them and they may don't depend on them. Hence the logistics providers should be talented to bring to the consumers by a high degree of reliability.

Table 4.69 Logistics providers are able to deliver to the customers with a high degree of reliability.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.5	1.5
Disagree	4	2.9	3	4.4
Neutral	27	19.6	20	24.4
Agree	69	50	51.1	75.6
Strongly Agree	33	23.9	24.4	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

The logistics providers are able to deliver to customers with the high degree of reliability with all the required quality. It has the case of agree category where the frequency is 57 and the percent is of 41.3 with the valid percent of 42.2. The next it has the case of strongly agree category with the frequency of 37 and the percent of 26.8 and the valid percent of 27.4. The next is the case of neutral category where the frequency is of 25 and the percent is of 18.1 with the valid percent of 18.5. The next is the case of the option of Disagree where the frequency is 8 with the percent of 5.8 and the valid percent of 5.9. The next comes the case of strongly disagree category where the frequency is of 8 and the percent of 5.8 with the valid percent of 5.9.

4.5.9 Logistics providers are able to adapt to sudden changes in delivery schedules.

Logistics providers should be able to adapt to sudden changes in delivery schedules. This may be because of any reason like urgent need in the material or change in the production quantity of the client customers etc.

Table 4.70 Logistics providers are able to adapt to sudden changes in delivery schedules.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.3	2.3
Disagree	3	2.2	2.3	4.5
Neutral	45	32.6	33.8	38.3
Agree	58	42	43.6	82

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Agree	24	17.4	18	100
Total	133	96.4	100	

Source: Survey Data

The logistics providers are able to become accustomed to unexpected alters in delivery schedules with the required changes in the quantity and the delivery times. In this it has the agree options for which it has given the first preference with the frequency of 58 and the percent of 42.0 with a valid percent of 43.6. The next is the option of neutral category where the frequency is of 45 and the percent is of 32.6 and the valid percent of 33.8. The next is the case of strongly agree category with the frequency of 24 and the percent of 17.4 percent with the valid percent of 18.0. The next is the option of disagree where the frequency is of 3 and the percent of 2.2 and also the valid percent of 2.3. The next is the option of strongly disagree with the frequency of 3 and the valid percent of 2.3.

4.5.10 Logistics providers are able to adapt to sudden changes in delivery quantities.

Logistics providers should be able to adapt to sudden changes in delivery without which the customers may be dissatisfied and lookout for new or other service providers who follow or adapt to the new changes in delivery.

Table 4.71 Logistics providers are able to adapt to sudden changes in delivery

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.2	2.2
Disagree	14	10.1	10.4	12.6
Neutral	27	19.6	20	32.6
Agree	69	50	51.1	83.7
Strongly Agree	22	15.9	16.3	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

Our logistics providers are able to adapt to sudden changes in the delivery quantities. In this case it can be observed that 3 of the companies strongly disagree with the statement as the logistics providers may not be in a position to accept the sudden changes in the delivery quantities. The 14 other companies also disagree with the statement where they may not be interested in accepting the sudden changes in the delivery quantity. There are 27 companies which are neither accepting nor rejecting the statement and they are neutral with the statement. There is another case where the 91 companies of which 69 agree or accept with the statement which is coming to 51.1 percent of the total sample and 22 of them strongly agree with the statement. It can be observed with the statement that the demand of the required quantity may vary from time to time. So it may differ from the order date to the date of despatch from the supplier. Under such conditions it should be observed that the logistics provider should be in a position to handle the difference quantity and with the most effectiveness. In some cases where the products to be carried may be of large sizes or of different shapes under such conditions it may not be possible or it may be difficult to suddenly adapt to the changes in the delivery quantities.

4.5.11 Logistics providers are able to provide services at a competitive cost

Logistics providers are able to give the checks at a aggressive cost. If service providers are able to provide the services at the competitive cost they can retain their old customers else they may loose their prosperous customers who shift to other service providers who provide the services at lower prices than ours.

Table 4.72 Logistics providers are able to provide services at a competitive cost.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	4	2.9	3	3
Disagree	4	2.9	3	6
Neutral	34	24.6	25.6	31.6
Agree	65	47.1	48.9	80.5
Strongly Agree	26	18.8	19.5	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

The logistic providers are able to provide services at a competitive cost. In this case it has the agree option with the frequency of 65 and with a valid percent of 48.9. The next one is the neutral category where the frequency is of 34 and the percent of 24.6 and the valid percent of 25.6. The other one is the category of strongly agree category with the frequency of 26 and the percent of 18.8 and the valid percent of 19.5. The next one is the category of disagree and the frequency of 4 with the percent of 2.9 and the valid percent of 3. The next one is the category of strongly disagree category where the frequency is of 4 and the percent of 2.9 with a valid percent of 3.0. This is observed with the increase in the number of logistics providers where the cost of providing the logistics differs. If one service provider quotes the service cost at a price then the competitor quotes the price at the lower cost and the third competitor may provide the service at a lower cost of the other two. In this case the service providers should provide the service at a price which is very competitive and in most cases they even provide the service at no profit no loss basis.

4.5.12 Logistics providers are able to provide material tracking facility

Logistics providers are able to provide the material tracking facility which helps in tracing the trucks which helps us to find out the delay in the delivery of the material and it helps in avoiding or minimizing the delay of the delivery time which in turn leads to the customer satisfaction.

Table 4.73 Logistics providers are able to provide material tracking facility.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.3	2.3
Disagree	9	6.5	6.8	9.1
Neutral	50	36.2	37.9	47
Agree	50	36.2	37.9	84.8
Strongly Agree	20	14.5	15.2	100
Total	132	95.7	100	
Missing	6	4.3		
Total	138	100		

Source: Survey Data

Our logistics providers are able to provide the material tracking facility which gives us the clear indication of where the products are. In many of the cases it can be seen that the material gets stuck in between where we cannot trace the items and the industrial operations gets stuck in between so that we can find out whose fault is it and main cause for it. In this it has the option of agree with the frequency of 50 and the percent of 36.2 with a valid percent of 37.9. It has the option of neutral category where the frequency is of 50 and the percent of 36.2 with a valid percent of 37.9. Now it has the option of strongly agree where the frequency is of 20 and the percent is of 14.5 and the valid percent of 15.2. The next option is of disagree where the frequency is 9 and the percent of 6.5 percent and the valid percent of 6.8. It also has the strongly disagree category where the frequency is of 3 with the percent of 2.2 and the valid percent of 2.3.

4.5.13 Logistics providers are able to address all complaints within 24 hours

The logistic providers are able to address all complaints within 24 hours. This statement is accepted by most of the service providers and it can be observed that who all will accept the statement and who disagree with the statement.

Table 4.74 Logistics providers are able to address all complaints within 24 hours.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.2	2.2
Disagree	7	5.1	5.2	7.5
Neutral	31	22.5	23.1	30.6
Agree	60	43.5	44.8	75.4
Strongly Agree	33	23.9	24.6	100
Total	134	97.1	100	
Missing(0)	4	2.9		
Total	138	100		

Source: Survey Data

The logistics providers are able to address the complaints within 24 hours so that the customers don't have to look to any other service provider so that they can retain their customers and the customer satisfaction should be their motto. It has the prime case of agree where the frequency is of 60 and the percent of 43.5 with the valid percent of

44.8. The next comes the option of strongly agree with the frequency of 33 and the percent of 23.9 and the valid percent of 24.6. The next is the option of neutral category where the frequency is of 31 and the percent of and the percent is 22.5 with the valid percent is of 23.1. The next is the case of disagree where the frequency is of 7 and the percent of 5.1 with the valid percent of 5.2. The other one is the case of strongly disagree category where the frequency is of 3 and the percent of 2.2.

4.5.14 Offering competitive price

This indicates as to whether the prices that are offered are competitive prices or will the prices offered are as per the production cost of the product. Hence the prices offered should be equal or in competition to the competitive prices.

Table 4.75 Offering competitive price

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.5	1.5
Disagree	11	8	8.5	10
Neutral	14	10.1	10.8	20.8
Agree	65	47.1	50	70.8
Strongly Agree	38	27.5	29.2	100
Total	130	94.2	100	
Missing(0)	8	5.8		
Total	138	100		

Source: Survey Data

The competitive advantage of our firm is the one where we offer competitive price. The agree option has the frequency of 65 and the percent of 47.1 and the valid option is 50.0. The next option is with the frequency of 38 with the option of about 27.5 for the operation of strongly agree and with the valid percent of 29.2. The other one is with the option of neutral where the frequency is 10.1 and the valid frequency is of 10.8. The next comes the option of disagree where the frequency is of 11 and the frequency of 8 and the valid frequency of 8.5. The next comes the case of strongly disagree with the frequency of 2 and the percent of 1.4 with a valid percent of 1.5 percent. It also has the case of missing system where the frequency is 8 and the percent of 5.8

4.5.15 Can offered price be as low as or lower than our competitor

This indicates that the service provider can provide the product at the price as low as the competitor or even lower than the competitor. From the survey that we have done we can check with the entrepreneurs as to who will agree with the statement or disagree with the statement.

Table 4.76 Can offered price be as small as or lesser than our competitor?

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	3	2.2	2.3	2.3
Disagree	8	5.8	6.1	8.3
Neutral	34	24.6	25.8	34.1
Agree	58	42	43.9	78
Strongly Agree	29	21	22	100
Total	132	95.7	100	
Missing(0)	6	4.3		
Total	138	100		

Source: Survey Data

It offers price as low or lower than the competitor with the responses of agree option with the frequency of 58 with the option of 42 percent and the valid percent of 43.9. Then comes the option of neutral with the frequency of 34 with the percent of 24.6 and the valid percent of 25.8. The next comes the case of strongly agree category where the frequency is of 29 and the percent of 21.0 and the valid percent of 22.0. The next comes the case of disagree option with the frequency of 8 and the percent of 5.8 percent and the valid percent of 6.1. The next comes the case of strongly disagree with the frequency of 3 valid percent of 2.3.

4.5.16 Provide customised products

Provide the customised products indicate that previously the products were all supplier centric where the customers had to buy the products manufactured as per the facilities of the manufacturer. But now in the competitive environment the customers are willing to purchase the products that are as per the fulfilment of the needs of the customers. It

indicates that the products are customer centric where the customer wants are fulfilled or they'll jump to the other provider. Here the frequencies of the manufacturers are found out as to which indicates or provide what.

Table 4.77 Provide customised products.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	1	0.7	0.7	0.7
Disagree	8	5.8	6	6.7
Neutral	27	19.6	20.1	26.9
Agree	51	37	38.1	64.9
Strongly Agree	47	34.1	35.1	100
Total	134	97.1	100	
Missing(0)	4	2.9		
Total	138	100		

Source: Survey Data

The customised products are the one which are very much in demand because the companies are competing with lot of service providers who are readily providing the features demanded by the customers. It has the frequency of 51 for the agree option with the percent of 37 and the valid percent of 38.1. The next is the option of strongly agree with the frequency of 47 and the percent of 34.1 with the valid percent of 35.1. The next is the option of neutral and the frequency of 27 and the percent of 19.6 with the valid percent of 20.1. The next option is of disagree with the frequency of 8 and the percentage of 5.8 and the valid percentage of 6.0. The next option is of strongly disagree with the frequency of 1 and the valid percent of 0.7.

4.5.17 Alter the produce contributions to meet the customer requirements

Changing the product offerings to meet the client needs indicates that the way we alter the facilities that are offered with the actual products to meet the changes in the customer's needs and demands. This is done by keeping the changes in needs and the wants of the customers as per the change in time.

Table 4.78 Alter the product offerings to meet the client needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	5	3.6	3.7	3.7
Neutral	29	21	21.5	25.2
Agree	56	40.6	41.5	66.7
Strongly Agree	45	32.6	33.3	100
Total	135	97.8	100	
Missing(0)	3	2.2		
Total	138	100		

Source: Survey Data

Nowadays the customer needs are given preferences in order to retain the customers in the competitive environment. It can be observed that the client needs are given preferences and it can be observed that the agree option is given the frequency of 56 with the percent of 40,6 and the valid percent of 41.5. The option of strongly agree is given the frequency of 45 and the percent of 32.6 with a valid percent of 33.3. The next is the option of neutral with the frequency of 29 and the valid percent of 21.5. The next is the option of disagree where the frequency is of 5 and the valid percent of 3.7.

4.5.18 React well to client demand for “new” characteristics

The response to the customer demands for new features should be good and try to implement the changes which they are willing. Hence the customers can be retained with the company as their demands are fulfilled.

Table 4.79 Respond well to customer demand for “new” features

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	5	3.6	3.8	3.8
Neutral	11	8	8.4	12.2
Agree	61	44.2	46.6	58.8
Strongly Agree	54	39.1	41.2	100
Total	131	94.9	100	
Missing(0)	7	5.1		
Total	138	100		

Source: Survey Data

Customer demand for new features are well responded. This is one of the important factor by which the companies are trying to retain their customers by focusing on the changes which they need, so that they can keep the customers retained with the company. It has the option of agree which is with the high preference where the frequency is 61 and the percent of 44.2 with the valid percent of 46.6. The next one is the option of strongly agree with the frequency of 54 and the percent of 39.1 with the valid percent of 41.2. The next is the option of neutral category where the frequency is 11 and the percent of 8.0 with the valid percent of 8.4. The next is the option of disagree where the frequency is of 5 and the percentage of 3.6 with the valid percent of 3.8.

4.5.19 Deliver the kind of products needed

The kind of products needed or demanded by the customers should be delivered to the customers in order to keep them or retain them with us.

Table 4.80 Deliver the kind of products needed

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	4	2.9	3.1	3.1
Disagree	7	5.1	5.3	8.4
Neutral	22	15.9	16.8	25.2
Agree	53	38.4	40.5	65.6
Strongly Agree	45	32.6	34.4	100
Total	131	94.9	100	
Missing(0)	7	5.1		
Total	138	100		

Source: Survey data

The types of products essential by the client are delivered. This is one of the important factors which satisfies the customers and which help us in retaining the customers. From the data that we have collected it can be observed that out of 138 customers, only 4 of them i.e., 3.1 percent of the population strongly disagree with the statement as some of the products are not available with the required specifications of the customers. The next case is the one where 7 of the total customers i.e., 5.3 percent of the suppliers disagree with the above statement. Next comes, the case of the suppliers who are

neutral with the statement where they deliver the kind of the products needed by the customers. The next come the case where the number of the suppliers who are neutral with the kind of the products needed by the customers is 22, i.e., 16.8 percent of the total sample. In this case the suppliers either agree or disagree with the products the customer demand for. Next is the case where the supplier agrees with the kind of the products demanded by the customer and which are 53 of the total sample of 138 which is around 40.5 percent of the sample. The next is the case where the frequency is 45 of the total sample which is 34.4 percent of the total sample. It can be observed that the combination of the agreement and the strongly agree options is 98 of the total 138 which is around 71 percent which is nearly three fourth of the total sample size. So most of the suppliers are trying to see to it that they provide the customer with the kind of the product the customer the supplier is looking for and to increase the base of the customers to gain a good position in the competitive market.

4.5.20 Deliver the customer orders on time

The customer orders should be delivered on time to make them satisfied. If there is any delay in the delivery of the products or orders on time then the customers may be dissatisfied and may shift to other company.

Table 4.81 Deliver the customer orders on time

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	5	3.6	4	4
Disagree	4	2.9	3.2	7.2
Neutral	18	13	14.4	21.6
Agree	46	33.3	36.8	58.4
Strongly Agree	52	37.7	41.6	100
Total	125	90.6	100	
Missing	13	9.4		
Total	138	100		

Source: Survey Data

The delivery of the customer orders on time is one of the significant issues which in turn lead to the client pleasure. In the current day situation of the competitive market, none of the customers are looking for the time to wait for the product which the suppliers are trying to lookout for. As the competition in the market is increasing day by day, the customers are having many options where they can get the products with the specifications they are looking for from different companies and may even get the suppliers with the better and advanced specifications and latest designs. It can be observed that the suppliers are looking for or agreeing with the fulfilment of their orders on time or looking for the other competitor products. In this case it is observed that the suppliers who agree with the statement are 46 i.e., 36.8 percent and those who strongly agree with the statement are 52 which is 41.6 percent. This indicates that nearly 78.4 percent of the total sample of 125 is delivering the customers' orders on time. It can be observed that 5 companies i.e., 4 percent of the total companies strongly disagree with the statement. This implies that they may not be in a position to fulfil the orders because of many reasons like lack of material, lack of equipment etc. Of these 4 companies disagree with the statement. Of the 125 companies 18 say that they are neutral with the statement, i.e., 14.4 percent. Of the companies which are neutral or disagree may get converted in such a way that they may also be interested or make it possible to deliver the customer orders on time so that the customer satisfaction may be attained.

4.5.21 Provide the dependable delivery

The logistics provider should provide the dependable delivery.

Table 4.82 Provide the dependable delivery

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	5	3.6	4	4
Neutral	25	18.1	20	24
Agree	48	34.8	38.4	62.4
Strongly Agree	47	34.1	37.6	100
Total	125	90.6	100	
Missing(0)	13	9.4		
Total	138	100		

Source: Survey Data

We provide the dependable delivery where the products are trustworthy. These products are the one where the customers depend on the product to produce the final product. In this case there are the companies which disagree with the statement. It is observed that there are 5 of the 125 customers who disagree with the statement. There are 25 of the total 125 companies who stay neutral to the statement i.e., they are neither dependent nor independent with the product. There are 48 no of companies who agree with the statement and they are dependent on the delivered product. The balance of the 47 industries strongly agree that they are fully dependent on the delivered product which is used as a semi-finished product to produce the finished product. Of the total 138 industries selected for the study it can be observed that 13 of them have not responded to the question.

4.5.22 Compete based on quality

In the current day scenario the competitions are so high that the different ways to compete are minimising. So the competition based on pricing will not work because the price cannot be reduced beyond the cost price. Hence the other one is the quality which differs from one another. So the competition can be one of the factors on which we can compete.

Table 4.83 Compete based on quality

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	1	0.7	0.8	0.8
Disagree	7	5.1	5.4	6.2
Neutral	36	26.1	27.7	33.8
Agree	43	31.2	33.1	66.9
Strongly Agree	43	31.2	33.1	100
Total	130	94.2	100	
Missing(0)	8	5.8		
Total	138	100		

Source: Survey Data

In the current day scenario where the competition is very high, one of the factors where the competition is focused on is the quality of the products. If the quality of the product is high and good enough, then the competition with the competitors is reduced. As it can be observed that the frequency which strongly disagrees with the statement is 1 which is 0.8 percent. The other case is the one where the frequency is 7 and the percentage is 5.4 which disagrees with the statement. The next cases where the opinion is neutral with the frequency of 36 and the percentage of 27.7 where they are neither with disagree or agree statement. The last two cases are the one where the options are agree and strongly agree the frequency is 86 of the total of 130 cases and the percentage of 62.4. This indicates that most of the companies agree with the statement and in many cases we can also look in to the factors where we can convert the cases where disagree or neutral can be made into agree cases, then the number of customers can be increased.

4.5.23 Products that are highly reliable are offered

The products which are highly reliable can be offered which satisfies the customers.

Table 4.84 Products that are highly reliable are offered

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	7	5.1	5.4	5.4
Disagree	13	9.4	10	15.4
Neutral	45	32.6	34.6	50
Agree	24	17.4	18.5	68.5
Strongly Agree	41	29.7	31.5	100
Total	130	94.2	100	
Missing(0)	8	5.8		
Total	138	100		

Source: Survey Data

The products that are offered are highly reliable and dependent on lot of factors which the company can rely on. It can be observed that there are 7 of the total companies strongly disagree with the statement and they feel that their products are fixed with the given factors and they are unable to suit to the minor changes in the factors. Similarly

13 of the companies disagree with the statement. The total of the 15.4 percent of the companies disagree with the statement and much of the efforts have to be kept to make the products reliable. In the next case it can be observed that the companies are neutral and they don't agree or disagree with the statement. In this case it can be observed that if some of the care is taken with the requirements and factors the product can be made agreeable with the statement. In the next case it can be observed that 65 of the total number of companies (130) agree or strongly agree to the statement. In this case it can be observed that the products can be highly reliable with the products and it comes to 50 percent of the total number of companies. It can be observed that 84.6 percent of the total companies are reliable and it is advantageous to the companies and the customers.

4.5.24 Products that are highly durable are offered

The customers also look into the products which are highly durable and last for a longer period.

Table 4.85 Products that are highly durable are offered

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.5	1.5
Disagree	9	6.5	6.8	8.3
Neutral	45	32.6	33.8	42.1
Agree	42	30.4	31.6	73.7
Strongly Agree	35	25.4	26.3	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

The products that are offered are highly durable. This indicates that the companies producing the products are highly durable and which lasts for a longer period. Of the total, 2 of the respondents i.e., 1.5% of the respondents strongly disagree with the statement. Of the other 9 of the respondents i.e., 6.8 percent disagree with the statement. Of the balance 45 respondents i.e., 33.8 percent of the respondents are

neutral with the statement i.e., they either disagree or agree with the statement. Of the other respondents 42 of the respondents i.e., 31.6 percent of the respondents agree with the statement that they produce the products which are highly durable. The balance of the respondents i.e., 35 of them i.e., 26.3 percent of them strongly agree with the statement that they produce that the produce the products which are highly durable. So from the above data we can observe that 77 of the total 133 respondents agree or strongly agree with the statement and 45 of the respondents are neutral. So if the respondents which are neutral also are positive then it can be observed that 122 of the total 133 respondents i.e., 91.7 percent are in the positive side for producing the products which are durable and it is advantageous for the customer.

4.5.25 High quality products are offered to the customers

The competition is so high that the customers look in to different factors and most of them look into the quality that is offered. Hence the high quality products are accepted from the customers.

Table 4.86 High quality products are offered to the customers

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.5	1.5
Disagree	14	10.1	10.8	12.3
Neutral	39	28.3	30	42.3
Agree	33	23.9	25.4	67.7
Strongly Agree	42	30.4	32.3	100
Total	130	94.2	100	
Missing(0)	8	5.8		
Total	138	100		

Source: Survey Data

The products that are offered to the customers are of high quality. In the data available it can be observed that 2 of the total 130 respondents i.e., 1.5 percent of them strongly disagree with the statement and they say that depending on the material supplied by the supplier there may be some changes in the quality of the products produced. Of the other respondents 14 of them i.e., 10.1 percent disagree with the statement, saying that

there may be some products which may not be of the specifications specified by the customers. 39 of the balance i.e., 114 respondents are neutral where they are neither positive nor negative with the statement. Of the remaining respondents 33 of them i.e., 25.4 percent agree with the statement and the balance 42 of them i.e., 32.3 percent strongly agree with the statement that they produce high quality products to the respondents. It implies that 75 of the 130 respondents are accepting the statement that they provide the products which are of high quality to the respondents and in turn this helps them to retain their valuable respondents in the competitive environment.

4.5.26 Products are delivered to market quickly

The products should be delivered to the customers or the market quickly. This is so because the customers are not so patient that they can wait for a longer period hence they may shift to other company products.

Table 4.87 Products are delivered to market quickly

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	1	0.7	0.8	0.8
Disagree	8	5.8	6	6.8
Neutral	37	26.8	27.8	34.6
Agree	35	25.4	26.3	60.9
Strongly Agree	52	37.7	39.1	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

The product is delivered to the market quickly. One of the total 133 i.e., 0.8 percent strongly disagree with the statement. 8 of the total 133 respondents i.e., 6 percent of them disagree with the statement because of some reasons related to the production process, material etc because of which they may not be in a position to deliver the product in the market quickly. Of the balance 37 respondents i.e., 27.8 percent of the total may neither disagree nor agree with the statement. It may be depending on their urgency they may deliver the product in the market. Of the balance 35 respondents i.e.,

26.3 percent of the total agree with the statement that they deliver the product quickly in the market. The balance 52 of the 133 respondents which is 39.1 percent of the total respondents strongly agreed that they deliver the product in the market quickly. It indicates that 87 of the total 133 respondents i.e., 65.4 percent are towards the positive side where they also agree or strongly agree to the statement so as to deliver the products quickly in the market and by doing so this gives them the advantage of retaining the customers.

4.5.27 Introduce the new products first in the market.

The new products should be introduced first in the market so that the market can be captured with more number of customers.

Table 4.88 Introduce the new products first in the market.

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.5	1.5
Disagree	9	6.5	6.8	8.3
Neutral	32	23.2	24.1	32.3
Agree	41	29.7	30.8	63.2
Strongly Agree	49	35.5	36.8	100
Total	133	96.4	100	
Missing(0)	5	3.6		
Total	138	100		

Source: Survey Data

They do the first move for the product in the market. Of the 138 respondents 5 of them didn't responded to the question. In the balance it can be observed that 2 of the respondents i.e., 1.5 percent strongly disagree with the statement. 9 of the respondents i.e., 6.8 percent of them disagree with the statement that they will be the first introducers of the new products. 32 of the respondents i.e., 24.1% of the respondents are neutral with the statement and they say that they are neither the first to introduce nor the last to look into the product. 41 respondents of the balance respondents which comes to 30.8 percent are the one who agree to be the introducers or the first movers of

the product in the market. The balance i.e., 49 of the total respondents which comes to 36.8 percent of the total respondents strongly agreed with the statement saying that they are the introducers of the new products in the market.

4.5.28 Time-to-market is lower than the industry average

Time-to-market is lesser than the industry standard indicate that if the time to market our product is less than the industry average it makes us to capture the market to the maximum extent.

Table 4.89 Time-to-market is lower than the industry average

	Frequency	Percent	Valid Percent	Cumulative Percent
Strongly Disagree	2	1.4	1.6	1.6
Disagree	7	5.1	5.5	7
Neutral	37	26.8	28.9	35.9
Agree	40	29	31.3	67.2
Strongly Agree	42	30.4	32.8	100
Total	128	92.8	100	
Missing	10	7.2		
Total	138	100		

Source: Survey Data

The time to advertise the product is lesser than the industry normal and is accepted by most of the respondents. Of the 138 respondents 10 of them didn't responded to the statement. Of the balance i.e., the valid respondents are 128. 2 of the total respondents which comes to 1.6 percent strongly disagree with the statement and they say that their time to market their product is more than the industry average. 7 of the total respondents which comes to 5.5 percent state that they are not below industry average to market their product in the competitive market. 37 of the total respondents which comes to 28.9 percent are neutral with the statement i.e., they are neither lower than the industry average nor more than the industrial average. Of the balance 40 i.e., 31.3 percent of the respondents agree with the statement that they are time to market the product is lower than the industry average. The balance 42 i.e., 32.8 percent of the respondents strongly agree to the statement that the time taken to market their product

is lower than the industry average and they have the chance to capture the market as much as possible.

4.6 Relationships

4.6.1 Relationship between the Age Group and the Frequent Meetings with the Suppliers

The age group relation with the frequent meetings with the suppliers can be observed and if they are not having any such changes it can be dependent or independent to one another.

Table 4.90 Age Group with Frequent Meetings with the Suppliers

Months Years	1-2	3-4	5-6	7-8	More than 8	Total
1-10	13(76.5)	2(11.8)	2(11.8)	0(0.0)	0(0.0)	17(100)
11-20	48(66.7)	10(13.9)	8(11.1)	1(1.4)	5(6.9)	72(100)
21-30	25(80.6)	3(9.7)	3(9.7)	0(0.0)	0(0.0)	31(100)
> 30	7(63.6)	1(9.1)	2(18.2)	0(0.0)	1(9.1)	11(100)
Total	93(71.0)	16(12.2)	15(11.5)	1(0.8)	6(4.6)	131(100)

Source: Survey Data

It can be observed from the above table that the companies which have their existence from 1 to 10 years have the meetings for every 1 to 2 months and the total of 13 companies have this within this period which totals to nearly three fourth (76.5%) of the total companies with these many years of existence. For the frequency of 3 to 4 months and 4 to 6 months there are 2 companies each having the meetings with their suppliers. For the other two frequencies i.e., 7 to 8 months and more than 8 months there are no companies conducting the meetings with such long periods.

For the companies which have their existence between 11 to 20 years the frequency of meetings for every 1 to 2 months is nearly two thirds of the total number of industries i.e., 48 of the total 72. In the second case for the meeting in 3 to 4 months there are 10 companies which have their supplier meeting in that period and which come to around 14 percent. In the next case where the period is 4 to 6 months there are few companies, 8, which have the meeting with their suppliers i.e., around 11 percent of the total

industries. In the next case where the period is within 7 to 8 months there is very rare, 1, meeting with their supplier which is around 1.4 percent of the total industries. In the next case of meeting above 8 months only around 5 industries does it and it is around 7 percent of the total industries (72).

In the next case where the years of existence of the industries is between 21 to 30 years the frequency of meetings within 1 to 2 months is nearly four fifth (25) of the total (31) in that category. In the second case and third case where the meetings with the suppliers is held within 3 to 4 months and 4 to 6 months is one tenth (3) of the total industries in this category (31). In the fourth and the fifth cases where the meetings with the suppliers are held in every 7 to 8 months and above 8 months is zero.

In the last case where the year of existence of the company is above 30 years have their meeting for every 1 to 2 months with 7 companies which is nearly three fifth of the total number of companies 11 i.e., around 63.6 percent. In the second case where the meeting is held within 3 to 4 months is and more than 8 months is done in one company each which comes to 9.1 percent each of the total industries(11) in this category. The other case where the meeting is held once in 4 to 6 months is done in 2 companies which come to 18.2 percent. None of the companies have their meetings in the category of 7 to 8 months. Now looking at the overall allocations it can be observed that 93 companies have meetings with their suppliers within the period of 1 to 2 months where they can discuss about the products and the alterations if any in the dimensions, quality, design etc, of the product can be made whenever they are required with which the productivity can be increased which in turn can reduce the wastage and the expenses.

Table 4.91 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.086 ^a	12	0.912
Likelihood Ratio	8.371	12	0.755
Linear-by-Linear Association	0.01	1	0.921
N of Valid Cases	131		

a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .08.

The Chi-Square test indicates that the Pearson Chi-Square value is 6.086 with the Degrees of freedom as 12 and the asymptotic significant value is 0.912 for 2-sided test. The likelihood ratio value is 8.371 with 12 degrees of freedom and the asymptotic value is 0.755. The linear-by-linear association value is 0.010 and the Degree of freedom is 1 and the asymptotic value is 0.921. The number of valid cases is 131 and the number of cells having the expected count less than 5 are 14. The minimum expected count for the total number of valid cases is 0.08. As the Pearson Chi square values asymptotic value of significance is 0.912 which is more than the 0.05 percent (95 percent level of significance).

As the minimum expected count for the total number of valid cases is 0.08 and the Pearson Chi-square has asymptotic value as 0.912 which is more than 0.05 percent and hence the alternative hypothesis is rejected.

4.6.2 Product Type with Frequent meetings with the Suppliers

The relation of the product type with the frequency of meetings with the suppliers can be found out and it can be checked out whether it is having any relation between them or are they independent without having any relation.

Table 4.92 Product Type with Frequent meetings with the suppliers

Prod Type	1-2 months	3-4 months	5-6 months	7-8 months	More than 8 months	Total
MTO	49(75.4)	6(9.2)	6(9.2)	0(0.0)	4(6.2)	65(100.0)
ATO	6(60.0)	1(10.0)	2(20.0)	1(10.0)	0(0.0)	10(100.0)
MTS	23(60.5)	7(18.4)	6(15.8)	0(0.0)	2(5.3)	38(100.0)
ETO	15(83.3)	2(11.1)	1(5.6)	0(0.0)	0(0.0)	18(100.0)
Total	93(71.0)	16(12.2)	15(11.5)	1(0.8)	6(4.6)	131(100)

Source: Survey Data

It can be observed that the companies with the product types Make-to-Order (MTO) and Make-to-Stock (MTS) are conducting the meetings with the supplier within one to two months with the frequency of 49 and 23. The total coming to 72 out of the total of 93 companies conducting the meetings with the supplier. The next case is the one

where the product type is Engineer-to-order (ETO) where the technical dimensions and the physical and the chemical properties are observed as per the requirements of the customer where the frequency is 15 with the percentage of 83.3 within the time period of 1 to 2 months.

The next is the case where the product type is make-to-stock where the frequency of conducting the meeting with the supplier is 3 to 4 months is 7 with the percentage of 18.4. The next come the case of the product type of assemble-to-order where the frequency is 6 which come to the percentage of 60.0 of this product type. The next is the case of the make-to-order where the meetings are held within the time period of 3 to 4 months with the frequency of 6 with the percentage of 9.2.

The similar is the case with the make-to-order product type where the number of companies having meeting with the supplier is 6 with a percentage of 9.2 within the time period of 5 to 6 months. It can be observed that the frequency of conducting meetings within 4 to 6 months is 6 with the percentage of 15.8. There are few cases where the frequency of conducting the meetings with the suppliers with the period of 7 to 8 months and more than 8 times which are very few and they can be evaluated and tested to minimise them so that they can be avoided. In such companies where the meetings are conducted within the period of 7 to 8 months and above 8 months, the changes that occur in such large periods will be very drastic. Hence the meetings can be conducted within the short durations so that they can have an eye on the market trends and take the required actions, if any, as per the requirements.

Table 4.93 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.911 ^a	12	0.091
Likelihood Ratio	13.069	12	0.364
Linear-by-Linear Association	0.086	1	0.77
N of Valid Cases	131		

a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .08.

The Chi-Square tests conducted for these data has the Pearson Chi-Square value of 18.911 with the degrees of freedom as 12 $((5-1) \times (4-1) = 4 \times 3)$ and the asymptotic value for two sides as 0.091 which is higher than the value of 95 percentage of significance. So this indicates that the alternate hypothesis is rejected. The Likelihood ratio value is 13.069 with the degrees of freedom as 12 and the asymptotic significant value for two sides as 0.364. The Linear by Linear association value is 0.086 with the degrees of freedom as 1 and the asymptotic significance for the 2 sided cases as 0.770 and the total number of valid cases being 131.

4.6.3 Product Type with Time required for supplying the products to the Supplier

The type of the product and the time required for supplying the products to the supplier and their relation with one another to have a clear indication of their dependency or independent.

Table 4.94 Product Type with Time required for supplying the products to the supplier

Prod Type	Within a day	Within 2-3 Days	Within a week	8-15 Days	More than 15 days	Total
MTO	22(34.4)	18(28.1)	12(18.8)	5(7.8)	7(10.9)	64(100.0)
ATO	0(0.0)	2(20.0)	2(20.0)	3(30.0)	3(30.0)	10(100.0)
MTS	10(30.3)	10(30.3)	12(36.4)	0(0.0)	1(3.0)	33(100.0)
ETO	5(27.8)	3(16.7)	6(33.3)	1(5.6)	3(16.7)	18(100.0)
Total	37(29.6)	33(26.4)	32(25.6)	9(7.2)	14(11.2)	125(100.0)

Source: Survey Data

The time duration for supplying the products which are ordered to your suppliers is within a day is with 22 companies with the product type of Make-to-Order which is 34.4 percent of the total number of the companies. The next case is the one where the supply of products ordered to the supplier is within 2 to 3 days is 18 companies which come to 28.1 percentage of the total of make-to-order companies. The next option is within a week which is done with 12 companies which is around 18.8 percent. The other two cases are within 8 to 15 days and more than 15 days which are done with 5

and 7 companies which is coming to around 7.8 percent and 10.9 percent. Now it should also be observed that if the duration of supplying the products which are ordered to supplier may lose the customers as the customers are not willing to wait for such a long period and the competition also is very high. Hence the time duration for supplying the products should be within a week or up to a week where the customers may be convinced or satisfied.

In the second case where the product type is Assemble-to-Order the time duration for supplying the products within a day are nil or zero. The next case is the one where the products are supplied within 2 to 3 days are 2 which is coming to 20 percentage of the products supplied to the companies. The next case where the time to supply the products to the supplier is a week is with 2 companies. The next case where the products are supplied within 8 to 15 days is done by 3 companies which is 30 percent of the companies. The last case in the assemble-to-order is where the products are supplied to the supplier within 15 days is done by 3 companies which comes to 30 percent. Hence the total numbers of companies which supply the products in the Assemble-to-order product type are 10.

The next product type is Make-to-Stock where the time duration to supply the products within a day is done by 10 companies which comes to 30.3 percentage. The next one is the case where the time to supply the products is 2 to 3 days and is done by 10 companies which comes to 30.3 percent. The next case is the one where the supply of the products is within a week and is done by 12 companies which is equal to 36.4 percent of the total number of the companies which supply the products within the given time. The next case is the supply of the products within 8 to 15 days and in this case there are no such suppliers. The next case is the one where the supply of the products is beyond 15 days and it is done by one company which comes to 3 percent.

The next product type is Engineer-to-order where the time to supply the products within a day is done by 5 companies which comes to 27.8 percent. The next one is the one within 2 to 3 days where there are 3 companies which do it and it comes to 16.7 percent. The next one is the supply of products within a week which is done by 6 companies which comes to 33.3 percent. The next one is the one where the company

supply the products within 8 to 15 days is 1 company and it comes to 5.6 percent. The next case is the one where the supply of the products is done beyond 15 days is done by 3 companies and it comes to 16.7 percent.

Table 4.95 Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	23.055 ^a	12	0.027
Likelihood Ratio	24.921	12	0.015
Linear-by-Linear Association	0.119	1	0.73
N of Valid Cases	125		

12 cells (60.0%) have expected count less than 5. The minimum expected count is 0.72

The calculated Pearson Chi-Square value at 5 percent level of significance and 12 (df) degrees of freedom $\{(5-1) \times (4-1) = 4 \times 3\}$ is 23.055 and the asymptotic value is 0.027 which is lower than 0.05 whereas the table value is 21.03 which strengthens the alternative hypothesis statement. Hence the alternative hypothesis is accepted.

4.6.4 Product Type with the way they get the Orders from Customers

The type of product and the way they get the orders from Customers is one of the significant factors which have to be measured in the supply chain management process.

Table 4.96 Prod Type with the way they get the orders from the customers

Prod Type	Manual	Internet based	Telephonic	Postal	More than 15 days	Total
MTO	31(45.6)	14(20.6)	13(19.1)	9(13.2)	1(1.5)	68(100.0)
ATO	0(0.0)	5(45.5)	4(36.4)	0(0.0)	2(18.2)	11(100.0)
MTS	10(26.3)	7(18.4)	13(34.2)	4(10.5)	4(10.5)	38(100.0)
ETO	5(27.8)	4(22.2)	5(27.8)	3(16.7)	1(5.6)	18(100.0)
Total	46(34.1)	30(22.2)	35(25.9)	16(11.9)	8(5.9)	135(100.0)

Source: Survey Data

The above table gives the details of the type of production and the different types of orders which they get. The product type is MTO (Make-to-Order) then the orders are manually raised and they are 31 of the 46 manually raised orders which are up to 45.6

percent of the MTO's. The number of orders raised through Internet is 14 which come to 20.6 percent of the total MTOs. The next method used to order the products in MTO is telephonic and the frequency is 13 which come to 19.1 percent of the total MTO orders. Next comes the postal way of ordering the MTO products which comes to the frequency of 9 and the percentage of 13.2. At the last the other method if any which is not mentioned in the list is used and it comes to the frequency of 1 which comes to the 1.5 percent of the total methods of ordering the MTO products.

Second product type is ATO (Assemble to Order) which is used to order the products using the different methods. The first method used to order the ATO products is manually with a frequency of 0, i.e., none of the ATOs are ordered manually. The second method is internet based where the frequency is 5 which comes to the percentage of 45.5. The third method is telephonic and it comes with a frequency of 4 and the percentage of 36.4. The other method of ordering the orders is postal way and the frequency in this is zero. It implies that none of the customer uses the postal method to order the products in the ATO. The last method used for ordering the products in the ATO method is any other method where the frequency is 2 and the percentage is 18.2.

The next product type is MTS (Make-to-stock). The first method of ordering the products is manually and the frequency is 10 with the percent of 26.3. The other way to order the product is through internet and the frequency is 7 and with a percentage of 18.4. The other way to order the products is through telephonic and it comes with a frequency of 13 and a percentage of 34.2 percent. The other method used for ordering the products is postal orders and it comes with a frequency of 4 and a percentage of 10.5. The other method of ordering the products is any other way which is not applicable in our methods types. It is with a frequency of 4 and the percentage of 10.5.

The last product type that is used is ETO (Engineer-to-Order). The frequency of the products ordered in the manual method is 5 with a percent of 27.8. The second method used to order the products is internet based with a frequency of 4 and the percent of 22.2. The third method used is telephonic and the frequency is 5 and the percentage of 27.8. The next method is postal method with the frequency of 3 and the percentage of

16.7. The next method used is any other method which is not specific with a frequency of 1 and the percentage of 5.6.

Table 4.97 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.232 ^a	12	0.047
Likelihood Ratio	25.164	12	0.014
Linear-by-Linear Association	4.837	1	0.028
N of Valid Cases	135		

The Pearson Chi-Square value for the calculated value with 12 degrees of freedom (5-1) X (4-1) with 5 percent level of significance is 21.232 which are more than the table value of 21.03.

It is concluded that the asymptotic value is 0.047 which is lower than 0.05 and proves that the Chi-Square value is more than the table value which accepts the alternative hypothesis statement. Hence it is accepted.

4.6.5 Product type with the General business strategy of the firm.

The product type which the firm manufacturers and the general business strategy which the firm follows are some of the factors which should be considered.

Table 4.98 Product Type with General business strategy of the firm

Prod Type	Pure cost	Primary Cost	Primary Emphasis	Pure Differentiation	Not Specific	Total
MTO	12(18.5)	26(40.0)	8(12.3)	1(1.5)	18(27.7)	65(100.0)
ATO	1(9.1)	2(18.2)	8(72.7)	0(0.0)	0(0.0)	11(100.0)
MTS	9(23.1)	8(20.5)	11(28.2)	2(5.1)	9(23.1)	39(100.0)
ETO	3(16.7)	4(22.2)	7(38.9)	1(5.6)	3(16.7)	18(100.0)
Total	25(18.8)	40(30.1)	34(25.6)	4(3.0)	30(22.6)	133(100.0)

Source: Survey Data

The above table gives us the data related to the product type and the different general strategies applied. Firstly the product type is the MTO (Make-to-Order) and the strategy applied is pure cost and it is with a frequency of 12 and the percentage of 18.5. The next one is the same product type with the strategy of primary cost with a frequency of 26 and the percentage of 40. The next is the strategy of primary emphasis with the frequency of 8 and the percentage of 12.3. The next is the strategy of pure differentiation with the frequency of 1 and the percentage of 1.5. Next is the strategy which is not specific and is with the frequency of 18 and the percent of 27.7.

Then next comes the product type of ATO (Assemble-to-Order). The ATO product type with the strategy of pure cost has the frequency of 1 with the percentage of 9.1. Next is with the strategy of primary cost with the frequency of 2 and the percentage of 18.2. The next one is the case of the strategy of primary emphasis with the frequency of 8 and the percentage of 72.7. Next comes the case of the strategy of pure differentiation with the frequency of 0 i.e., the product type of ATO doesn't use the strategy of pure differentiation. Next one is the case where there is no specific strategy applied and this is not done by any of the company.

The next comes the product type of MTS (Make-to-Stock). In the first case it is with the strategy of pure cost and frequency of 9 with the percent of 23.1. The next case is the one of primary cost with a frequency of 8 and the percentage of 20.5. The next comes the case of primary emphasis which is with the frequency of 11 and the percent of 28.2. The next case is the one with the pure differentiation with the frequency of 2 and the percentage of 5.1. The next comes the strategy of not specific where no specific strategy is applied is with a frequency of 9 and the percentage of 23.1.

Then next comes the product type which is Engineer-to-Order and the first case is the one of pure cost with the frequency of 3 and it comes to 16.7 percent. The next strategy is the one with primary cost which comes with the frequency of 4 and the percent of 22.2. Then next comes the case of primary emphasis with a frequency of 7 and the percent of 38.9. Then next comes the case of pure differentiation with the frequency of 1 and the percent of 5.6. The last case is the one of not specific strategy where the

strategies are applied depending upon the case and the requirement. The frequency of this is 3 with the percent of 16.7.

Table 4.99 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	25.868 ^a	12	0.011
Likelihood Ratio	26.43	12	0.009
Linear-by-Linear Association	0.025	1	0.873
N of Valid Cases	133		

11 cells (55.0%) have expected count less than 5. The minimum expected count is .33

The Pearson Chi-Square value for the calculated value with 12 degrees of freedom (5-1)X(4-1) with 5 percent level of significance is 25.868 which is more than the table value of 21.03.

It is concluded that the asymptotic value is 0.011 which is lower than 0.05 and proves that the Chi-Square value is more than the table value which accepts the alternative hypothesis statement.

4.6.6 Process characteristics and Frequency of Meeting with the Suppliers

The process characteristics and the frequency of meeting with the suppliers are the demographic factors which may have some impact on the supply chain of the firm.

Table 4.100 Process characteristics with Frequency of Meetings with the Suppliers

Process Type	1-2 months	3-4 months	5-6 months	7-8 months	More than 8 months	Total
batch	26(74.3)	3(8.6)	5(14.3)	0(0.0)	1(2.9)	35(100.0)
continuous	31(75.6)	3(7.3)	4(9.8)	0(0.0)	3(7.3)	41(100.0)
job order	31(67.4)	9(19.6)	4(8.7)	0(0.0)	2(4.3)	46(100.0)
not specific	3(60.0)	0(0.0)	2(40.0)	0(0.0)	0(0.0)	5(100.0)
Others	2(50.0)	1(25.0)	0(0.0)	1(25.0)	0(0.0)	4(100.0)

Source: Survey Data

The above table gives the details of the different processes which are used to manufacture the products and the different time periods which the different companies

use. In the first case the process which the companies use is the batch process. It can be observed that the batch process is used for 1 to 2 months by 26 companies which comes to the percentage of 74.3. The time period of 3 to 4 months is used by 3 companies which come to 8.6 percent. The third case where the batch process is used for 5 to 6 months is with the frequency of 5 companies with the percent of 14.3. The next case is for the time period of 7 to 8 months is with a frequency of 0 i.e., none of the companies use the batch process within this time period. The next case is with the time period beyond 8 months is 1 company which comes to 2.9 percent.

The next one is the continuous process. The first case is with a time period of 1 to 2 months is with the frequency of 31 with the percent of 75.6. The next is the time period of 3 to 4 months is 3 companies use this which comes to the percentage of 7.3. Then is the case of 5 to 6 months where 4 companies use this process which comes to 9.8 percent. The next case is the one where the continuous process is used within a period of 7 to 8 months is 0 where none of the companies use this process for this period. Next is the case of using the continuous process beyond the period of 8 months which comes to a frequency of 3 with the percent of 7.3.

Then is the process of job order where the time period used by the companies is given. In the first case the process of job order is applied for a period of 1 to 2 months by 31 companies which comes to 67.4 percent. The second case is using that process for 3 to 4 months is used by 9 companies which is 19.6 percent. The third case where the process is used for a period between 5 to 6 months is 4 which are 8.7 percent. The next case is between 7 to 8 months where there are no companies supplying the material. Then next comes the one which is beyond 8 months where the frequency is 2 with the percent of 4.3.

Then next comes the case of not specific where there is no specific step for supplying the products and they'll be applying the method which they think is specific for that instant. Firstly the case of 1 to 2 days comes with a frequency of 3 and the percent of 60. Next is the case of 5 to 6 days with a frequency of 2 and a percentage of 40. The next is the case of 3 to 4 days with the frequency of 1 and the percent of 25. The next is

the case of supplying the material within 7 to 8 days and is with a frequency of 1 and percent of 25.

Table 4.101 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	42.696 ^a	16	0
Likelihood Ratio	17.711	16	0.341
Linear-by-Linear Association	0.665	1	0.415
N of Valid Cases	131		

a. 19 cells (76.0%) have expected count less than 5. The minimum expected count is .03

The Pearson Chi-Square value for the calculated value with 16 degrees of freedom (5-1)X(5-1) with 5 percent level of significance is 42.696 which is more than the table value of 21.03.

It is concluded that the asymptotic value is 0.000 which is lower than 0.05 and proves that the Chi-Square value is more than the table value which accepts the alternative hypothesis statement.

4.6.7 Process characteristics with percentage of transportation cost incurred as a component of total cost

The process characteristics and the percentage of transportation cost incurred as a component of total cost may have some difference in the supply chain process of the firm.

Table 4.102 Process character with Percentage of transportation cost incurred as a component of total cost

Process Type	1-3%	4-6%	7-9%	10-12%	more than 12%	Total
batch	5(13.5)	20(54.1)	10(27.0)	1(2.7)	1(2.7)	37(100.0)
continuous	9(21.4)	16(38.1)	9(21.4)	6(14.3)	2(4.8)	42(100.0)
job order	15(30.6)	15(30.6)	15(30.6)	2(4.1)	2(4.1)	49(100.0)
not specific	1(20.0)	0(0.0)	2(40.0)	0(0.0)	2(40.0)	5(100.0)
Others	1(25.0)	1(25.0)	0(0.0)	0(0.0)	2(50.0)	4(100.0)

Source: Survey Data

In the above table it can be observed that the process characters can have the percent of transportation cost incurred as a component of total cost. The batch process with the transportation cost as 1 to 3 percent of the total cost which is used by 5 companies which comes to 13.5 percent of the total cost. The next case is with the 4 to 6 percent of the total cost which is used by 20 companies which comes to 54.1 percent. The next is the cost of 7 to 9 percent of the total cost which is applied by 10 companies which comes to 10 percent of the total cost. The other case is the one with 10 to 12 percent of the total cost which is used by 1 company which comes to 2.7 percent. The next case with the transportation cost more than 12 percent is used by one company which is 2.7 percent of the total cost used by the batch process.

The next process is continuous process where the transportation cost is 1 to 3 percent of the total cost used by the continuous process which is used by 9 companies which comes to 21.4 percent. The next comes the case of 4 to 6 percent which is used by 16 companies which comes to 38.1 percent. The next case is of 7 to 9 percent of total cost which is used by 9 companies which comes to 21.4 percent. The next is the case of 10 to 12 percent which is used by 6 companies which is 14.3 percent. The next one is the case of beyond 12 percent of the total cost which is used by 2 companies which is 4.8 percent.

The next comes the process of Job order and the transportation cost of 1 to 3 percent used by 15 companies which is 30.6 percent of the total cost applied in the process. The next case is the one with 4 to 6 percent which is used by 15 companies which comes to 30.6 percent. The next is the case of 7 to 9 percent which is used by 15 companies which is 30.6 percent. The next is the case of 10 to 12 percent which is used by 2 companies which is 4.1 percent. The next is the case of beyond or more than 12 percent which is used by 2 companies which is 4.1 percent.

The next is the process where there is no specific method applied and will apply as per the case of their requirement. The transportation cost of 1 to 3 percent is used by 1 company which is 20 percent. The next is the case of 4 to 6 percent where no company uses this method. The next is the case of 7 to 9 percent which is used by 2 companies which is 40 percent. The next is the case of 10 to 12 percent where no company uses

this. The next is the cost of more than 12 percent which is used by 2 companies which is 40 percent.

The next is the process which is other than the one mentioned in the above table. In the case of 1 to 3 percent one company uses this which is 25 percent. The next case is 4 to 6 percent which is used by one company which is 25 percent. There is no company which uses the one with 7 to 9 percent or 10 to 12 percent. The next case is more than 12 percent which is used by 2 companies which is 50 percent.

Table 4.103 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	37.437 ^a	16	0.002
Likelihood Ratio	29.029	16	0.024
Linear-by-Linear Association	1.691	1	0.193
N of Valid Cases	137		

16 cells (64.0%) have expected count less than 5. The minimum expected count is .26.

The Pearson Chi-Square value for the calculated value with 16 degrees of freedom (5-1)X(5-1) with 5 percent level of significance is 37.437 which is more than the table value of 21.03.

It is concluded that the asymptotic value is 0.002 which is lower than 0.05 and proves that the Chi-Square value is more than the table value which accepts the alternative hypothesis statement.

4.6.8 Process characteristics with Total distribution cost as a percentage of total cost

In the above statement “the process characteristics and the total distribution cost as a percentage of total cost” may have some relation between themselves which may have some impact on the supply chain management.

Table 4.104 Process char with Total distribution cost as a percentage of total cost

Process Type	10-20%	20-30%	30-40%	40-50%	More than 50%	Total
batch	10(28.6)	12(34.3)	8(22.9)	4(11.4)	1(2.9)	35(100.0)
continuous	21(50.0)	7(16.7)	10(23.8)	2(4.8)	2(4.8)	42(100.0)
job order	16(34.0)	15(31.9)	5(10.6)	3(6.4)	8(17.0)	47(100.0)
not specific	0(0.0)	1(20.0)	2(40.0)	0(0.0)	2(40.0)	5(100.0)
Others	0(0.0)	2(50.0)	1(25.0)	1(25.0)	0(0.0)	4(100.0)

Source: Survey Data

In the above table it gives relation between the process characteristics and the total distribution cost and the total cost. The batch process with the total distribution cost as a percentage of total cost is taken as the first case. In this the total distribution cost as 10 to 20 percent of the total cost is used by 10 companies which come to 28.6 percent. The next case of 20 to 30 percent of total cost is used by 12 companies which is 34.3 percent. The next case where the distribution cost is 30 to 40 percent of total cost is used by 8 companies which is 22.9 percent. The next case is distribution cost is 40 to 50 percent of total cost which is used by 4 companies which is 11.4 percent. The case where the distribution cost is more than 50 percent of the total cost is used by one company which is 2.9 percent of the total cost used in the batch process.

The next comes the case of continuous process. In continuous process the distribution cost is 10 to 20 percent of total cost in 21 companies which comes to 50 percent. The next comes the case of 20 to 30 percent of total cost which is used by 7 companies which is 16.7 percent. Next is the case of 30 to 40 percent of total case which comes to 10 companies which is 23.8 percent. Next is the case of 40 to 50 percent which is used by 2 companies which is 4.8 percent. Next is the case of more than 50 percent which is used by 2 companies which is 4.8 percent.

The next process is the job order process where the process is used depending on the order of the job. In this process the first process is of 10 to 20 percent of the total cost and it is applied by 16 companies which is 34 percent. The next one is the case of 20 to

30 percent of total cost which is used by 15 companies which is 31.9 percent. The next is the case of 30 to 40 percent which is used by 5 companies which is 10.6 percent. The next case is the one of 40 to 50 percent which is used by 3 companies which is 6.4 percent. The last is the case of more than 50 percent which is used by 8 companies which is 17.0 percent.

The next is the process of not specific which indicates that they don't specifically used a particular method instead they use the process which is appropriate to the situation and the design. In this case first comes the case of 10 to 20 percent which is not applied by any of the companies. Next comes the case of 20 to 30 percent which is used by one company which comes to 20 percent. The next is the case of 30 to 40 percent which is used by 2 companies which comes to 40 percent. Next is the case of 40 to 50 percent which is not used by any company. Next is the case of more than 50 percent which is used by 2 companies which comes to 40 percent.

The next is the case of other processes which indicates the one which is none of the one specified in the above table. In this case the first is the case of 10 to 20 percent which is not used by any company. The next case is the one of 20 to 30 percent which is used by 2 companies which is 50 percent. The next is the case of 30 to 40 percent which is applied by one company which is 25 percent. Next is the case of 40 to 50 percent which is used by one company which comes to 25 percent. Lastly it's the case of above 50 percent which none of the companies uses.

Table 4.105 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	26.942 ^a	16	0.042
Likelihood Ratio	28.612	16	0.027
Linear-by-Linear Association	2.978	1	0.084
N of Valid Cases	133		

a. 16 cells (64.0%) have expected count less than 5. The minimum expected count is .30.

The calculated Pearson Chi-Square value with 16 degrees of freedom (5-1)X(5-1) with 5 percent level of significance is 26.942 which is more than the table value of 26.30.

It is concluded that the asymptotic value is 0.042 which is lower than 0.05 and proves that the Chi-Square value is more than the table value which accepts the alternative hypothesis statement.

It indicates that the total distribution cost as a percentage of the total cost is dependent value on the process characteristics.

4.6.9 Process characteristics with the way they get the orders from the customers

The process characteristics and the way they get the orders from the customers may have some impact on the supply chain management either positive or negative.

Table 4.106 Process character with the way they get the orders from the customers

Process Type	Manual	Internet based	Telephonic	Postal	Any other	Total
batch	8(23.5)	8(23.5)	8(23.5)	5(14.7)	5(14.7)	34(100.0)
continuous	21(48.8)	6(14.0)	9(20.9)	4(9.3)	3(7.0)	43(100.0)
job order	17(34.7)	14(28.6)	14(28.6)	4(8.2)	0(0.0)	49(100.0)
not specific	0(0.0)	0(0.0)	3(60.0)	2(40.0)	0(0.0)	5(100.0)
Others	0(0.0)	2(50.0)	1(25.0)	1(25.0)	0(0.0)	4(100.0)
Total	46(34.1)	30(22.2)	35(25.9)	16(11.9)	8(5.9)	135(100)

Source: Survey Data

In the above table it can be observed that the relation between the process characters and the way of the ordering from the customers is given. The first processing method is the batch type with the customer orders done manually and is done by 8 companies which comes to 23.5 percent. Next is the case of customer orders placed through internet and is done by 8 companies which comes to 23.5 percent. Next is the case of orders placed through telephone and is used by 8 companies which is equal to 23.5 percent. Next comes the case of placing the orders by post and it is used by 5 companies which is 14.7 percent. Next case is the one where the orders are placed by any other method other than the one placed in the table and it is used by 5 companies which are coming to 14.7 percent.

The next process is continuous process and the case where the orders are placed manually is done by 21 companies which is 48.8 percent. Next is the case of orders place through internet and is used by 6 companies which is 14.0 percent. The next is the case of getting the orders by telephone and is used by 9 companies which come to 20.9 percent. The next is the case of getting the customer orders by post and is used by 4 companies which is 9.3 percent. The next case is getting the customer orders by any other method other than the one used above and it is used by 3 companies which is 7 percent.

The next processing method that is used is job order method. The first case of ordering the orders manually is used by 17 companies which is 34.7 percent. The next is the placing the orders is through internet and is used by 14 companies which is 28.6 percent. The next is the case of placing the orders by telephone and is used by 14 companies which is 28.6 percent. The next is the case of placing the orders by post and is done by 4 companies which is 8.2 percent.

The next process method is not specific. In this case they don't use any specific method and may use any of the method as per their requirement. The first comes getting the orders manually and is not used by any of the companies. Next is the case of getting the orders by internet and none of the company uses this method. Next is the case where the orders are placed by telephone and is used by 3 companies which is 60 percent. The next case where the orders are placed or ordered by post and is used by 2 companies which is 40 percent.

The next method of processing is done by other method. The method is the one which is different from any of the one used in the above table. The orders are given by internet and 2 companies use this which is 50 percent. The next method is placing the orders

through telephone and is used by one company which is 25 percent. The next method is placing the orders by post and is used by one company which is 25 percent.

Table 4.107 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	27.430 ^a	16	0.037
Likelihood Ratio	31.359	16	0.012
Linear-by-Linear Association	0.448	1	0.503
N of Valid Cases	135		

a. 14 cells (56.0%) have expected count less than 5. The minimum expected count is .24

The calculated Pearson Chi-Square value with 16 degrees of freedom (5-1)X(5-1) with 5 percent level of significance is 27.430 which is more than the table value of 26.30.

It is concluded that the asymptotic value is 0.037 which is lower than 0.05 and proves that the Chi-Square value is more than the table value which accepts the alternative hypothesis statement.

4.7 CORRELATION

The correlation coefficient is the coefficient which gives the relation between one and other variables. In the available data it can be observed that it is easy to find the factors which are inter-related to one another and the one which are in favour to the variables and the one where they are negatively related to one of the other factors.

The factors that are considered and the relationship between them can be observed in the below figure

Table 4.108 Correlation Coefficient between the Different Factors

	SCM practices	SC environment	SCM strategies and systems	Support SCM	SC performance	Competitive advantage of your firm
SCM practices	1					
SC environment	.195*	1				
SCM strategies and systems	0.107	-0.086	1			
Support SCM	0.131	-0.07	-0.077	1		
SC performance	0.064	0.081	0.15	-0.119	1	
Competitive advantage of your firm	-0.108	0.05	0.139	.198*	.584**	1

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

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

From the above table it can be observed that the Supply chain practices and environment are positively correlated with 0.195 where as the supply chain performance has a greater correlation value of 0.584 with the competitive advantage of the firm. It can be observed that the SCM strategies and systems are having some low relation with the supply chain practices and hence some of the factors should be further considered to improve to have a better relation with supply chain practices. As the Supply chain strategies and systems are having negative value of -0.086 with the supply chain environment it implies that they are reversely related i.e., in the opposite direction.

If the Support SCM is considered it could be observed that the SC Environment and SC Strategies and Systems are having negative values which imply that they are inversely proportional to the Support Supply Chain factors.

The SC Performance has the lower values of 0.064, 0.081 and 0.150 between SC Practices, SC Environment and SC Strategies and systems which are to be improved to get the results to the expected level so that they can be with the expected range. The SC

Performance is with the negative value with the Support SC Practices which implies that it is inversely proportionate to one another. Hence some action or necessary steps should be taken to minimise the value.

The Competitive Advantage of the firm has the negative value of -0.108 with the SCM Practices which indicate that they are inversely proportional to one another and hence the necessary steps should be taken to reduce the negative value and add to the Competitive advantage of the firm which again increases organisational performance of the firm. The SC Environment and the SC Strategies and Systems have the value which is a bit less than the expected and they can be increased by taking the necessary action to increase the value from the present value to increase the Competitive Advantage of the firm. The values of Support SC practices and the SC Performance are 0.198 and 0.584. The Support SC Practices are within the 95 percent level of significance i.e., 0.05 level of significance and SC performance are within 99 percent level of significance i.e., 0.01 level of significance.

Inference 1: If the firm wants to make the practices better it has to make sure that there is a proper organisational environment. On the contrary there should be a congenial atmosphere in the organisation to make the supply chain flow better.

Inference 2: If the firm wants to increase the supply chain performance in the market then it has to increase its competitive advantage. The competitive advantage can be improved only when all the key factors work for a common goal.

4.8 REGRESSION ANALYSIS

Regression analysis is a statistical process used for estimating the associations among the different variables in a statistical modelling. Whenever the focus is on the connection among a dependent and one or more self-governing changeable it uses most of the techniques for analysing the different variables. The independent variables are called “Predictors”. The regression analysis actually helps one in knowing how the

typical value of the dependent variable or the criterion variable changes when a independent variable is varied and all other independent variables are fixed.

In this case the SC Performances is a dependent variable and all others like SC Practices, SC Strategies and Systems, SC Environment, Support SCM and Competitive Advantage are the independent variables. Hence the SC performance is a function of all the independent variables.

SC performance = f(Competitive advantage, SC practices, SCM strategies and systems, support SCM, SC environment)

Table 4.109 Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	CA, SCP, SCMP, SSP, ENVT, SCST ^b	.	Enter

a. Dependent Variable: SCPERF

b. All requested variables entered.

Table.4.110 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.577 ^a	0.333	0.302	8.666	0.333	10.723	6	129	0

a. Predictors: (Constant), CA, SCP, SCMP, SSP, ENVT, SCST

From the above table it can be observed that the predictors i.e., the independent factors with the constant are taken to calculate the R value which is 0.577. The R square value is taken because in most of the cases the R value may be negative. So inorder to get the right values the R square value of 0.333 is taken and the adjusted R square value of 0.302 is taken and the Standard error of the estimate is calculated.

Inferences: The dependent variable Supply chain performance of the firm be able to be determined by the independent variables mentioned above keeping in view to the R square value in the table 5.2. It may be noted that higher is the R square value higher is the model fit. Further from the “adjusted R square” value it is understood that the sample is highly representing the population (close value to R square). Hence it can be said that the model is valid.

Table 4.111 ANOVA for the model ANOVA^a

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4832.33	6	805.389	10.723	.000 ^b
	Residual	9688.61	129	75.106		
	Total	14520.9	135			

a. Dependent Variable: SCPERF

Predictors: (Constant), Competitive Advantage (CA), SCM practices (SCP), Support Supply Chain Management (SSP), Supply Chain Environment (ENVT), Supply Chain Management Strategies And Systems (SCST)

The above table calculates the ANOVA for the model where the predictors like the SCM practices, SC Environment, SC Strategies and Systems, Support SC Management, Competitive Advantage are taken as independent factors and the SC Performance of the Firm as Dependent variable. The Regression and the Residual are calculated with the Sum of Squares for Regressions as 4832.331 and the degrees of freedom as 6. The mean square value for regression is 805.389 and the F value is 10.723. The significant value is 0.000 which is acceptable with the 99 percent level.

The Residual value is considered with the Sum of squares as 9688.610 with 129 as the Degrees of freedom and 75.106 as the Mean Square value.

From the ANOVA table 5.111 it is seen that the dependent variable is significantly varied with the independent variables ($p < 0.05$). It further says that there is at least one variable which is making a difference among all the independent variables (different means). From the table 3 it can be observed that except the competitive advantage no other variable has an impact on the dependent variables ($p < 0.05$) and hence are not useful for the supply chain performance. So it is finally inferred that if the organisation

wants to improve its competitive advantage then it has to strengthen its supply chain for a better performance

Table 4.112 Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	43.725	13.494		3.24	0.002
	SCP	-0.131	0.11	-0.088	-1.19	0.236
	SCMP	-0.385	0.251	-0.115	-1.536	0.127
	ENVT	0.01	0.11	0.007	0.087	0.931
	SCST	0.026	0.108	0.018	0.241	0.81
	SSP	-0.267	0.179	-0.11	-1.486	0.14
	CA	0.632	0.089	0.528	7.076	0

a. Dependent Variable: SCPERF

The Supply chain Performance is taken as the dependent variable and the other factors as the independent variables and when the un-standardized and the standardized coefficients are calculated for the independent variables it can be observed that the B values of all the factors other than the Competitive Advantage are either negative or very low and the Competitive Advantage value is 0.632. Similarly is the case with standardized coefficient the Beta value is reasonable for Competitive Advantage which is 0.528 higher of all the values. Now taking the value of significance into consideration of all the values the value of significance is at Competitive Advantage which is 0.000 which is less than 0.01 which are at the level of 99 percent of significance. Hence the dependent factor Supply Chain Performance is dependent on the independent factor like Competitive Advantage.

Inferences: The dependent variable Supply Chain Performance of the firm can be determined by the independent variables mentioned above keeping in view to the R square value in the table 1. It may be noted that higher is the R square value higher is the model fit. Further from the “adjusted R square” value it is understood that the sample is highly representing the population (close value to R square). Hence it can be said that the model is valid.

From the ANOVA table (table 2) it is seen that the dependent variable is significantly varied with the independent variables ($p < 0.05$). It further says there is at least one variable which is making a difference among all the independent variables (different means). From the table 3 it can be observed that except competitive advantage no other variable have any impact on the dependent variables ($p < 0.05$) and hence are not useful for the supply chain performance. So it is finally inferred that if the organisation wants to improve its supply chain performance then it should strengthen its competitive advantage, for a better performance.

4.10 Factor analysis

4.10.1 Factor analysis of Supply Chain Environment

The supply chain environment gives us the different factors that deal with the surroundings and the markets which have the impact on the growth of the company. The Factor analysis is functional to reduce the changeable and things to least of the convenient variables. Factor analysis is performed with the two statistical tests like Kaiser-Meyer-Olkin test and Bartlett's test. The KMO test of sampling adequacy prioritises the balanced variances of the variables which are caused due to the emerging factors. KMO value plays an important role and if the value exceeds 0.50 it indicates that Factor analysis perfectly fits for the data set.

Table 4.113 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.614
Bartlett's Test of Sphericity	Approx. Chi-Square	297.432
	Df	91
	Sig.	0

The Kaiser-Meyer-Olkin value for the calculation of the sampling adequacy of the SC environment is 0.614 which is satisfactory and acceptable.

The Bartlett's test of sphericity gives the approximate Chi-Square value of 297.432 which is high and indicates that the variables have been perfectly issued. Principal Component Analysis was applied for extracting purpose and the Varimax rotation is applied as the standard rotation. The degree of freedom is 91 and the value of significance is 0.000 which is less than 0.01 and indicates that the worth is significant at 99 percent level of confidence and is acceptable. Factors having Eigen values greater than one are taken as the reduced factors and are used as the new factors for further analysis. The resultant three factors of the total variables are ten extracted from supply chain environment variables. The variables are grouped as three factors namely "Planning and Problem Solving", "Product Quality" and "Competitors". Four variables constitute the first factor whereas the other three variables are for the second factor and the third factor has the other three variables. The table displays the variance and the Eigen value extracted through each factor of the Supply chain environment.

Descriptive Statistics

In this stage the factors that are useful for our analysis and which have some value are considered and the others are eliminated.

Table 4.114 Communalities

	Initial	Extraction
ENVT2	1	0.62
ENVT3	1	0.48
ENVT4	1	0.7
ENVT6	1	0.55
ENVT7	1	0.54
ENVT10	1	0.4
ENVT11	1	0.47
ENVT12	1	0.36
ENVT13	1	0.55
ENVT14	1	0.6

Extraction Method: Principal Component Analysis

The communalities give us the components which are required for the analysis and the extraction method used is Principle component analysis. The number of the components is reduced depending upon their usage and their importance.

Table 4.115 Variance explained by Factor of SC Environment

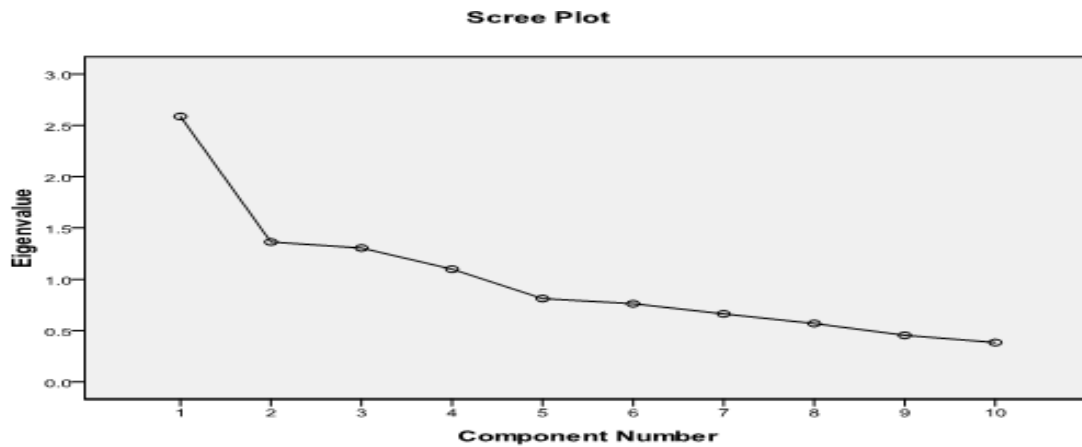
Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	2.586	25.86	25.86	1.997	19.969	19.969
2	1.364	13.638	39.498	1.635	16.353	36.322
3	1.305	13.048	52.546	1.622	16.223	52.546
4	1.099	10.99	63.536			
5	0.812	8.123	71.659			
6	0.762	7.622	79.282			
7	0.663	6.633	85.914			
8	0.57	5.697	91.611			
9	0.455	4.547	96.159			
10	0.384	3.841	100			

The decreased three factors describe the whole variance of 52.546 percent which is sensibly important. Of the three SC environment issues Planning and Problem solving lives in the high location, because this factor only give details of 19.969 percent of the whole discrepancy. This demonstrates that the main SC environment of all the production firms is dependent on planning and the problem solving methods or techniques.

The Eigen values are compressed to such an extent where the value of minimum number of components is more than the value of the other components that are

extracted. That is the Rotation Sums of Squared Loadings is more than the percentage of the sum of the other components percentage when kept together.

Figure 141 Scree Plot



The screen plot gives us the clear picture of the flow of the Eigen value which moves a smooth path and it can be observed that the slopes at the initial stages are very steep but in the ending stage the slope is very less. It can be observed that the Eigen value is inversely proportionate to the component number.

Table 4.116 Component Matrix^a

	Component		
	1	2	3
ENVT2			0.63
ENVT3			0.55
ENVT4		0.77	
ENVT6	0.55		
ENVT7	0.5	0.52	
ENVT10	0.61		
ENVT11	0.51		
ENVT12			
ENVT13	0.69		
ENVT14			-0.55

Extraction Method: Principal Component Analysis

a. 3 components extracted.

The component matrix is extracted by applying the Extraction method of Principal Component Analysis and following much number of iterations to find out the output. But it can be observed that the output has the negative values. Hence the component analysis is not taken into consideration.

The Rotated component Matrix is now extracted.

Table 4.117 Description of Rotated Component Matrix with Dimensions and Reliability

Rotated Component Matrix ^a					
	Component			Dimensions	Reliability
	1	2	3		
Key suppliers are included in our planning and goal setting activities ENVT14	0.754			I. Suppliers involvement in Planning and Problem solving	0.605
Key suppliers are included in the continuous improvement programs conducted ENVT13	0.686				
Problems are solved regularly and jointly with the suppliers ENVT11	0.637				
Quality is considered as the main criteria in selecting the suppliers. ENVT10	0.529				
Customer product preferences change over the year ENVT2		0.785		II. Product Criteria	0.613
Properties of the material from suppliers vary greatly within the same batch ENVT3		0.688			
Suppliers are helped to improve their product quality ENVT12		0.54			
Competitors are from different industries ENVT4			0.822	III. Technologies & Competitors	0.637
Technological changes provide opportunities for enhancing competitive advantage ENVT7			0.695		
Technology is changing significantly in the industry ENVT6			0.603		

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 4 iterations.

The rotated component matrix is extracted using the Principal Component Analysis as the extraction method and the Varimax with the Kaiser Normalisation rotation method and the rotation convergence takes place in 4 iterations. It can be observed that the output has the positive values and finding out the different statements which give the same components.

The components are divided into different categories depending upon their values. These categories are further classified depending upon the different characteristics or properties.

I. Suppliers involvement in Planning and Problem solving

- It can be observed from the above table that the components within the category 1 are the one with high importance indicated by the manufacturing industries and they include the following:
- Key suppliers are included in planning and goal setting activities which helps the suppliers to understand the products which they have to supply and the targets which they have to fulfil within the stipulated period.
- Key suppliers are included in the continuous improvement programs conducted which is helpful in knowing the different changes which the suppliers are looking for to improve the methods which are required to make their work easy and better.
- Problems are solved regularly and jointly with the suppliers which will make the entrepreneurs have a clear idea about the problems faced by the supply chain members which delays the supply of the required material within the assigned time and to find the solutions for the raised problems so that the flow of the material within the supply chain will be smooth and easy.
- Quality is considered as the main criteria in selecting the suppliers which makes the enterprise and the suppliers maintain the relationship for a longer period.

II Product Criteria

- This factor has three variables which help in maintaining the quality of the product as per the customer requirements and they are as the following
- Customer product preferences change over the year which can have a clear idea about the change in the preferences as per the time differences. Hence the suppliers are intimated with the customer preferences to satisfy the customer by supplying the products as per the customer's needs.
- Properties of the material from dealers differ hugely within the same lot which will make the differences in the product quality. These should be observed and informed to the supplier so that there shouldn't be any such differences in the properties of the material supplied so that the customers get dissatisfied.
- Suppliers are helped to improve their product quality which makes the suppliers to sustain in the market by supplying the products as per the requirements of the customers, so that the customers don't shift to other suppliers.

III Technologies & Competitors:

- This is one of the critical factors which assist us to concentrate on the competitors and the changes in the technologies to sustain ourselves in the market.
- Competitors are from different industries and have experience in different fields. This makes them competitive in any of the industry. This should be one of the prime factors which should concentrate upon.
- Technological alterations give-chances for pretty competitive advantage. The changes in the technology will increase the chances to sustain in the market in even facing the challenges in the new era.
- Technology is changing significantly in the industry to improve the product features and the customer needs.

4.10.2 Factor analysis of Supply Chain Strategies and Systems

The Supply Chain Strategies and Systems explain the different factors which deal with the different strategies and systems used for decision making. Similar to the above one the Factor Analysis is used to reduce the variables to the maximum possible extent. The statistical tests like Kaiser-Meyer-Olkin test and Bartlett's test are performed in the Factor analysis. KMO value plays an important role and if the value exceeds 0.50 it indicates that Factor analysis perfectly fits for the data set.

Table 4.118 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.7
Bartlett's Test of Sphericity	Approx. Chi-Square	473.66
	Df	55
	Sig.	0

The Kaiser-Meyer-Olkin value for the measure of the sampling adequacy of the supply chain strategies and systems is 0.70 which is satisfactory and acceptable.

The Bartlett's test of sphericity gives the approximate Chi-Square value of 473.66 which is high and indicates that the variables have been perfectly factored. Principal Component Analysis was applied for extracting purpose and the Varimax rotation is applied as the standard rotation. The degree of freedom is 55 and the value of significance is 0.000 which is less than 0.01 and indicates that the value is significant at 99 percent level of confidence and is acceptable.

Table 4.119 Communalities

	Initial	Extraction
SCST7	1	0.71
SCST5	1	0.6
SCST17	1	0.37
SCST8	1	0.5
SCST9	1	0.68

	Initial	Extraction
SCST10	1	0.74
SCST11	1	0.71
SCST12	1	0.62
SCST13	1	0.78
SCST4	1	0.61
SCST16	1	0.4

Extraction Method: Principal Component Analysis

The communalities give us the components which are required for the analysis and the extraction method used is Principle component analysis. The number of the components is reduced depending upon their usage and their priorities.

Table 4.120 Variance explained by Factor of Supply Chain Strategies and Systems

Comp onent	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.92	26.62	26.62	2.71	24.63	24.63
2	2.36	21.53	48.15	2.33	21.23	45.87
3	1.47	13.43	61.58	1.72	15.71	61.58
4	0.99	9.07	70.66			
5	0.69	6.32	76.98			
6	0.59	5.41	82.4			
7	0.56	5.09	87.5			
8	0.47	4.28	91.78			
9	0.4	3.71	95.5			
10	0.25	2.28	97.78			
11	0.24	2.21	100			

The resultant three factors of the total variables describe the total variance of 61.58 percent which are combination of eleven, extracted from Supply Chain Strategies and Systems variables. The variables are grouped as three factors namely “Cost Reduction”, “External Source” and “Standardisation”. Four variables constitute the first factor

which constitutes 24.63 percent whereas the other four variables are for the second factor which constitute 21.23 percent and the third factor has the other three variables which constitute 15.71 percent. The table displays the variance and the eigen gives the detailed description of the component

Table 4.121 Variance and the Eigen

	Component			Dimensions	Reliability
	1	2	3		
Increase of capacity utilization SCST11	0.841			Cost Reduction	0.714
Reduction of inventory SCST10	0.838				
Production standardisation SCST9	0.78				
Reduction in manufacturing cost SCST8	0.712				
Third party logistics SCST13		0.871		External Source	0.646
Delivery Speed SCST12		0.766			
Outsourcing and sub contracting SCST4		0.743			
e-Commerce SCST16		0.584			
Manufacturing flexibility SCST7			0.838	Standardisation	0.623
Purchasing as a strategic activity SCST5			0.765		
Process bench marking SCST17			0.541		

Extraction Method: Principal Component Analysis

a. Rotation converged in 5 iterations.

The rotated component matrix is extracted using the Principal Component Analysis as the extraction method and the Varimax with the Kaiser Normalisation rotation method and the rotation convergence takes place in 5 iterations. It can be observed that the output has the positive values and finding out the different statements which give the same components.

The components are divided into different categories depending upon their values. These categories are further classified depending upon the different characteristics or properties:

Cost Reduction, External source and Standardisation are the different factors which should be considered in order to take the strategic decisions.

Cost Reduction

- The increase in the capacity utilisation will increase the quantity of production with the same price which reduces the production cost. This will by default be useful in cost reduction which is useful for the overall expenses of the organisation.
- The reduction in the cost can be achieved by reducing the inventory cost. The reduction in the inventory cost will be useful in reducing the warehouse cost also.
- The production standardisation will be useful in reducing the cost of the organisation as there won't be any necessity for the repeated production of the products.
- The reduction in manufacturing cost will again be useful in the reducing the manufacturing cost and this is done by bulk manufacturing.

External Sourcing

- The third party logistics is the one where the movement of the material in the organisation from the raw material supplier till the final customer or the end user is done by the external logistics service provider so that the organisation can concentrate on their core products and businesses.
- The increase in the delivery speed of the products will improve the customer satisfaction and this can be done by taking the external sources.
- Outsourcing and sub-contracting are the other ways where the company out sources the work or the product that are not that important or are the part of the main work or product.

- The e-commerce is the one where the business is done with the use of external electronic devices which are used for communication.

Standardisation

- The manufacturing flexibility is one of the factors which should be considered where the flexibility in manufacturing should be applicable for different products of different dimensions.
- The purchasing is a strategic activity where the purchase of the raw material and the volume and other factors should be considered before purchasing.
- The process bench marking is the one where the standard process is marked as a bench mark with the required standards and there cannot be any such standard process.

4.10.3 Factor analysis of Supply Chain Competitive Advantage

The supply chain competitive advantage deals with the factors which should be considered to overcome the competition. To reduce the number of variables to the minimum and reasonable number the Factor analysis is applied. The Kaiser-Meyer-Olkin test and Bartlett's test are the statistical tests performed. The KMO test of sampling adequacy looks into the factors or variables which are due to the emerging factors. KMO value plays an important role and if the value exceeds 0.50 it indicates that Factor analysis perfectly fits for the data set. The Bartlett's test of Sphericity is used to find out the approximate Chi-Square value and the degrees of freedom and the value of significance.

Table 4.122 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.784
Bartlett's Test of Sphericity	Approx. Chi-Square	442.036
	Df	66
	Sig.	0

The Kaiser-Meyer-Olkin Measure of Sampling Adequacy value of the Supply Chain Competitive Advantage is 0.784 which is very high than the 0.50 and hence is satisfactory and acceptable.

The Bartlett's test of sphericity gives the approximate Chi-Square value of 442.036 which is high and indicates that the variables have been perfectly factored. Principal Component Analysis was applied for extracting purpose and the Varimax rotation is applied as the standard rotation. The degree of freedom is 66 and the value of significance is 0.000 which is less than 0.01 and indicates that the value is significant at 99 percent level of confidence and is acceptable. The factors having Eigen values greater than one are taken as the reduced factors and are used as the new factors for further analysis. The resultant three factors of the total variables are twelve extracted from supply chain competitive advantage variables.

Table 4.123 Communalities

	Initial	Extraction
SCCOMA1	1	0.588
SCCOMA3	1	0.672
SCCOMA4	1	0.765
SCCOMA5	1	0.618
SCCOMA6	1	0.504
SCCOMA7	1	0.442
SCCOMA8	1	0.605
SCCOMA9	1	0.518
SCCOMA10	1	0.57
SCCOMA11	1	0.487
SCCOMA13	1	0.617
SCCOMA14	1	0.703

Extraction Method: Principal Component Analysis

The communalities give us the components which are required for the analysis and the extraction method used is Principle component analysis. The number of the components is reduced depending upon their usage and their importance.

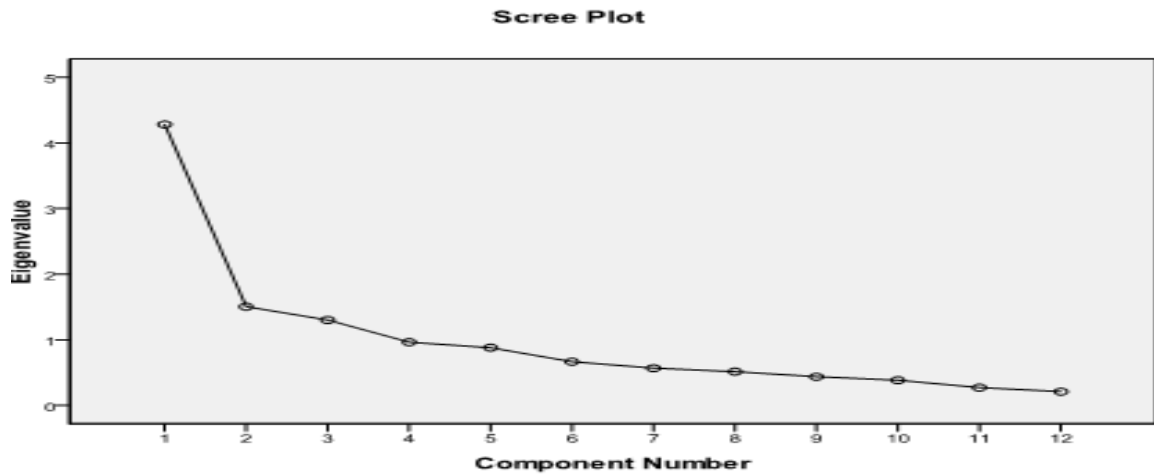
Table 4.124 Variance explained by Factor of SC Competitive Advantage

Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.28	35.677	35.677	3.06	25.492	25.492
2	1.51	12.547	48.224	2.59	21.585	47.077
3	1.3	10.853	59.077	1.44	12	59.077
4	0.97	8.042	67.119			
5	0.88	7.343	74.462			
6	0.67	5.566	80.028			
7	0.57	4.747	84.775			
8	0.52	4.302	89.077			
9	0.44	3.662	92.74			
10	0.39	3.217	95.956			
11	0.27	2.278	98.234			
12	0.21	1.766	100			

The resultant three factors of the total variables describe the total variance of 59.077 percent which is reasonably significant and which are combination of twelve, extracted from Supply Chain Competitive Advantage. The variables are grouped as three factors namely “Customisation”, “Product Characteristics” and “Introducer”. Four variables constitute the first factor which constitutes 25.492 percent whereas the other four variables are for the second factor which constitute 21.585 percent and the third factor has the other three variables which constitute 12.000 percent. Of the three factors the Customisation occupies the top place as this explains 25.492 percent of the total variance. This explains that the main SC competitive advantage of all the production firms is dependent on the customisation.

The Eigen values are compressed to such an extent where the value of minimum number of components is more than the value of the other components that are extracted. That is the Rotation Sums of Squared Loadings is more than the percentage of the sum of the other components percentage when kept together.

Figure 15 Eigen value



The screen plot gives us the clear picture of the flow of the Eigen value which moves a smooth path and it can be observed that the slopes at the initial stage i.e., in the first point is very steep but in the next stages the slope is very less. It can be observed that the Eigen value is inversely proportionate to the component number.

Table 4.125 Component Matrix^a

	Component		
	1	2	3
SCCOMA1	0.713		
SCCOMA3	0.784		
SCCOMA4	0.672		
SCCOMA5	0.677		
SCCOMA6	0.637		
SCCOMA7	0.573		
SCCOMA8	0.759		
SCCOMA9	0.711		
SCCOMA10			-0.514
SCCOMA11			
SCCOMA13		0.607	
SCCOMA14		0.633	0.537

Extraction Method: Principal Component Analysis.

a. 3 components extracted.

The component matrix is extracted by applying the Extraction method of Principal Component Analysis and following much number of iterations to find out the output.

But it can be observed that the output has the negative values. Hence the component analysis is not taken into consideration.

The Rotated component Matrix is extracted next.

Table 4.126 Rotated Component Matrix^a

	Component			Dimension	Reliability
	1	2	3		
alter prod offerings to meet clients needs SCCOMA4	0.873			Customisation	0.665
response is well based on the customer demands SCCOMA5	0.773				
provide customised products SCCOMA3	0.743				
delivery of customer order on time SCCOMA7	0.654				
offer products which are highly reliable SCCOMA10		0.752		Product Characteristics	0.686
deliver the kind of products needed SCCOMA6		0.651			
offer products which are highly durable SCCOMA11		0.648			
provide dependable delivery SCCOMA8		0.613			
offer competitive prices SCCOMA1		0.595			
variable to compare based on quality SCCOMA9		0.543			
first in the market to introduce new products SCCOMA14			0.837	Introducer	0.613
deliver the product to the market quickly SCCOMA13			0.782		

Similar to the previous analysis the rotated component matrix is extracted using the Principal Component Analysis as the extraction method and the Varimax with the Kaiser Normalisation rotation method and the rotation convergence takes place in 5 iterations. The output in this case also has the positive output and finding out the different statements which give the similar components.

The components are split into different categories as per their values. Then these are classified by taking their characteristics and properties.

The categories that are split are: Customisation, Product Characteristics and Introducer.

Customisation

- The manufacturers should look into the alterations which the customers need in order to satisfy the customers or clients.
- The response should be well in such a way that the customers' demands for the new features should be fulfilled.
- The products should be so customised that the customer will get all the features which they have thought of. By doing so the chance of losing the customers will be minimised.
- The customers will be very satisfied when the products they have ordered for will be delivered to them on time.

Product Characteristics

- The customers will be looking for the products on which they can rely on.
- The customers should be supplied with the products which they need.
- The customers will be looking for the products which are highly durable and lasts for a longer period.
- The customers should be provided with the dependable delivery.
- The products should be offered at the competitive prices so that the customers should not shift to the competitor for lower prices.
- The products should be in a position where they can vary with the competitor depending on the quality.

Introducer

- The company should be first in the market in introducing the new products.
- The company should deliver the products in the market quickly so that they can take the advantage of absorbing the majority of the market.

4.11 Hypotheses for the Study

SCM Practices on SC performance -

H₁: Environment practices positively influence on supplier performance

H₂: Supply chain strategies and systems positively influence on logistics performance

H₃: competitive advantage positively influence on delivery performance

SC Performance practices in metallic industry:

Product type-

H₄: there is a positive relationship between product type and frequent meetings with suppliers.

H₅: there is a positive relationship between product type and time required for supplying the product to the supplier

H₆: there is a positive relationship between product type and the way they get orders from customers.

H₇: there is a positive relationship between product type and a general business strategy of the firm

Process characteristics-

H₈: there is a positive relationship between process characteristics and frequency of meetings with suppliers

H₉: there is a positive relationship between process characteristics and with percentage of transportation cost incurred as a component of total cost.

H₁₀: there is a positive relationship between process characteristics and total distribution cost as a percentage of total cost.

H₁₁: there is a positive relationship between process characteristics and with the way they get the orders from the customers.

4.12 Results of the study

Table 4.127 Summary of Research Hypotheses

S. No	Statement	Result
H ₁	Environment practices positively influence on supplier performance	Rejected
H ₂	Supply chain strategies and systems positively influence on logistics performance	Rejected
H ₃	Competitive advantage positively influence on delivery performance	Accepted
H ₄	There is a positive relationship between product type and frequent meetings with suppliers	Rejected
H ₅	There is a positive relationship between product type and time required for supplying the product to the supplier	Accepted
H ₆	There is a positive relationship between product type and the way they get orders from customers.	Accepted
H ₇	There is a positive relationship between product type and a general business strategy of the firm.	Accepted
H ₈	There is a positive relationship between process characteristics and frequency of meetings with suppliers.	Accepted
H ₉	There is a positive relationship between process characteristics and with percentage of transportation cost incurred as a component of total cost	Accepted
H ₁₀	There is a positive relationship between process characteristics and total distribution cost as a percentage of total cost.	Accepted
H ₁₁	There is a positive relationship between process characteristics and with the way they get the orders from the customers	Accepted

CHAPTER V

DISCUSSION AND CONCLUSIONS

5.0 Introduction

The findings and recommendations are being presented in this chapter. This chapter includes the opinion of the different managers and entrepreneurs on the different topics related to the small and medium enterprises related to the metallic industries.

The present study has examined the operational performance of the SMEs of the three districts of Telangana- Hyderabad, Medak and Ranga Reddy confined to metallic industry. The techniques of frequency testing, Anova, Chi-Square test, Correlation and Regression and Factor Analysis were used.

5.1 Findings and recommendations

Part A: Demographic Factors

The demographic factors like age group with the frequent meetings with the suppliers show that there are many cases in which the values are in favour of the one where the meetings are conducted in the second case of 11 to 20 years with a frequency of 48 out of 131. But the Pearson Chi square values asymptotic value of the above data is 0.912 which is much more than the 0.05 percent (95 percent level of significance) and hence it is not significant and the alternative hypothesis is rejected.

The demographic factors of Product type when compared with the frequent meetings with the suppliers it can be observed that the companies with the product type of Make-to-Order and Make-to-Stock are conducting the meetings with the suppliers with in the first 1 to 2 months with the frequencies of 49 and 23. In this case the Pearson Chi-

square values asymptotic value of the above data is 0.091 which is higher than 0.05 percent (95 percent level of significance) and hence it is rejected.

The demographic factors of the product type with Time required for supplying the products to the suppliers it is observed that of the Make-to-Order product type 22 of the companies are supplying the product within a day. It can be observed that there are around 102 companies which supply the products to the suppliers within a week of the total 125 companies. The Pearson Chi-square value at the 5 percent level of significance is 23.055 and the asymptotic value is 0.027. This value is lower than 0.05 and the table value is 21.03 which is lower than 23.055. Hence 21.03 strengthens the alternative hypothesis statement and hence the alternative hypothesis is accepted.

The next one is the Product type with the way they get the orders from the customers and it is observed that of all the product types Make-to-Order has maximum number of companies which take the orders manually i.e., 31 of the total 46 manually ordered. From the different ways of getting orders it can be observed that most of the orders are being done using manual, internet and telephonic based methods. That is there are 111 companies which use one of these ways to get the orders (46+30+35). The Pearson Chi-square value with 12 degrees of freedom with the 5 percent level of significance is 21.232 which is greater than the table value. The asymptotic value is 0.047 lower than 0.05 which accepts the alternate hypothesis.

The next is the Product type with the General business strategy of the firm and it can be observed that most of the strategies which they follow are Primary cost with the Make-to-Order with 26 companies opting for it. On the whole there are 40 companies which are opting for Primary cost and second comes Primary emphasis with 34 of the companies opting for it and the next is Pure cost where there are 25 companies opting for it. So there are 99 companies opting for the first three ways of business strategies (25+40+34). There are other 30 companies which don't follow any specific strategy and may opt for the one which ever they think is feasible. The Pearson Chi-square value with the calculated value with 12 degrees of freedom with 5 percent level of significance is 25.868 which are higher than the table value. The asymptotic value is

0.011 which is lower than 0.05 and hence the Chi-Square value is more than the table value which accepts the alternative hypothesis.

The next is Process characteristics with Frequency of meetings with the Suppliers it is observed that in most of the cases the companies are opting for 1 to 2 months duration as they can take the opinion of the suppliers as early as possible and do the required changes as and when required. In this case it is observed that there are 93 companies which opt for 1 to 2 months duration which is 71 percent of the total 131 companies. The calculated Pearson value is 42.696 with 16 degrees of freedom with 5 percent level of significance which is more than the table value of 21.03. Further as the asymptotic value is 0.000 which is lower than 0.05 it accepts the alternative hypothesis.

The next is the Process Characteristics with Percentage of transportation cost incurred as a component of total cost where most of the companies 52 of the companies opt for 4 to 6 percent. The next comes the 7 to 9 percent of the 36 companies and 1 to 3 percent for 31 companies. So it can be concluded that the percentage of transportation cost incurred is 1 to 9 percent of the total cost. The calculated Pearson Chi-Square value for 16 degrees of freedom with 5 percent level of significance is 37.437 which are higher than the table value. The asymptotic value is 0.002 which is less than 0.05 and it accepts the alternative hypothesis.

The next is the Process Characteristics with Total distribution cost as a percentage of the total cost where most of the companies are opting for 10 to 20 percent, the next is 20 to 30 percent and the next one is 30 to 40 percent. The total number of companies opting for these three options is 110 which implies that most of the companies are within the distribution cost of 10 to 40 percent of the total cost. The calculated value of Pearson Chi-Square value for 16 degrees of freedom with 5 percent level of significance is 26.942 which are higher than the table value. The asymptotic value is 0.042 which is lower than 0.05 and it accepts the alternative hypothesis.

The next is the Process characteristics with the way they get the orders from the customers where it can be observed that the orders are placed manually with 34.1 percent of the total orders. Next is the orders being placed telephonically which is 25.9

percent and the third one is the one where the orders are placed through internet which is 22.2 percent. So it can be understood that most of the orders are placed either through manually, telephonically or through internet. The calculated value of Pearson Chi-Square value for 16 degrees of freedom with 5 percent level of significance is 27.430 which are higher than the table value. The asymptotic value is 0.037 which is lower than 0.05 and it accepts the alternative hypothesis.

The correlation coefficient between the different factors can be found where the SC environment has a value where it indicates that it is significant at 0.05 level for SCM practices.

The SC performance has positive relation among the SCM practices, SC environment and SC strategies and systems but it can be observed that their values are not up to the significant level and hence are neglected. On the other hand it can be observed that the support SCM has a unenthusiastic worth which indicates that it is inversely related or proportional to the SC performance.

The competitive advantage is negatively related or inversely proportionate with the supply chain management practices. It can be observed that the supply chain environment and supply chain management strategies and systems are positively related to competitive advantage their value are not up to the mark of the level of significance. The other values like support supply chain management is positively correlated and the supply chain performance are with greater correlated values.

Part B: Supply Chain Management Practices

The SCM practices, in the analysis of variance indicate that it doesn't have any impact or influence on the variables and hence they indicate that it is an independent variable.

The correlation coefficient between the different factors can be found where the SC environment has a value where it indicates that it is significant at 0.05 levels for SCM practices.

Part C: Supply Chain Environment

The SC environment, in the process of ANOVA shows that it doesn't have any impact on the variables and it indicates that these are the independent variables.

In the other case where the SC strategies and systems has negative relation with the SC environment which indicates that it is inversely proportional to it.

The SCM practices have a positive value with the SCM strategies but it can be observed that the value is not under the significant level and hence it is considered as an independent variable.

The factor analysis in SC environment is performed where the factors are further reduced to 10 looking at their Eigen values and reducing them to the required factors and the KMO and Bartlett's test is conducted which gives the Kaiser-Meyer-Olkin measure of sampling adequacy value above the 0.6 which is significant. In the Bartlett's test of sphericity where the Chi-square value is high and the variables are perfectly factored and the significance value is 0.000. The rotated component matrix is extracted and the components are given the values pertaining to the properties. The factors are then grouped up as three factors and they are Suppliers involvement in Planning and Problem Solving, Product Criteria and Technologies and Competitors.

Part D: Supply Chain Management Strategies and Systems

The SCM strategies and systems in the process of ANOVA indicate that it doesn't have impact or changes on the variables and they indicate that they are independent variables.

The support SCM has a positive relation with the SCM practices but the value is not up to the significant level and hence it is considered as a dependent variable.

In the other cases it can be observed that the support SCM has a negative relation with the SC environment and SC strategies and systems which indicates that they are inversely proportional to it.

The factor analysis in SC strategies and systems is performed where the factors are further reduced to 11 looking at their Eigen values and reducing them to the required factors. The KMO and Bartlett's test is conducted which gives the Kaiser-Meyer-Olkin measure of sampling adequacy which gives the value above the 0.6 which is significant. In the Bartlett's test of sphericity where the Chi-square value is high and the variables are perfectly factored and the significance value is 0.000. The rotated component matrix is extracted and the components are given the factors pertaining to the properties. The factors are then grouped up as three factors and they are Cost Reduction, External Source and Standardisation.

Part E: Supply Chain Performance and Competitive Advantage

The SC performance in the process of ANOVA has a high impact on the process character and they indicate that they have some changes on the variables which indicate that they are dependent variables.

The SC performance has the positive relation with the SC practices, SC environment and SCM strategies and systems but as the values are not up to the significant level they are considered as dependent variable.

The SC performance has a negative value with the support SCM which indicates that it is inversely proportional to it.

The factor analysis in the case of the SC performance is not required as the questions in the questionnaire are prepared in a fashion that they are already divided into different components like Delivery Performance, Supplier Performance and Logistics Performance.

The competitive advantage in the process of ANOVA indicate that they don't have any impact or changes on the variables they indicate they are independent variables.

The competitive advantage of the firm has a negative relation with the SCM practices which indicates that it is inversely proportional to the competitive advantage.

The competitive advantage of the firm has the positive values with SC environment, SCM strategies and systems but they are not up to the significant levels which indicate that they are independent variables.

At the later stage it can be observed that the support SC management has a value which is at the significant level and it is in correlation with 0.05 levels of significance.

The other one which is the SC performance is in higher correlation with the competitive advantage with the 0.01 level of significance which is at 99 percent.

The factor analysis in SC Competitive Advantage is performed where the factors are further reduced to 12 looking at their Eigen values and reducing them to the required factors. The KMO and Bartlett's test is conducted which gives the Kaiser-Meyer-Olkin measure of sampling adequacy which gives the value well above the 0.6 which is significant. In the Bartlett's test of sphericity the Chi-square value is high and the variables are perfectly factored and the significance value is 0.000. The rotated component matrix is extracted and the components are given the values pertaining to the properties. The factors are then grouped up as three components and they are Customisation, Product Characteristics and Introducer.

5.2 Research contributions

5.2.1 Theoretical Contribution

The study has been carried out considering the factors like supply chain environment, supply chain strategies, support supply chain (technologies) and competitive advantages and supply chain performances. The previous research related to supply chain variables confined to some particular characteristics are considered for the study and is compared to different metallic industries. The environment, strategies, technologies, competitive advantage and the overall performance of the SMEs is found out using the supply chain and is compared with the practical outcome.

5.2.2 Practical Contribution

The study on supply chain performance in small and medium industries in these topics like the supply chain environment, supply chain strategies and systems, technologies and the competitive advantage is performed. The outcome of the study gave the different factors which are directly or indirectly proportional to the performance of the SMEs. The theoretical and practical contributions are then compared to find the variation if any.

5.3 Limitations of the study

- The research is limited to only metallic industry.
- The research is confined to a limited area of three districts only.
- Study is done using cross sectional design

5.4 Scope for future research

The scope for future research can be carried out to other SMEs (industries) like plastic, fibre etc. This study can be carried out in other geographical locations of India. The longitudinal study can be carried out. The comparative study of different SMEs like metallic wooden and other industries can be made.

5.5 Conclusions

The underlying SC structure comprises of its evolved environment, innovative strategies, and inherent competitive advantages and leads to best performances of SMEs. The SC environment evolves with the best planning, problem solving, product quality and competitors. The SC strategies and systems will be successful with cost reduction, standardization, external sources for raw materials. The SC competitive

advantage is basically emergences with customization, product characteristics and the introducer.

The features authorising the SC performance of SMEs were identified with the extensive study taken up. The bottom line expectations of the end customer are exceeded by these features of SC performances. The identified features were; an increase of the speed in the right parts, which has high lead times and affect the product delivery were taken at most preference to avoid delays. An improvement in the quality in the right place i.e. the raw material is given importance for the quality which affects the final product. A strategy to reduce the costs in the right time depending on the market demand–supply scenario, competition and pitching the right market should be considered. All these features have improved the SC performances in the SMEs. To enhance these features fundamental tactics such as SC team dynamics, stability of requirements, strategic outsourcing, supplier management, information integrity, balanced score card, customer connectivity and continual improvement were given more importance.

The relationship between SC environment, SC strategies, SC competitive advantages and SC performance of SMEs was identified in this study by correlation. Correlation coefficient gives the relation between one and the other factors and is very quick to find out the factors which are in favour of or which are positively related and those which indicate whether they are negatively related to one another. In the study the SC practices and environment are positively related to each other. The SC performance has good correlation with the competitive advantage of the firm. The SC strategies and systems have less relation with the supply chain practices which should be improved to get good relationship with SC practices. The strategies and systems are reversely related with environment. The Support SC is inversely proportional to SC environment and strategies and systems. The SC performance has low values between SC practices, SC environment and SC strategies and systems and hence they must be improved. The Support SC practices and SC performance are inversely proportionate to each other. Hence it must be tried to minimise the value. The competitive advantage and the SC

practices are inversely related to one another; hence the negative value should be reduced to increase the competitive advantage of the firm.

The SC performance is the dependent variable and hence is the function of the erstwhile variables like SC practices, SCM strategies and systems, SC environment, Support SCM (technologies) and Competitive advantage which are the independent variables. The higher the R square value higher is the model fit.

This study has identified the impact of SC environment, SC strategies, SC competitive advantages on SC performance of SMEs in Metallic industry. Using the process of ANOVA it can be observed that the SC environment doesn't have any impact on the SC practices and they are independent variables, but when the Factor analysis is conducted the total of 14 factors is reduced into 10 and divided into common dimensions depending on their values and are further classified based on their properties like Planning and problem solving, Product criteria and Technologies and competitors. Similarly the variables in SC strategies and systems are split up into three factors like Cost reduction, External source and Standardisation. The variables in SC Competitive advantage are grouped into three different factors namely Customisation, Product characteristics and Introducer. The above mentioned factors have great impact on the SC Performance of SMEs in metallic industries with relation to Suppliers, Competition, Technologies, Cost, Standards, Customers, Products and Initiators.

To suggest a SCM model for SMEs performance, keeping in view the technological changes and Best performances of suppliers, logistics and delivery of SMEs. Still the orders are placed manually. Ease of the SMEs to cater to the IT requirements with changing demand is high. Quality of the products is given preference. From the study it can be concluded that Supply Chain Environment, Supply chain strategies and Competitive advantages have positive relation with supply chain performance.

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Appendix A: Questionnaire For SME Proprietors/Owners

PART-A: DEMOGRAPHIC FACTORS:

- a) Name of Respondent :
- b) Designation of Respondent : Manager/Proprietor/ Partner
- c) Experience (years) :
- d) E-mail Id of Respondent :
- e) Name of Company :
- f) Year of the establishment:
- g) Total investment :
- h) Revenue :
- i) Number of Employees : < 10 10-20 20-50 50-100
- j) Type of Industry:
- ☐Automobile ☐Fabrication ☐Textiles ☐Food ☐Services
- ☐Building Material ☐Electronics ☐Metal ☐Any other
- k) Product Characteristics:
- ☐ Make to Stock ☐Assemble to Order ☐Make to Order ☐Engineer to Order
- l) Process Characteristics:
- ☐ Job Order ☐ Batch ☐ Continuous ☐Others (Specify)
- m) Annual Sales of the Company (in Crores of Rupees):
- a) <10 b) 10-50 c) 50-100 d) 100-500 e) >500
- n) Coverage area of commercial operations : Within the State/ South India/ Entire Country/International

PART-B: SUPPLY CHAIN PRACTICES (In-General)

1. How frequently you have meetings with the supplier? (Specify number of meetings held in a month)
- a) 1-2 months b) 3-4 months c) 4-6 months d) 7-8 months e) More than 8 times

2. What is the time duration for supply the products which are ordered to your suppliers?

a) Within a day b) within 2-3 days c) Within a week d) 8-15 days e) More than 15 days

3. What is the time duration for supplying the products which are ordered by your customers?

a) Within a day b) within 2-3 days c) Within a week d) 8-15 days e) More than 15 days

4. How many suppliers do you manage in order to avoid the break in supply of materials under any circumstances?

a) 1-3 b) 4-6 c) 7-9 d) 10-12 e) More than 12

5. What is the total percentage of transportation cost you incur as a component of the total cost?

a) 1-3% b) 4-6% c) 7-9 % d) 10-12% e) more than 12 suppliers

6. What is your suppliers fill rate with respect to your purchase orders?

a) 75-100% b) 75-65 % c) 65-55% d) 55-45% e) less than 45%

7. What is your suppliers fill rate with respect to customer's orders

a) 75-100% b) 75-65 % c) 65-55% d) 55-45% e) less than 45%

8. What is the total distribution cost (including marketing, transportation, packaging and handling as a percent of total cost?

a) 10-20% b) 20-30 % c) 30-40% d) 40-50% e) More than 50%

9. What percent of defects you will observe in a single production order?

- a) 0-5% b) 5%-10% c) 10- 15% d) 15- 20% e) 20% and above

10. How do you get the orders from your customers?

- ☐Personal contact ☐Internet based ☐Telephonic ☐Postal ☐Any other

11. How much time you need to respond to your customer's queries?

- a) Instantaneously b) Within one hour c) 1-6 hours d) 6-12 hours e) More than 12 hours

12. Which material management method do you follow in your firm?

- a) ABC b) EOQ c) JIT d) Any other e) Not specific

13. What according to you is the general business strategy of your organisation?

- a) Pure cost b) Primary cost c) Primary emphasis d) Pure differentiation e) Not specific

14. Please Answer the Following Questions relating to SCM practices

1	2	3
Less	Moderate	More

i.	What is the level of ease with which you can design and modify new and existing products?	1	2	3
ii.	How much is the cost effectiveness of your logistics with the change of supplier?	1	2	3
iii.	How flexible are you to alter the labour manufacturing practices to meet the demand?	1	2	3
iv.	Ease of your SME to cater to the IT requirement with the changing demand in the market	1	2	3
v.	What is the increase in the market share since last year?	1	2	3

vi.	How much do you give preference to packaging?	1	2	3
vii.	How frequent you grade the performance of your SME ?	1	2	3
viii.	How do you grade the quality of your product	1	2	3

PART-C: SUPPLY CHAIN ENVIRONMENT

15. Directions: Please answer your response on five point scale

1	2	3	4	5
Strongly	Disagree	Neutral	Agree	Strongly

i.	Customers order different product combinations over the year	1	2	3	4	5
ii.	Customers' product preferences change over the year	1	2	3	4	5
iii.	The properties of materials from suppliers can vary greatly within the same batch	1	2	3	4	5
iv.	Competitors are from different industries	1	2	3	4	5
v.	Competitors often introduce new products unexpectedly	1	2	3	4	5
vi.	Technology is changing significantly in our industry	1	2	3	4	5
vii.	Technological changes provide opportunities for enhancing competitive advantage in our industry	1	2	3	4	5
viii.	Technological breakthrough results in many new product ideas in our industry	1	2	3	4	5
ix.	Improving technology generates new products frequently in our industry	1	2	3	4	5
x.	We consider quality as the main criterion in selecting suppliers	1	2	3	4	5
xi.	We regularly solve problems jointly with our suppliers	1	2	3	4	5
xii.	We have helped our suppliers to improve their product quality	1	2	3	4	5
xiii.	We have continuous improvement programme that include our key suppliers	1	2	3	4	5
xiv.	We include our key suppliers in our planning and goal-setting activities	1	2	3	4	5

PART-D: SUPPLY CHAIN MANAGEMENT STRATEGIES AND SYSTEMS:

16. Indicate the degree of emphasis your organization currently places on the attributes mentioned below as per the following scale. Kindly tick your response.

No Emphasis

Moderate Emphasis

Extreme Emphasis

|-----1-----|-----2-----|-----3-----|-----4-----|-----5-----|

	ATTRIBUTE	Response				
i.	Planning strategically	1	2	3	4	5
ii.	Information sharing with the suppliers	1	2	3	4	5
iii.	Information sharing with the customers	1	2	3	4	5
iv.	Outsourcing and sub-contracting	1	2	3	4	5
v.	Purchasing as a strategic activity	1	2	3	4	5
vi.	Extending supply chain beyond first tier suppliers	1	2	3	4	5
vii.	Manufacturing flexibility	1	2	3	4	5
viii.	Manufacturing cost reduction	1	2	3	4	5
ix.	Production standardisation	1	2	3	4	5
x.	Reduction of inventory	1	2	3	4	5
xi.	Increase of capacity utilisation	1	2	3	4	5
xii.	Delivery speed	1	2	3	4	5
xiii.	Third party logistics	1	2	3	4	5
xiv.	Customer service	1	2	3	4	5
xv.	Cycle time reduction	1	2	3	4	5
xvi.	E-commerce	1	2	3	4	5
xvii.	Process benchmarking	1	2	3	4	5
xviii.	Development of core competencies	1	2	3	4	5
xix.	Business process outsourcing	1	2	3	4	5
xx.	Employee training	1	2	3	4	5
xxi.	Team work	1	2	3	4	5

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

1	2	3
Custom-made	Standard package	Not in use

Response

i.	Material Requirements Planning (MRP)	1	2	3
ii.	Manufacturing Resources Planning (MRPII)	1	2	3
iii.	Enterprise Resource Planning (ERP)	1	2	3
iv.	Warehouse Management System (WMS)	1	2	3
v.	Customer Relationships Management (CRM)	1	2	3
vi.	Supplier Relationships Management (SRM)	1	2	3
vii.	Advanced Planning System (APS)	1	2	3
viii.	Just In Time (JIT)	1	2	3
ix.	Theory of Constraints (TOC)	1	2	3
x.	E-commerce	1	2	3
xi.	Decision support / expert system	1	2	3
xii.	Radio Frequency Identification (RFID)	1	2	3
xiii.	Electronic Data Interchange (EDI)	1	2	3
xiv.	Bar coding	1	2	3

18. How much did you actually benefit from using these systems?

Directions: Please mark your response on five point scale as mentioned below

1	2	3	4	5
Not at all	Little	Average	Greatly	A lot

	Attribute	Response				
i.	Better quality of information	1	2	3	4	5
ii.	Better quantity of information	1	2	3	4	5
iii.	Flexibility	1	2	3	4	5
iv.	Reduced lead-time in production	1	2	3	4	5
v.	Cost saving	1	2	3	4	5
vi.	Forecasting	1	2	3	4	5
vii.	Resource planning	1	2	3	4	5
viii.	Better operational efficiency	1	2	3	4	5

	Attribute	Response				
ix.	Reduced inventory level	1	2	3	4	5
x.	More accurate costing	1	2	3	4	5
xi.	Increased coordination between	1	2	3	4	5
xii.	Increased coordination with suppliers	1	2	3	4	5
xiii.	Increased coordination with customers	1	2	3	4	5
xiv.	Increased sales	1	2	3	4	5

PART-E: SUPPLY CHAIN PERFORMANCE AND COMPETITIVE ADVANTAGE:

19. Competitive Advantage of your firm

Directions: Please mark your response on five point scale

1	2	3	4	5
Strongly	Disagree	Neutral	Agree	Strongly

i.	We offer competitive price	1	2	3	4	5
ii.	We are able to offer price as low or lower than that of our competitors	1	2	3	4	5
iii.	We provide customised products	1	2	3	4	5
iv.	We alter our product offerings to meet client needs	1	2	3	4	5
v.	We respond well to customer demand for “new” features	1	2	3	4	5
vi.	We deliver the kind of products needed	1	2	3	4	5
vii.	We execute customer orders on time	1	2	3	4	5
viii.	We provide dependable delivery	1	2	3	4	5
ix.	We are able to compete based on quality	1	2	3	4	5
x.	We offer products highly reliable	1	2	3	4	5
xi.	We offer products highly durable	1	2	3	4	5
xii.	We offer high quality products to our customers	1	2	3	4	5
xiii.	We deliver products to the market quickly	1	2	3	4	5
xiv.	We are first in the market in introducing new products	1	2	3	4	5

xv.	We have our time-to-market lower than the industry average	1	2	3	4	5
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20. Supply Chain Performance

Please mark each question with the appropriate choice to describe your firm's competitive advantage in business

1	2	3	4	5
Strongly	Disagree	Neutral	Agree	Strongly

DELIVERY PERFORMANCE					
Our firm:					
-fills customer orders on time	1	2	3	4	5
-has short order-to-delivery cycle time	1	2	3	4	5
-fast customer response time	1	2	3	4	5
SUPPLIER PERFORMANCE					
Our Suppliers:					
-deliver materials/components/products to us on time	1	2	3	4	5
-provide dependable delivery to us	1	2	3	4	5
-provide high quality materials /components /products to us	1	2	3	4	5
LOGISTICS PERFORMANCE					
Our logistics providers are able to:					
-deliver to customers on time	1	2	3	4	5
-deliver to customers with a high degree of reliability	1	2	3	4	5
-adapt to sudden changes in delivery schedules	1	2	3	4	5
-adapt to sudden changes in delivery quantities	1	2	3	4	5
-provide services at competitive costs	1	2	3	4	5
-provide material tracking facility	1	2	3	4	5
-address all complaints within 24 hours	1	2	3	4	5

Appendix B: Publications & Presentations

1. Published a paper **“Supply Chain Management Competitive Advantage in Small and Medium Enterprises- A Study of Select Districts in Telangana State”** in International Journal of Business and Administration Research Review(IJBARR), Volume no-3, Issue no- 16, Oct-Dec 2016
2. Presented the paper entitled ***“SCM Practices in SME Sector- A Study on Manufacturing Company’s in India”*** in the ***“Third International Symposium and Workshop on Global Supply Chains”*** held on 6th and 7th January 2009 at PSG Institute of Management, Coimbatore.
3. Presented a paper titled ***“Impact of Organized Retail Supply Chain – on Unorganized retail Supply Chain- A Comparative Study”*** in International conference on ***“Retailing in the Globalised era- Perspectives & Challenges – ICOR-08”*** organized by School of Management Studies, University of Hyderabad on January 10-12, 2008.
4. Presented a paper in Fifth AIMS International Conference on ***“Effective Inventory Management in Supply Chain – Using Radio Frequency Identification (RFID) Technology”*** organized by ICFAI Business School on December 27-30, 2007.

**EVALUATION OF SUPPLY CHAIN PERFORMANCE WITH REFERENCE TO
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A synopsis submitted to the University of Hyderabad
in partial fulfilment for the award of the degree of

DOCTOR OF PHILOSOPHY

By

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1.0 Introduction to MSME sector in India

What is MSME?

- MSME stands for Micro, Small and Medium Enterprises
- MSMEs are classified in to two Classes:
 - a. Production (manufacturing) and
 - b. Servicing
- As per MSMED Act 2006 the micro, small and medium enterprises are classified depending upon their investment limits.

Table 1.1 Category of Enterprises

S.No	Type of Enterprise	Investment limit (in Lakhs)	
		Manufacturing	Service
1	Micro	Up to 25	Up to 10
2	Small	>25 and <500	>10 and <200
3	Medium	>500 and <1000	>200 and <500

Source: MSMED Act, 2006

The different terms of MSME are defined as follows

a. Registered Sector: Enterprises registered with District Industries Centres in the State/UTs., KVIC/ Khadi and Village Industries Board, Coir Board as on 31.03.2007 and factories under the coverage of section 2m(i) and 2m(ii) of the Factories Act 1948 used for Annual Survey of Industry having investment in plant and machinery up to Rs 10 crore were considered to belong to registered sector.

b. Unregistered Sector: All enterprises engaged in the activities of manufacturing or in providing/rendering of services, not registered permanently or not filed EM with State

Directorates of Industries/District Industries Centres on or before 31-3-2007 are called unregistered enterprises.

*c. **Small Scale Industrial Unit:*** An industrial undertaking in which the investment in fixed assets in plant & machinery, whether held on ownership terms, or on lease, or by hire purchase, does not exceed Rs.100 lakhs as on 31-03-2001 is to be treated as a Small Scale Industrial Unit.

*d. **Micro Small Medium Enterprises (MSME):*** MSME Sector consists of any enterprise, let it be proprietorship, Hindu undivided family, association of persons, co-operative society, partnership or undertaking or any other legal entity, known by any name, engaged in production of goods related any industry specified in the first schedule of Industries Development and Regulation Act, 1951 & other enterprises engaged in production and rendering services, subject to limiting factor of investment in plant and machinery and equipment respectively as mentioned above.

1.1 SMEs current scenario

MSMEs stand as back bone for the Indian economy

- SME's is a Unorganized sector
- SME's are contributing to the Indian economy
- They are generating employment
- They lack coordination and networking
- They have to concentrate on the quality of services and product
- No IT , the information sharing

1.2 Supply chain management deals with the movement of the material from the supplier to the end user with minimum expenses and within the stipulated time. Hence the SCM plays a

vital role for the growth of the SMEs. This study will be useful to find the different factors which are important to overcome the competition between the SMEs in the current day scenario. The factors considered for the study are the demographic factors, supply chain practices, supply chain environment, supply chain strategies, supply chain competitive advantage and supply chain performance.

2.0 Review of Literature

The review of literature is done to know the opinions of different writers written in their articles and to know the extent to which research is done. The different definitions of Supply chain management are

- SCM is the management of a network of unified business es concerned in the final rider of product and check packages required by end clients (Harland, 1996). SCM covers all movement and storage of raw materials, work-in-process inventory, and completed goods from point of source to point of use (supply chain).
- APICS (American Production and Inventory Control Society) describes SCM as the "design, planning, execution, control, and monitoring of supply chain actions with the aim of creating net value, structure a aggressive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and calculating presentation globally."

2.1 Demographic factors

Ozbayrak (2006) reveals that the evolving customer command have lead to the appearance of a innovative industry age everywhere and the alter takes part in a leading position, which in turn have raised lot of competencies to be possessed by the supply chain systems to live on and flourish under alter and uncertainty. The plan of this job is to replicate the presentation of a Make-To-Order (MTO) manufacturing system which functions as a wider supplier chain network following different strategies and recognize the best of those. The number of performance metrics such as Work-In-Process (WIP), tardiness,

responsiveness and mean flow time has been considered to provide further insight into the impact of these three localized control policies.

Ulusoy (2003) seeks to assess the SC and innovation management system in place in the manufacturing industries in Turkey. Research indicates the need for adopting product differentiation, particularly through intensive products as the dominant competitive strategy and also the need for improvement in various areas of supply chain, as well as innovation management. Evolving consumer demand has led to the emergence of a new business era, where change plays a dominant role. This new era has in turn brought to the fore a number of competences that supply chain systems need to possess so as to survive and prosper under conditions of change and uncertainty. The main aim of this work is to model the performance of a Make-To-Order (MTO) production environment that operates as part of a wider supply chain network under various control policies and identify the best performing ones. A simulation model has been created and used as a tool to help quantify the effects of three control policies on the MTO system.

Veenapan (2005) has brought out that the SMEs, in India, in quantifiable terms contribute almost 40% of the whole industrial production and 35% of exports. This segment even adds 7 percent of the GDP. The share of employment in this sector is 45% of the whole employment in the nation and 80% in the industrial sector as well as India the developed economies has the SME sector which has a strong presence. Other than the direct contribution to the economy, the SSI segment plays a major position in the qualitative development of the society. Given the rural drop back of the Indian economy, it is but logical that the small and micro enterprises are the best answer to the growing problem of unemployment. Since at times the SSI is a one man show, the entrepreneur has to face all problems alone. The issues that plague an SSI are difficult access to credit, exposure to vagaries of market and delayed payments.

Lakshminiwas (2008) brings out that the small scale sector contributes more than one-third of the total manufacturing output of the country, which point out the significance of this segment in the national economy. The small scale sector looked for self reliance and self-assistance in the recent proposals of the government to increase the investment range from Rs. 60 lakhs to Rs. 300 lakhs. The growth in the manufacturing segment is more than 35%. It has given job opportunities to more than 95 lakh persons and the rate of growth in employment is found to be over 5%, which is superior to that for the main segments of the economy.

2.2 Supply chain practices

Dawson et. al.(1989) noticed that the management of innovation and change in two different operating units of high technology and the transformation of work in changing from the production for stock to production to order' is analyzed, and the process of changing established patterns of work (as a brown-field operation), and designing new production arrangements from the outset (as a green-field operation) are contrasted and compared. The key features of JIT and TQM standards are identified and the extent to which they represent real innovations in production is assessed.

Julien et. al. (1994) have discussed the effect of globalization of the financial system on little selling. The problems of small exporting firms has been analyzed on a number of occasions and the researchers have recently seen to begun to pay closer attention to the effects of the opening up of national borders of regions on small businesses. The writers end that, evaluated to most large firms, small and medium-sized enterprises (SMEs) are usually less well-resourced to face the challenges posed in increasing the global trade.

Ogbuehi et. al.(1994) stated that the information about global marketing and global markets is frequently not known to the MSEs in U.S. enterprises (Edmunds and Khoury 1986), of which most of them are new in the global marketplace. The victorious

representation of the procedure improves the inevitability of export behaviour. Also important variables influence the path, price, and achievement of export growth need to be identified. The revise seeks to look at the insight of the entrepreneurs of SMEs comparative to certain export activities.

Gulledge (2002) states that possible advantages to large organisations are clear where as the profits to dealers (SMEs) are obviously less. This manuscript depicts the author's skill in functioning with Boeing to construct an aerospace centre in Asia, and speaks to the difficulties that SMEs look as they are solicited to take part in exchanges. The revision reveals the difference between active and designed use of business by big downstream companies, as evaluated to upstream SMEs. They (SMEs) are careful, barely in arranging to spend in e-Business if leading downstream clients force them. But, they do not value the full profits or advantages to be increased from acceptance of e-Business and take in an sketch out for a sensible business case that comprises of supplier thoughts, and finishes with a suggestion to make an replaced surroundings so as to make it comfortable for SMEs to take part.

Sommer (2003) opines that SMEs are no longer just coping with the supply chains, but are also excluded from participating in the lucrative supply-chain transactions generated by much larger manufacturers and suppliers. In most cases, SMEs were unable, or unwilling, to spend the necessary capital for transactional system implementations, or infrastructure upgrades. SMEs were at the mercy of their large customers who dictated the transactional standards and technology interface requirements.

Jüttner (2005) has derived an understanding of the business requirements from a consultant viewpoint. Depending on the rulings from an investigative quantitative survey and qualitative centre group discussions with supply chain managers, some issues of SCRM are

arrived at and arranged the length of the three theoretical stages of “philosophy”, “principles” and “processes”.

Li et. al., (2005) opine that rivalries during the 1990s strengthened and marketplaces turn out to be global, as a result did the tasks linked with attaining a produce and check to the correct position at the correct instance and at the least price.

Eng (2006) argues that the organisational norms are examined in terms of the arbitrating position of cross-functional harmonization for studying, the relationship among organisational standards and supply chain performance. SCM philosophy stresses that integration of supply chain connects a company with its clients, dealers and other channel partners. Cross-functional coordination in SCM involves multiple business functions that span departmental and firm boundaries, importance of information flow, interaction and integration in coordinating different functions to achieve SCM goals. Cross-functional coordination among interdependent functions reflects now a day’s rising difficulty of handling worldwide systems of supply chains and increasingly global SCM and hyper-competitive business environments.

The National Small Industries Corporation limited (2008) brings out that it entered into a system for providing the authorization of loans for small enterprises from mercantile banks. NSIC provided credit facilitation up to the value of Rs. 215.03 crore in the year 2006-07 and Rs 284.63 crore up to December 2007 during the year 2007-08 through tie up arrangement with banks. NSIC support the SMEs, by bringing and providing natural resources like steel, aluminium and copper, etc, besides the monetary support.

Sivalingam, et. al.(2008) state that the MSEs segment occupies a significant position in the total manufacturing sector in India. The importance of micro and small enterprises sector can be seen from the fact that it explains for 95 percent of industrialized units, 40 percentage of the value addition in manufacturing sector and 30 percent of exports. As on 31.3.2008,

there were about 5.5 lakhs registered micro and small enterprises spatially distributed through the length and breadth of Tamilnadu, with a total investment of Rs. 19,364 crores and have provided employment to more than 39.46 lakh persons. The study reveals an increasing pattern in the number of units, employment, investment and production.

Operational Definition: SC practices define or use the practices which are most generally used to get the required data from the entrepreneurs.

2.3 Supply Chain Environment (SCENVT)

Lefebvre and Lefebvre (1993) have investigated the association among aggressive placing and inventive attempts, as deliberate by R&D spending, procedure innovation, and the utilization of copy right information bases. For this purpose, they studied 455 small manufacturing firms. The output show that a association does survive and that firms which grasp a stronger aggressive place, in words of price, excellence, and variety, usually create better efforts with look upon to novelty. In reality, some dissimilarities have been established to survive in the strength of the range of original attempts among groups of firms having dissimilar understand aggressive strategies. These results support the statement that a relation exists between business policy and original efforts. This relation is toughest in those companies which have the most excellent aggressive positioning.

Sikka (1998) states that, the weak relations among the technology sources and the SMEs as technology consumers. Insufficient inspiration will be for the SMEs for improving their ability towards entering into contract out and ancillarisation of performance with the well-built firms in India. A particular mechanism needs to be shaped at the nationwide level to allow the SMEs to improve their technical competencies and capabilities for manufacturing superiority products to interrelate with well-built and bigger firms in new and budding fields. The editorial highlights the entrepreneurship capabilities which are being developed by SMEs

in India for creating excellence goods in addition to undertake ancillarisation and sub-contracting activities for the big firms in India.

Klassen et. al.(1999) has revealed that management of the natural environment and resources is becoming very important in the case of manufacturing industries. The managers also challenge the implementation of the changes to improve the competitiveness.

Boone T et. al., (2007) bring out that e-Business skills have permeated every supply chain process.

- a. Products are jointly planned on the Web.
- b. Procurement software and swaps have streamlined buying and abridged transaction costs.
- c. ERP systems have codified, standardized, and automated data storage and retrieval.
- d. Combined technology has improved supply chain visibility and has made the sharing of products and services well-organized
- e. Communication technologies have better client relationships and promotion strategies.

As e-Business techniques carry with them the assurance of inclined and well-organized supply chains, companies that apply them need to speak to several issues before the possibility of such technologies is completely understood.

Nikolaou and Zervas (2016) have examined the affects that are caused in decision making by the owners to include environmental concerns in their SCM because of the environmental information. This is done by keeping some theories which are mainly connected to the familiarity of manager regarding ecological results of SMEs. These also take in to account the limitations and chances faced by SMEs while applying convinced exercises

to green their SCM. The results indicate that information and ecology in order plays a significant and vital position in managers' choices to take on environmental exercises diagonally SCM, where as the financial disaster appears to unenthusiastically influence their purpose in implementing some environmental traditions.

Operational Definition: SC environment in this study is operationalised as the planning and problem solving to improve product quality and to compete with the competitor's to withstand and overcome the competition.

2.4 Supply chain management strategies and systems (SCST)

Ellram and Cooper (1990) opined on the strengths that have formed the SCM and company associations. The possible advantages and dangers of participation in SCM, company relationships are studied taking the viewpoints of both the transporter and the facility source into consideration. The study gave rise to the issues which comprise will power of whether a firm should use a SCM approach, the organization structure to utilize in the SCM and modelling SCM systems.

Tan (2001) has explained the traditional purchase and the logistics functions as the broader strategic approach and called them as the supply chain management.

William Keogh (1998) focuses on the importance and the viability of the high technology used in the small firms to the economies in creating the employment and they work as the base to the emerging industrial sector. The methodology applied was the interviewing the top officials who know the each and every step taken or done for the establishment of the firm for its good running. The different problems were identified which arouse in running the firms or formulating the strategies were taken into consideration. The key factors or the issues which the firms have considered important for their strategic growth

included innovation, internationalisation, man power and the collaboration. The organisational, local and national level policy implications were highlighted.

Peel (1999) focuses on the preparing, business aims and wealth financial planning in Japanese, German and local SMEs in the production sector and observe that the small firms take franchising as the growth strategy for both economic and idiosyncratic reasons but that the economic reasons tend to exist. The suggestions he put forth are that the franchising is worth the growing strategy for the small firms and it also creates some major problems for the growth oriented small businesses. And he further suggests that research is required into the experiences of the failed franchises and the small firms which encounter the problems for not taking the franchising as a growth strategy.

Carr and Pearson, (1999) use information composed from top intensity purchasing executives at the Director VP level representing a large cross industry sample of 739 firms. The data analysis is rigorous. Using data from 571 of the 739 firms, correlation analysis and exploratory factor analysis have been performed. This is the first attempt to examine a structural model of strategic purchasing and its influence on supplier evaluation systems, buyer-supplier relationships, and a firm's financial performance. The inferences of this study are that a planned acquiring purpose is significant for the achievement of the organization. Organizations that have a planned purchasing purpose are added probably to put into practice a dealer assessment system. This would provide the purchase department with an improved sympathetic of which dealers are performing healthy and which dealers are not performing well. Increased importance on tactical obtaining and dealer assessment systems are significant for firms looking for to set up long-standing associations with their dealers.

Ha (2001) opined that the problem of designing a contract to maximise the supplier's profit in a one-supplier-one-buyer relationship for a short-life-cycle product. Demand for the

finished product is stochastic and price-sensitive, and only its probability distribution is known when the supply contract is written. When the supplier has complete information on the marginal cost of the buyer, it is found that several simple contracts can induce the buyer to choose the order quantity that attains the single firm profit maximising solution, resulting in the maximum possible profit for the supplier. When the marginal cost of the buyer is private information, it shows that it is no longer possible to achieve the single firm solution. Under the optimal contract, the supplier employs a cut off level policy on the buyer's marginal cost to determine whether the buyer should be induced to sign the contract.

Yu et.al.(2001) are convinced that the advantages of supply chain joint ventures support on in order contribution can mitigate deficiencies associated with decentralised control and reduce the “bullwhip effect”. This study illustrates the benefits of supply chain partnerships based on information sharing. For a decentralised supply chain comprising a manufacturer and a retailer, it derives the members’ optimal inventory policies under different information sharing scenarios.

Beheshti (2004) states that technical progress and get through have produced remarkable raise in information accessibility and have completed successful utilization of current information technology a significant and aggressive business instrument. In support of this study, a study tool was expanded to measure the collision of information technology on SMEs in the USA. The outcomes give helpful insights into the utilization of information technology by production and service SMEs.

Gunasekaran et. al (2004) has brought out that the supply chains specially in the manufacturing industries are better managed by the managers. The supply chain management signifies the mainly higher state in the progress in growth of buying, procurement and other SC performances.

Hirst et. al. (2005) have found out the main reasons for the failure of the British manufacturing industry. Though there is lot of growth in the output, employment and productivity. Most worst is the balance of trade in manufactured goods and its effects on the balance of payments. The domestic firms have failed to regain market share in consumer goods lost in the extensive import penetration of the 1970s. Second, imported semi-manufactures account for a growing proportion of the British final output, leading to lower value added per unit of gross output. Third, the sharp decline of the UK capital goods sector during 1980s means that new equipment required by the recent surge in manufacturing investment cannot be met from domestic sources. These are the macro indicators responsible for the failure of the micro-economic factors i.e., not being flexible in meeting the new methods of manufacturing which have been the key to industrial success in the main competitor nations.

Liker et. al., (2006) reveal that more businesses are counting on their suppliers to lower costs, improve quality, and develop innovations faster than their competitors' suppliers can. To this end, many experts agree that American firms, like their Japanese rivals, should build supplier keiretsu: networks of vendors that learn, improve, and prosper in synchronization with their parent companies. During the past ten years, automakers Toyota and Honda have entered into successful partnerships with some of the same suppliers that are at odds with the Big Three and created effective keiretsu across Canada, the United States, and Mexico.

Ferrin et. al (2006) state that organisational buying models focus on the utilization of total cost of ownership (TCO) to cost to buy chances. The study presents proof that innovative firms in fact use such models. This investigative study offers, for the first time, information on the environment, and utilization of the price drivers on which firms support their TCO computations. The study proposes a general model of TCO is not suitable. The

core cost drivers would be present in all TCO computations. Purchasing managers could use different, specific cost drivers from the auxiliary set to tailor the TCO computation for a particular purchase situation.

Zhou et. al. (2008) investigated the integration of information sharing and supply chain practice in supply chain management. Data from 125 North American manufacturing firms was collected. The results show that

- a. Effective information sharing significantly enhances effective supply chain practice;
- b. Supply chain dynamism has significant positive influence on effective information sharing, as well as effective supply chain practice. Supply chain dynamism has more influence on information sharing than supply chain practice;
- c. Effective supply chain practice becomes more important, when the level of information sharing increases.

The findings show that both effective information sharing and effective supply chain practice are critical in achieving a good supply chain performance.

Gunasekaran et. al. (2009) focus on the build-to-order supply chain as the system has received a great deal of attention in recent years because of the success of high-tech companies such as Dell, BMW, Compaq and Gateway. Chains that explicitly address the problems of BTO-SCM with modelling are rather limited in number. Research on the modelling and analysis of global outsourcing includes optimisation between product variants and the cost of production, the point of differentiation along the production/assembly process, the selection of suppliers, logistics costs, and customer relationship management. Operations research models have been used to solve supply chain management problems.

Seuring et. al.,(2010) noticed that issue mirrors the increasing relevance of this topic for both practitioners in companies, and academicians. The purpose of this special issue is to serve as a catalyst to this important topic. Environmental and social problems and challenges do not stop at the gates of single company, but have to be considered along the supply chains as the entities across which related material and information flows are organised. It also covers supply chain strength of regions and regional activities as well as actions taken by small- and medium-sized manufacturing and public organisations. It also takes a look at performance indicators and closed-loop supply chain aspects. Amongst these topics, four papers incorporate social aspects, which have been relatively and significantly less researched than environmental issues.

Khang (2010) noticed that Supply chain management (SCM) is one of the tools used by organisations to improve their business performance. This aims to investigate the relationships between supply chain practices and an organisation's performance. Six supply chain practices are chosen in this research: customer orientation, knowledge sharing, Information Technology (IT) adoption, partnership, leadership and training. Regression analysis was applied to test the model in this research. The findings show that leadership, IT adoption, customer orientation and training have a significant influence on the performance of the service organisations.

Khan et. al., (2010) study the entire SC of SMEs of Pakistan and how SMEs adopt their way of understanding business from traditional practice to e-business. Implementation of supply chain management will lower costs and increase efficiency and thus lead to the significant gain for SMEs. The SCM implemented in the SMEs of Pakistan in the form of Cloud computing Model developed and maintain by government Ministries and development bodies.

Su et. al., (2010) have evaluated the impact of adoption of ERP systems on firm competences in supply chain management. The useful effects of ERP on the SC do guide to improved overall SCM capability. The ERP enhances the firm's capabilities of SCM in functioning process addition, customer and association integration and setting up and control process integration. The SCM has emerged as a new means in providing goods and services to the end customer at the lowest cost and high service level. The management of material and data flows both ways in the supply chain management.

Phonsuwan and Kachitvichyanukul (2010) focuses on the relevance of the discrete-event imitation modelling of the active supply chain and the analysis was done on One Tambon One Product (OTOP) plan and the local rules of Thailand. Arena simulation models by means of the rapid-prototype theoretical models are recently offered under expansion and as instruments for preparation and sustain decision-making for micro and small business of rural enterprise management rules depending on the information shaped by Supply Chain Simulation (SCS) experiments. The complex cluster models believed is consisted of six-stage: dealers, manufacturers, warehouses, wholesalers, retailers and the consumer and they evaluated SC production and the effect of lead time reduction.

Operational definition: Supply chain strategies in this study is operationalised as the standardization and cost reduction using external sources.

2.5 Supply chain competitive advantage of the firm (SCCOMA)

Bortoluzzi et.al., (2018) aims to relate different major researches and articles in both national and global articles related to different SME groups to combine different opinions on the benefits and positive outcomes by being the member of the group or network. A systematic procedure called Bibliographic Portfolio (PB) was implied for the said purpose. The study of expressive and bibliographic character concluded that the benefits revealed by

researchers in both similar and balancing advantages in the professional features, combined growth of new creations, price drop, reach to innovative markets, reach to trained labour and critical for the betterment of the SMEs aggressiveness.

Lee et. al (2016) points out that the knowledge management, technology innovation and competitive advantage are having positive relationship between one another. They applied the statistical tools which have provided an important method and could prove that the Knowledge Management has a direct positive relation with Technology Innovation and Competitive Advantage. The Technology Innovation plays the role of the mediator in providing a positive and important or vital role between Knowledge Management and Competitive Advantage.

Christopher (1996) says that they have recently received the questions on the strength of the conventional principles on which the selling idea is based and have recommended that the selling has failed to bring its long assured prize in the form of maintainable aggressive advantage. It still proposes that they want for selling today is as tough as ever. The preparation of selling must change its focal point to go further than a thin anxiety with creation value and in its place to highlight the formation of client worth as the overruling purpose of selling activity.

Woodruff (1997) opines that “driven by more demanding customers, global competition, and slow growth economies and industries, the organizations look for new ways to achieve and retain a competitive advantage”. The major source which is observed for competitive advantage will likely come from the external orientation which leads to clients as pointed by the various names for associations to struggle on better client worth release.

Carson et. al., (1998) have considered the specific SME (small and medium sized enterprises) and reviewed to a extent that the creative writing exactness viewpoints on value preparation in SMEs. The authors have discussed a few experiential judgments collect from

in detail meetings with 40 SME entrepreneur-managers in Northern Ireland. The judgments give confirmation of preceding studies and get bigger the sympathetic of the cost viewpoint for SMEs. This document inspects the genuine inferences of costing in SMEs and demonstrates how costing fits with selling in SMEs.

Lagacé et. al., (2003) highlight that the ability of small developed firms to keep up dependable and uninterruptedly improving production processes emerges to be a main condition for making certain long-term maintainability and the governments have been very vigorous in helping them undertake this challenge, in exacting by following the implementation of world-class production practices. It even offers a way to relate manufacturing development programmes and customs with the aggressive pointing required by SMEs.

Buffa (2006) concludes that the US position is eroding with wage cost changes taken into consideration. The competitive quality of American products is not being maintained. There are many cases which indicate the declining of American manufacturing competitiveness- particularly in comparison to that of the Japanese.

Kondaiah & Rao (2007) opine the Indian MSMEs comprise an significant section of the country's financial system. They argue that the procedure of financial liberalisation and market place improvements has unlocked up several potentials of admission to well-built markets and tougher and deeper marketplaces of SMEs by means of global ventures. They conclude that the sustainable growth of SMEs depends on formulating the right policies and taking the right initiatives that are need- based and making their presence felt in the global value chains, which implies that the SMEs should continue to strengthen their competitive character by creating opportunities afresh for sustained growth in the changing business environment.

Subhan et. al., (2013) have admitted the fact that encouraging entrepreneurship is a key to improve competitiveness, boost the trade volume, fostering economic activities and generating the employment opportunities. By taking the economic and social variables into study it is observed that the results are in favour of the positive correlation between the process innovation and SMEs growth and hence SMEs growth rate has positive linkage with economic development.

Operational definition: Supply chain competitive advantage in this study is operationalised as to customize the product characteristics to introduce & compete in the market.

2.6 Supply chain performance of the firm (SCPERF)

Zaefarian et. al., (2017) explain that business association because of resource-dependence problems are some of the vital topics to study in management and strategy investigation. Such business associations with clients and dealers are essential to the achievement of combined improvement activities and finally firm performance. End of dealing affairs as a professional movement with planned significance, and the fundamental managerial means allowing such association ending, have not been at the centre of study in this region. Hence the study highlights on relations concluding ability and the collision on product improvement success and the whole firm presentation

Awheda et.al., (2016) opines that competitive advantages or climates require the supply chain officials requires to take rapid actions on the issues related to competition, stock shortages, imprecise demand processing, buyer complaints, unreliable delivery activities etc. and the producers have the problems from the customers like item customization , order responsiveness, quality improvement, etc. They also face the problems pertaining to lowering the manufacturing cost, reduce the cycle times, decrease the inventory ranges to attain profitability.

Taschner (2016) explains that logistics performance as the key success factors for SMEs. The high logistical performance level can not only reduce costs like lowering inventory levels, but also contributes to customer satisfaction and acts as a competitive differentiator (Keebler and Plank, 2009). It too has an important impact on the company's on the whole flexibility and its ability to adapt to customer requirements and customization demands. This is further increased by joining forces with other partners through the value chain. More and more companies no longer compete with one another but act as integrated supply chains (Lambert et al., 1998). From one side the SMEs are a part of comprehensive supply chains that are dominated by bigger partners and on the other side they are faced with reduced entrance barriers and entrance of new competitors in the local markets which had a limited but stable base for business. This parallel development forces SMEs to compete globally and take the logistics performance as key success factors for them which hence deserve the high attention.

Li et. al., (1999) brings out that models have been established for optimising supply chain (SC) costs. It is focused on improving SC efficiency and effectiveness under four criteria: profit, lead-time performance, delivery promptness and waste elimination. The model established in the paper analyses the SC performance at two levels, the chain level and the operations level. At the Chain level, objectives associated with the criteria are set for each SC stage so that the SC performance can meet the customer service target and the best SCM strategy is selected. At the operation level, manufacturing and logistics activities are optimised under the given targets.

Gunasekaran (2004) has posited that the organisational performance measurement and metrics has major role in locating purposes, assess presentation and influential prospect routes of achievement.

Garg et. al., (2004) develops a method that facilitates variability reduction and business process synchronization for supply chains in a cost effective way. The method founded is developed on an analogy between the mechanical design tolerance and the supply chain lead time reduction. Initially the motivating sample is presented to describe the analogy. Later the process capability indices are used and a new index of delivery performance called delivery sharpness is used with the classical performance index called delivery probability which indicates the accuracy and the precision with which the products are delivered to the customers.

Vaart (2007) has called for focusing further research on supply chain integration within individual buyer-supplier relationships and examining the impact of this relationship on organisational performance. The supply chain management literature has the role of integration as a key factor in achieving the improvements. Many authors argue that integrative practices and a high level of integration have a positive impact on corporate and supply chain performance.

Kim (2007) has categorised the organisation types for supply chain management according to the formalisation and centralisation level of an independent department responsible for supply chain management (SCM) activities, and hierarchical relationship in organisational position and operational responsibility between the SCM department and other existing functional departments. He also identifies organisational characteristics, which have a significant influence on SCM performance, by investigating the difference in performance across the proposed organisation types.

Zhou et. al., (2007) highlight that the effectual information contribution considerably improves successful SC practices and the SC dynamism has important positive authority on effective information sharing as well as the effective SC practices. The SC dynamism

influences mostly on the information sharing rather than SC practice. The effectual SC practice gets prioritised while the intensity of data sharing increases. Hence it can be observed that the effective information sharing and effective SC practice are important in achieving the good SC performance.

Julien (2008) argues that SMEs' narrow ability to gain information and make use of sources is a key factor that explains their short level of participation and performance in the export marketplaces. A little volume of practical research has been taken on this topic. The paper presents the consequences of an inquiry into the impact of information look for and competencies on the aggressive strategy and export presentation of 346 exporting manufacturing SMEs. The research model assumes that the presentation of these SMEs is determined by their general aggressive plan, which, in turn is described by the aptitude of the business to obtain and manage overseas market information. The results of an analysis confirmed three of the four hypotheses.

Leng et. al., (2012) have analysed the impact of three dissimilar kinds of flows like information flow, material flow and the financial flow on the performance of the supply chain management and found that the information flow and the material flow don't have much impact on the performance of the supply chain management while the financial flow has the significant impact on the performance of the supply chain management.

Operational definition: SC performance in this revise is operationalised as the supplier and logistic performance which leads to the delivery performance.

2.7 Research gap

After going through the literature review on SMEs it is found that there is not much research done or carried out on metallic industries in the area of supply chain. Hence there is a gap exist in studying the environment, strategies and systems, supply chain performance

and competitive advantage. In this study an attempt has been made to provide insights for the SME manufacturers to overcome the supply chain issues.

2.8 Research questions

1. How do SCM practices influence on Supply chain performance in metallic industry?
2. How does the product type and process characteristics influence supply chain performance?

2.9 Research objectives:

Depending on review of literature the broad objectives outlined of the proposed study is to assess the SCMs in SMEs in the Telangana state. Specific aims of the study are

1. To explore the variables of SCM Practices on SC Performance.
2. To examine the impact of SCM Practices (environment, strategies and comparative advantage) on SC performance (supplier performance, logistics performance and delivery performance).
3. To analyze SC performance in metallic industries with respect to product type and process type.

2.10 Research Hypotheses

SCM Practices on SC performance -

H₁: Environment practices positively influence on supplier performance

H₂: Supply chain strategies and systems positively influence on logistics performance

H₃: competitive advantage positively influence on delivery performance

SC Performance practices in metallic industry:

Product type-

H₄: there is a positive relationship between product type and frequent meetings with suppliers.

H₅: there is a positive relationship between product type and time required for supplying the product to the supplier

H₆: there is a positive relationship between product type and the way they get orders from customers.

H₇: there is a positive relationship between product type and a general business strategy of the firm

Process characteristics-

H₈: there is a positive relationship between process characteristics and frequency of meetings with suppliers

H₉: there is a positive relationship between process characteristics and with percentage of transportation cost incurred as a component of total cost.

H₁₀: there is a positive relationship between process characteristics and total distribution cost as a percentage of total cost.

H₁₁: there is a positive relationship between process characteristics and with the way they get the orders from the customers

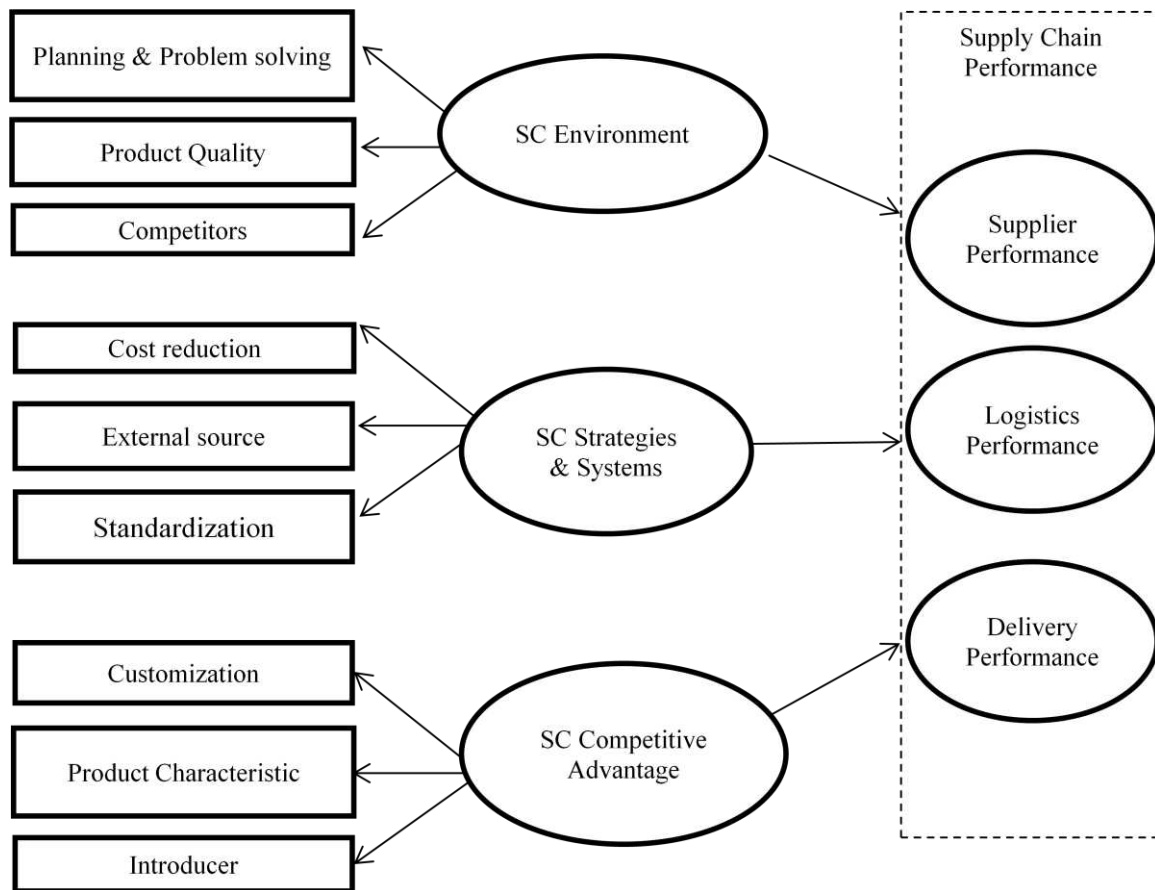


Figure 1 Proposed SME-SCM Model

3.0 Methodology

3.1 Research Design: This is for the purpose to analyse what type of enterprise they have and the changes if any required to improve their returns of the firm with regard to metallic industry. The features include the demographic factors like age of the company, type of industry, type of products they look into, the manufacturing processes they deal with, like casting, moulding, forging, machining (like lathe, drilling, etc), the type of product include make-to-order, make-to-stock, assemble-to-stock, engineer-to-stock, etc, the processes they include job order, batch order, etc.

Similarly there are the features for SC Environment, Strategies and systems, Competitive advantage of the firm and the SC Performance etc. These also plans to test the relationship

among SC management related variables plus the SC and the managerial performance of the built-up industries which indicates that the given research is descriptive in nature.

3.2. Justification for selecting the state of Telangana and metallic industry

The manufacturing segment in the metallic sector is playing a vital position in the competitive environment and the large industries are not in a position to directly face the competition in reducing the prices of the products to the maximum possible extent. In order to reduce the prices of the products as per the prices quoted in the tenders by manufacturing the products in their own company, they are outsourcing the ancillary parts and the products which are not that important. The companies are thus concentrating on the core products which are the primary products of the firms and the firms are known by the quality and the effectiveness of that product.

3.3 Nature and source of the data is based on the main and the minor information. The main data is connected to the variables of the SC along with the organizational performance. The profiles of manufacturing companies in the Telangana state have been collected by using the survey method considering the structured questionnaire to the top management and the owners of the firm's located in the districts of Hyderabad, Medak and Ranga Reddy Districts.

3.4 Sampling is done based on the purposive sampling technique. The manufacturing company's selected are from metallic industries of which the population of the moulding industries is 29,367, forging industries is 46,702 and casting industries is 51,189. The total population of the metallic industries is around 127,258 industries. The sample size taken is above 0.3 percent which is nearly 500. Visiting 500 numbers of industries or companies the data that could be collected was around 0.1 percent of the population which is around 128 companies but it was a bit more than that which is owners of companies. The major

drawback from the industry is that none of them are willing to disclose the information about the industry.

3.5 Research Methodology: The proposed study is descriptive and is done using survey method. The data collection is dependent on both main and secondary sources. Primary information needed for the research will be taken from entrepreneurs, industrialists, various functional heads and customers by administering structured questionnaire and also by interviewing the officials of industries departments.

The primary data is collected from the top management of the enterprise who has a clear knowledge about the business. The first part of the questionnaire consists of the questions related to the demographic factors and the second part of the questionnaire has the questions related to different functional areas.

The secondary data will be collected from the records of Laghu- Udyog department, National informatics centre, MSME website, Supply Chain Management and industrial journals, reports of commissions appointed by state and central governments, Andhra Pradesh State Finance Corporation (APSFC), Small Industries Development Bank of India (SIDBI), Andhra Pradesh Industrial Infrastructure Corporation (APIIC), Confederation of Indian Industries (CII), National institute for Micro, Small and Medium Enterprises (Ni-MSME), journals, newspapers, magazines, annual reports etc.

3.6 To collect the data the personal interview method is used. The questionnaire has the questions related to both qualitative and quantitative aspects whereas most of the weight age is given to quantitative aspects. The questionnaire is made depending upon the requirement. In most of the cases the Likert's scale is used where as the other method where the questions are based on the objectives pertaining to the questions are also involved.

3.7 Research instrument: A structured questionnaire is designed which is used to collect the primary data. The questionnaire is personally administered to the top management of the manufacturing metallic firms in the districts of Hyderabad, Medak and Ranga Reddy in the state of Telangana. The questionnaire is divided into six different parts like Demographic factors, SC practices, SC Environment, SCM Strategies and Systems, Competitive advantage and SC Performance. From these the important factors related to the one which make an important impact are considered.

Part-A consists of demographic factors of the respondents.

Part-B consists of supply chain practices, divided into two parts; (i) supply chain practices in general having 13 items where in the respondent has to choose from the given choices. (ii) supply chain practices having 8 items on three point scale (1-Less, 2-Moderate and 3-More).

Part-C consists of 14 items on five point scale (1-5 strongly disagree to strongly agree), relating supply chain environment.

Part-D consists of 21 substances on five point scale (1&2 - no emphasis, 3 - moderate emphasis, 4&5 - extreme emphasis), 14 items on support supply chain management i.e, technology using three point scale (1-custom-made, 2- standard package and 3 - not in use).

Part – E consists of 15 items on five point scale (1-5 strongly disagree to strongly agree), relating supply chain competitive advantage.

Part – F consists of 13 items on five point scale (1-5 strongly disagree to strongly agree), relating supply chain performance.

4.0 Data Analysis: The interpretation of the data collected from the SME industrialists in different areas of the regions is done using the frequency analysis and by looking at the outcome of the data. The questionnaire is prepared by dividing the different activities of the

industries in to different sections. The industries are divided into five broad sections. The broad sections contain the topics like:

- The Demographic factors
- SC Practices
- SC Environment
- SC Strategies and Systems
- Systems to Support SCM and Actual benefits got from using these systems
- SC Performance and Competitive Advantage.

The data collected is used to check the effectiveness of the factors for the SMEs. The different methods used to check the factors are

1. Descriptive analysis for all the factors
2. Relationship between different factors and finding the Chi-square value to know its acceptance looking at the tabular value and the calculated value. Few of the relationships can be observed
 - a. Product Type with Frequent meetings with the Suppliers

Table 4.1 Product Type with Frequent meetings with the suppliers

Product Type	1-2 months	3-4 months	5-6 months	7-8 months	More than 8 months	Total
MTO	49(75.4)	6(9.2)	6(9.2)	0(0.0)	4(6.2)	65(100.0)
ATO	6(60.0)	1(10.0)	2(20.0)	1(10.0)	0(0.0)	10(100.0)
MTS	23(60.5)	7(18.4)	6(15.8)	0(0.0)	2(5.3)	38(100.0)
ETO	15(83.3)	2(11.1)	1(5.6)	0(0.0)	0(0.0)	18(100.0)
Total	93(71.0)	16(12.2)	15(11.5)	1(0.8)	6(4.6)	131(100)

Source: Survey Data

Table 4.2 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.911 ^a	12	0.091
Likelihood Ratio	13.069	12	0.364
Linear-by-Linear Association	0.086	1	0.77
N of Valid Cases	131		

a. 14 cells (70.0%) have expected count less than 5. The minimum expected count is .08.

The Chi-Square tests conducted for these data has the Pearson Chi-Square value of 18.911 with the degrees of freedom as 12 $((5-1) \times (4-1) = 4 \times 3)$ and the asymptotic value for two sides as 0.091 which is higher than the value of 95 percentage of significance. So this indicates that the alternate hypothesis is rejected. The Likelihood ratio value is 13.069 with the degrees of freedom as 12 and the asymptotic significant value for two sides as 0.364. The Linear by Linear association value is 0.086 with the degrees of freedom as 1 and the asymptotic significance for the 2 sided cases as 0.770 and the total number of valid cases being 131.

3. Finding the correlation coefficient which gives the relation between one and the other variables. It is easy to find the relation between two factors whether in favour of or against the factors.

Table 4.3 Correlation Coefficient between the Different Factors

	SCM practices	SC environment	SCM strategies and systems	Support SCM	SC performance	Competitive advantage of your firm
SCM practices	1					
SC environment	.195*	1				
SCM strategies and systems	0.107	-0.086	1			
Support SCM	0.131	-0.07	-0.077	1		
SC performance	0.064	0.081	0.15	-0.119	1	
Competitive advantage of your firm	-0.108	0.05	0.139	.198*	.584**	1

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

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

The positive values are in proportionate to one another and the negative values are inversely proportionate to one another.

Inference 1: If the firm wants to make the practices better it has to make sure that there is a proper organisational environment. On the contrary there should be a congenial atmosphere in the organisation to make the supply chain flow better.

Inference 2: If the firm wants to increase the supply chain performance in the market then it has to increase its competitive advantage. The competitive advantage can be improved only when all the key factors work for a common goal.

4. Regression analysis: It is a statistical tool used for estimating the association between different variables. In our analysis the self governing bodies are called independent variables and the one which has the focus and which is not self governing is called dependent variable. In our case the Supply chain performance is taken as the dependent variable and all others are taken as independent variables.

In this case the SC Performances is a dependent variable and all others like SC Practices, SC Strategies and Systems, SC Environment, Support SCM and Competitive Advantage are the independent variables. Hence the SC performance is a function of all the independent variables.

SC performance = f(Competitive advantage, SC practices, SCM strategies and systems, support SCM, SC environment)

Table 4.4 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.577 ^a	0.333	0.302	8.666	0.333	10.723	6	129	0

a. Predictors: (Constant), CA, SCP, SCMP, SSP, ENVT, SCST

From the above table it can be observed that the predictors i.e., the independent factors with the constant are taken to calculate the R value which is 0.577. The R square value is taken

because in most of the cases the R value may be negative. So in order to get the right values the R square value of 0.333 is taken and the adjusted R square value of 0.302 is taken and the Standard error of the estimate is calculated.

Inferences: The dependent variable Supply chain performance of the firm be able to be determined by the independent variables mentioned above keeping in view to the R square value in the table 5.2. It may be noted that higher is the R square value higher is the model fit. Further from the “adjusted R square” value it is understood that the sample is highly representing the population (close value to R square). Hence it can be said that the model is valid.

Table 4.5 ANOVA for the model ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4832.33	6	805.389	10.723	.000 ^b
	Residual	9688.61	129	75.106		
	Total	14520.9	135			

a. Dependent Variable: SCPERF

Predictors: (Constant), Competitive Advantage (CA), SCM practices (SCP), Support Supply Chain Management (SSP), Supply Chain Environment (ENVT), Supply Chain Management Strategies And Systems (SCST)

The above table calculates the ANOVA for the model where the predictors like the SCM practices, SC Environment, SC Strategies and Systems, Support SC Management, Competitive Advantage are taken as independent factors and the SC Performance of the Firm as Dependent variable. The Regression and the Residual are calculated with the Sum of Squares for Regressions as 4832.331 and the degrees of freedom as 6. The mean square value

for regression is 805.389 and the F value is 10.723. The significant value is 0.000 which is acceptable with the 99 percent level.

The Supply chain Performance is taken as the dependent variable and the other factors as the independent variables and when the un-standardized and the standardized coefficients are calculated for the independent variables it can be observed that the B values of all the factors other than the Competitive Advantage are either negative or very low and the Competitive Advantage value is 0.632. Similarly is the case with standardized coefficient the Beta value is reasonable for Competitive Advantage which is 0.528 higher of all the values. Now taking the value of significance into consideration of all the values the value of significance is at Competitive Advantage which is 0.000 which is less than 0.01 which are at the level of 99 percent of significance. Hence the dependent factor Supply Chain Performance is dependent on the independent factor like Competitive Advantage.

Inferences: The dependent variable Supply Chain Performance of the firm can be determined by the independent variables mentioned above keeping in view to the R square value in the table 1. It may be noted that higher is the R square value higher is the model fit. Further from the “adjusted R square” value it is understood that the sample is highly representing the population (close value to R square). Hence it can be said that the model is valid.

5 Factor analysis

1. Factor analysis of Supply Chain Environment

The supply chain environment gives us the different factors that deal with the surroundings and the markets which have the impact on the growth of the company. The Factor analysis is functional to reduce the changeable and things to least of the convenient variables. Factor analysis is performed with the two statistical tests like Kaiser-Meyer-Olkin test and Bartlett's test. The KMO test of

sampling adequacy prioritises the balanced variances of the variables which are caused due to the emerging factors. KMO value plays an important role and if the value exceeds 0.50 it indicates that Factor analysis perfectly fits for the data set.

Table 4.6 KMO Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.614
Bartlett's Test of Sphericity	Approx. Chi-Square	297.432
	Df	91
	Sig.	0

The Kaiser-Meyer-Olkin value for the calculation of the sampling adequacy of the SC environment is 0.614 which is satisfactory and acceptable.

The Bartlett's test of sphericity gives the approximate Chi-Square value of 297.432 which is high and indicates that the variables have been perfectly issued

Factors having Eigen values greater than one are taken as the reduced factors and are used as the new factors for further analysis. The resultant three factors of the total variables are ten extracted from supply chain environment variables. The variables are grouped as three factors namely "Planning and Problem Solving", "Product Quality" and "Competitors".

Table 4.7 Communalities

	Initial	Extraction
ENV2	1	0.62
ENV3	1	0.48
ENV4	1	0.7
ENV6	1	0.55

	Initial	Extraction
ENVT7	1	0.54
ENVT10	1	0.4
ENVT11	1	0.47
ENVT12	1	0.36
ENVT13	1	0.55
ENVT14	1	0.6

Extraction Method: Principal Component Analysis

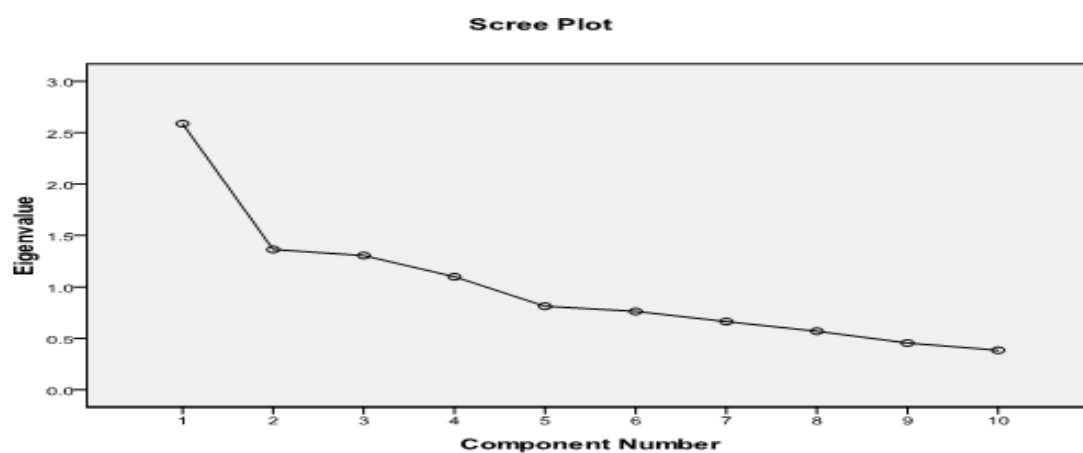
Table 4.8 Variance explained by Factor of SC Environment

Component	Initial Eigen values			Rotation Sums of Squared Loadings		
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
1	2.586	25.86	25.86	1.997	19.969	19.969
2	1.364	13.638	39.498	1.635	16.353	36.322
3	1.305	13.048	52.546	1.622	16.223	52.546
4	1.099	10.99	63.536			
5	0.812	8.123	71.659			
6	0.762	7.622	79.282			
7	0.663	6.633	85.914			
8	0.57	5.697	91.611			
9	0.455	4.547	96.159			
10	0.384	3.841	100			

The decreased three factors describe the whole variance of 52.546 percent which is sensibly important. Of the three SC environment issues Planning and Problem solving lives in the high location, because this factor only give details of 19.969 percent of the whole discrepancy.

The Eigen values are compressed to such an extent where the value of minimum number of components is more than the value of the other components that are extracted.

Figure 4.9 Scree Plot



The screen plot gives us the clear picture of the flow of the Eigen value which moves a smooth path and it can be observed that the slopes at the initial stages are very steep but in the ending stage the slope is very less. It can be observed that the Eigen value is inversely proportionate to the component number.

Table 4.10 Component Matrix

	Component		
	1	2	3
ENVT2			0.63
ENVT3			0.55
ENVT4		0.77	

	Component		
	1	2	3
ENVT6	0.55		
ENVT7	0.5	0.52	
ENVT10	0.61		
ENVT11	0.51		
ENVT12			
ENVT13	0.69		
ENVT14			-0.55

Extraction Method: Principal Component Analysis

a. 3 components extracted.

The component matrix is extracted by applying the Extraction method of Principal Component Analysis and following much number of iterations to find out the output. But it can be observed that the output has the negative values. Hence the component analysis is not taken into consideration.

The Rotated component Matrix is now extracted.

Table 4.11 Description of Rotated Component Matrix with Dimensions and Reliability

Rotated Component Matrix ^a					
	Component			Dimensions	Reliability
	1	2	3		
Key suppliers are included in our planning and goal setting activities ENVT14	0.754			I. Suppliers involvement in Planning	0.605

Rotated Component Matrix ^a					
	Component			Dimensions	Reliability
	1	2	3		
Key suppliers are included in the continuous improvement programs conducted ENVT13	0.686			and Problem solving	
Problems are solved regularly and jointly with the suppliers ENVT11	0.637				
Quality is considered as the main criteria in selecting the suppliers. ENVT10	0.529				
Customer product preferences change over the year ENVT2		0.785		II. Product Criteria	0.613
Properties of the material from suppliers vary greatly within the same batch ENVT3		0.688			
Suppliers are helped to improve their product quality ENVT12		0.54			
Competitors are from different industries ENVT4			0.822	III. Technologies & Competitors	0.637
Technological changes provide opportunities for enhancing competitive advantage ENVT7			0.695		
Technology is changing			0.603		

Rotated Component Matrix ^a					
	Component			Dimensions	Reliability
	1	2	3		
significantly in the industry ENVT6					

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 4 iterations.

The components are divided into different categories depending upon their values. These categories are further classified depending upon the different characteristics or properties.

I. Suppliers involvement in Planning and Problem solving

- It can be observed from the above table that the components within the category 1 are the one with high importance indicated by the manufacturing industries and they include the following:
- Key suppliers are included in planning and goal setting activities which helps the suppliers to understand the products which they have to supply and the targets which they have to fulfil within the stipulated period.
- Key suppliers are included in the continuous improvement programs conducted which is helpful in knowing the different changes which the suppliers are looking for to improve the methods which are required to make their work easy and better.
- Problems are solved regularly and jointly with the suppliers which will make the entrepreneurs have a clear idea about the problems faced by the supply chain members which delays the supply of the required material within the assigned time

and to find the solutions for the raised problems so that the flow of the material within the supply chain will be smooth and easy.

- Quality is considered as the main criteria in selecting the suppliers which makes the enterprise and the suppliers maintain the relationship for a longer period.

II Product Criteria

This factor has three variables which help in maintaining the quality of the product as per the customer requirements and they are as the following

- Customer product preferences change over the year which can have a clear idea about the change in the preferences as per the time differences. Hence the suppliers are intimated with the customer preferences to satisfy the customer by supplying the products as per the customer's needs.
- Properties of the material from dealers differ hugely within the same lot which will make the differences in the product quality. These should be observed and informed to the supplier so that there shouldn't be any such differences in the properties of the material supplied so that the customers get dissatisfied.
- Suppliers are helped to improve their product quality which makes the suppliers to sustain in the market by supplying the products as per the requirements of the customers, so that the customers don't shift to other suppliers.

III Technologies & Competitors:

- This is one of the critical factors which assist us to concentrate on the competitors and the changes in the technologies to sustain ourselves in the market.

- Competitors are from different industries and have experience in different fields. This makes them competitive in any of the industry. This should be one of the prime factors which should concentrate upon.
- Technological alterations give-chances for pretty competitive advantage. The changes in the technology will increase the chances to sustain in the market in even facing the challenges in the new era.

Technology is changing significantly in the industry to improve the product features and the customer needs. Similar is the case for the other factors.

4.13 Results of the study

Table 4.22 Summary of Research Hypotheses

S. No	Statement	Result
H₁	Environment practices positively influence on supplier performance	Rejected
H₂	Supply chain strategies and systems positively influence on logistics performance	Rejected
H₃	Competitive advantage positively influence on delivery performance	Accepted
H₄	There is a positive relationship between product type and frequent meetings with suppliers	Rejected
H₅	There is a positive relationship between product type and time required for supplying the product to the supplier	Accepted
H₆	There is a positive relationship between product type and the way they get orders from customers.	Accepted

H₇	There is a positive relationship between product type and a general business strategy of the firm.	Accepted
H₈	There is a positive relationship between process characteristics and frequency of meetings with suppliers.	Accepted
H₉	There is a positive relationship between process characteristics and with percentage of transportation cost incurred as a component of total cost	Accepted
H₁₀	There is a positive relationship between process characteristics and total distribution cost as a percentage of total cost.	Accepted
H₁₁	There is a positive relationship between process characteristics and with the way they get the orders from the customers	Accepted

5.0 Findings and contributions

5.1 Research contributions

5.1.1 Theoretical Contribution

The study has been carried out considering the factors like supply chain environment, supply chain strategies, support supply chain (technologies) and competitive advantages and supply chain performances. The previous research related to supply chain variables confined to some particular characteristics are considered for the study and is compared to different metallic industries. The environment, strategies, technologies, competitive advantage and the overall performance of the SMEs is found out using the supply chain and is compared with the practical outcome.

5.1.2 Practical Contribution

The study on supply chain performance in small and medium industries in these topics like the supply chain environment, supply chain strategies and systems, technologies and the competitive advantage is performed. The outcome of the study gave the different factors which are directly or indirectly proportional to the performance of the SMEs. The theoretical and practical contributions are then compared to find the variation if any.

5.2 Limitations of the study

- The research is limited to only metallic industry.
- The research is confined to a limited area of three districts only.
- Study is done using cross sectional design

5.3 Scope for future research

The scope for future research can be carried out to other SMEs (industries) like plastic, fibre etc. This study can be carried out in other geographical locations of India. The longitudinal study can be carried out. The comparative study of different SMEs like metallic wooden and other industries can be made.

5.4 Conclusions

The underlying SC structure comprises of its evolved environment, innovative strategies, and inherent competitive advantages and leads to best performances of SMEs. The SC environment evolves with the best planning, problem solving, product quality and competitors. The SC strategies and systems will be successful with cost reduction, standardization, external sources for raw materials. The SC competitive advantage is basically emerges with customization, product characteristics and the introducer.

The features authorising the SC performance of SMEs were identified with the extensive study taken up. The bottom line expectations of the end customer are exceeded by

these features of SC performances. The identified features were; an increase of the speed in the right parts, which has high lead times and affect the product delivery were taken at most preference to avoid delays. An improvement in the quality in the right place i.e. the raw material is given importance for the quality which affects the final product. A strategy to reduce the costs in the right time depending on the market demand–supply scenario, competition and pitching the right market should be considered. All these features have improved the SC performances in the SMEs. To enhance these features fundamental tactics such as SC team dynamics, stability of requirements, strategic outsourcing, supplier management, information integrity, balanced score card, customer connectivity and continual improvement were given more importance.

The relationship between SC environment, SC strategies, SC competitive advantages and SC performance of SMEs was identified in this study by correlation. Correlation coefficient gives the relation between one and the other factors and is very quick to find out the factors which are in favour of or which are positively related and those which indicate whether they are negatively related to one another. In the study the SC practices and environment are positively related to each other. The SC performance has good correlation with the competitive advantage of the firm. The SC strategies and systems have less relation with the supply chain practices which should be improved to get good relationship with SC practices. The strategies and systems are reversely related with environment. The Support SC is inversely proportional to SC environment and strategies and systems. The SC performance has low values between SC practices, SC environment and SC strategies and systems and hence they must be improved. The Support SC practices and SC performance are inversely proportionate to each other. Hence it must be tried to minimise the value. The competitive advantage and the SC practices are inversely related to one another; hence the negative value should be reduced to increase the competitive advantage of the firm.

The SC performance is the dependent variable and hence is the function of the erstwhile variables like SC practices, SCM strategies and systems, SC environment, Support SCM (technologies) and Competitive advantage which are the independent variables. The higher the R square value higher is the model fit.

This study has identified the impact of SC environment, SC strategies, SC competitive advantages on SC performance of SMEs in Metallic industry. Using the process of ANOVA it can be observed that the SC environment doesn't have any impact on the SC practices and they are independent variables, but when the Factor analysis is conducted the total of 14 factors is reduced into 10 and divided into common dimensions depending on their values and are further classified based on their properties like Planning and problem solving, Product criteria and Technologies and competitors. Similarly the variables in SC strategies and systems are split up into three factors like Cost reduction, External source and Standardisation. The variables in SC Competitive advantage are grouped into three different factors namely Customisation, Product characteristics and Introducer. The above mentioned factors have great impact on the SC Performance of SMEs in metallic industries with relation to Suppliers, Competition, Technologies, Cost, Standards, Customers, Products and Initiators.

To suggest a SCM model for SMEs performance, keeping in view the technological changes and best performances of suppliers, logistics and delivery of SMEs. Still the orders are placed manually. Ease of the SMEs to cater to the IT requirements with changing demand is high. Quality of the products is given preference. From the study it can be concluded that Supply Chain Environment, Supply chain strategies and Competitive advantages have positive relation with supply chain performance.

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