

**Major Research Project**  
**on**  
**FACTORS AFFECTING THE INFORMATION SHARING IN**  
**SUPPLY CHAIN MANAGEMENT**

Submitted By:-

Sarthak Srivastava

2K21/DMBA/111

Under the guidance of:

Dr. Archana Singh

Head of Department, DSM



**DELHI SCHOOL OF MANAGEMENT**  
**DELHI TECHNOLOGICAL UNIVERSITY**  
**Bawana Road Delhi 110042**

## **Certificate from the Institute**

This is to certify that the Major Research Project on “factors affecting the information sharing in supply chain management”, is a bona fide work carried out by Mr. Sarthak Srivastava of MBA 2021-2023 and submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-42 in partial fulfilment of the requirement for the award of the Degree of Masters of Business Administration.

Signature of Guide

(Dr. Archana Singh)

Signature of HOD

(Dr. Archana Singh)

Place: DTU, New Delhi

Date

## **DECLARATION**

I, Sarthak Srivastava student of Delhi School of Management, Delhi Technological University hereby declare that the Major research project “factors affecting the information sharing in supply chain management” submitted in partial fulfillment of the requirements for the award of the degree of Master of Business Administration (MBA) is the original work conducted by me. I also confirm that neither I nor any other person has submitted this project report to any other institution or university for any other degree or diploma. I further declare that the information collected from various sources has been duly acknowledged in this project.

Sarthak Srivastava

(2K21/DMBA/111)

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Sarthak Srivastava

2K21/DMBA/111

## **EXECUTIVE SUMMARY**

The Coordination between all the participants in a supply chain is greatly aided by the information exchange. Sharing information can increase the supply chain efficiency by lowering stocks and smoothing output, making it one of the most efficient ways to improve performance. The need for efficient information exchange across organisations with various objectives and viewpoints makes its implementation in practise difficult. The appropriate information must be shared with the desired people at the desired time, with the desired level of detail, in the desired context, and in the desired language. Any lapse in these areas could result in a breakdown in information exchange, which would be detrimental to the effectiveness of the supply chain. Due to the fact that there is currently more rivalry between individuals than between the supply chains, enhancing the supply chain efficiency is so much important.

The extent and importance of information sharing are both discussed in this review along with the effects on supply chains. While, highlighting all the potential advantages of information sharing, the article also reflects out that these are the advantages which might not be distributed fairly across the parties and consumers. The analysis suggests a number of research problems that call for additional investigation in the all of surrounding of the information exchange in supply chains using these two viewpoints.

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## **INTRODUCTION**

Today's fiercely competitive markets have led to a shift in management practises towards trading partners working together. To keep a company's competitive advantage, supply-chain partners must work effectively together. Companies must widen their scope of analysis and decision-making to include entire supply chains rather than simply single business units because the competition is no longer between individual companies but rather between entire supply chains (Lee and Whang, 2000).

Three majorly flows make up supply chains: raw material, data and information, and capital. For supply chain management to be effective, these flows must be coordinated and integrated both within and between organisations. Profitability and high-quality service depend on effective supply chain management. An essential component of efficient coordination along a supply chain is information exchange. Companies may make better operational decisions thanks to information sharing, which leads to greater resource utilisation and cheaper supply chain costs. Companies are also able to respond to client requests more swiftly because to effective information management (Lee and Whang, 2000).

Information and communication technology (ICT) advancements have made it easier for businesses to share information. For instance, businesses may transport digital data rapidly and for essentially no marginal cost thanks to the internet. What information should be shared, with whom, and how to maximise competitiveness and profitability are the main questions surrounding information sharing. This essay will review pertinent literature and make some important research proposal. A supply chain is a group of businesses that includes suppliers, manufacturers, warehouses, distributors, and retailers, according to Simchi-Levi et al. (2003). In addition to controlling physical movements, information and financial flows are also very important. A supply chain may also include outside parties who perform logistical tasks.

In conclusion, in today's highly competitive marketplaces, a collaborative approach to management practises has become crucial. Maintaining a competitive edge requires effective supply chain management, which basically involves the coordinate and the integration of material, information, and financial movements. Sharing the information obtained is very essential for the efficient coordination in a supply chain, and improvements in information and communication technology have made it simpler to do so.



## **1.1 Supply chain management**

Since the 1990s, interest in supply chain management (SCM) has grown, and numerous original meanings and the saying of SCM have been published in books and papers. Three major themes can be used to explain these definitions: Each of the three categories—Activities, Benefits, and Constituents/Components—can be further broken down into sub-themes. Benefits could include a rise in value, efficiency, and customer satisfaction which includes the activities include Flows (i.e., raw material and data available) and internal. and external Networks. of Relationships (Stadtler).

Sharing resources, knowledge, and financial data throughout organisational divisions is a component of supply chain management, which aims to better the efficiency of the entire supply chain and satisfy consumer demands. A supply chain is made up of numerous businesses engaged in a variety of processes and tasks to generate goods and the services for ultimate consumers, both during the upstream, and the downstream which includes suppliers, distributors, and final consumers.

The goals of SCM include enhancing customer satisfaction, service, and competitiveness as well as lowering product development costs and resource usage, increasing productivity, enhancing efficiency, lowering inventory levels and associated costs, boosting profits, and enhancing teamwork.

## **1.2. Asymmetric Information**

When it comes to resources in a SC have varying levels of private information. This is referred to as asymmetric information. To make wise decisions, one person has access to information that the others do not (Simatupang & Sridharan 2001). For instance, the merchant predicts client demand more accurately than the producer. The producer is more knowledgeable than the retailer regarding the products, lead times for deliveries, and production capacity. As a result, SC has asymmetric information by design.

Due to the economic worth of that information (real or perceived), chain members frequently may not want to fully and truthfully share it with all other chain members. As a result, the SC experiences (i) misaligned incentives, (ii) poor decision-making, and (iii) trouble coping with market uncertainty (Simatupang & Sridharan 2002).

### **(i) Misaligned incentives**

Due to their diverse places in the SC and thus having different goals, tactics, and duties, the chain members are prone to misunderstanding the collaborative efforts that they are making. When a person from the supply chain makes decisions based exclusively on the local incentives and punishments, which frequently diverge from maximising overall profitability, incentive misalignment emerges. Sometimes, this opportunistic activity that results from the player's self-interest compromises.

Because organisations typically lack the tools to force people to change their priorities and practises in order to line with the overall profit, incentive misalignment is a problem. A member's actions and decisions frequently have unanticipated costs or benefits for other members. This phenomena is often referred to as spillovers, neighbourhood impacts, or externalities. For instance, because the retailer does not take into account the supplier's profit margin, he chooses an order quantity that is lower than the ideal SC amount (Simatupang & Sridharan 2002). The SC members get into arguments about competing goals, decision rights, and responsibilities if they don't disclose the sensitive information needed to create shared objectives and plans. Resources may be allocated ineffectively as a result of this conflict, and there may be redundant or overlapping activity.

### **1.3 Suboptimal Decisions**

Because judgements are made in a limited context due to a lack of knowledge, it is impossible to verify that goods are basically provided to customers in the exact manner. This results in sub-optimal decisions being made by chain members. The chain members also have the inadequate and the continuous perspectives of consumer needs and visibility into performance at the other levels of the SC due to insufficient information sharing. As a result, judgements are either based on informed guesses or the best evaluation of the information and the data which is currently available. Such choices might be skewed, which would keep each chain of the members which are there in the chain. For instance, rather than sales data, the manufacturer frequently uses inbound orders with higher volatility.

- a hint regarding the expected future demand for the product from the merchant (Simatupang & Sridharan 2002). In order to save transportation costs, the manufacturer frequently ships huge quantities of goods, but this negatively affects on the timely delivery of performance because it is impossible to predict what the end customer will desire and how much inventory will be on hand at the retail locations.

#### (iii) The Challenge of Managing Market Uncertainty

Suppliers, manufacturers, and customers are the three different sources of unpredictability that have an impact on a SC. Increased stocks are required to account for uncertainties such as delayed deliveries, equipment failures, order fluctuations, etc. (Yu & Cheng 2001).

Dealing with market uncertainty is challenging due to differences in player knowledge of market conditions. Uncertainties will be amplified in ordering variations and spread across the SC. The bullwhip effect is the name given to this type of incident or phenomenon.

Long-standing descriptions of the bullwhips effect incident have been found in the literature; however, it has only been in the last ten years that the full scope of the issue has come to light, piqued the interest of several researchers.

When demand of the information is conveyed as orders with the supply chain and up to the most upstream suppliers, then the phenomenon of bullwhip effect causes this information to be distorted. Since the bullwhip effect is characterised by information distortion, the actions and policies of the SC members are the endogenous causes of it.

Comparatively to other upstream actors, retailing companies, for instance, have better access to client requests. They frequently gather data on demand and provide it in bulk to the members immediately upstream. Data may contain client wants and order information. The upstream players may encounter greater variation in customer demand as a result of the downstream players' capacity to alter demand conditions. Other variables that lead to higher demand swings, besides a lack of insight of end consumer demand, include promotions and price to end customers and trade agreements among chain participants (Simatupang & Sridharan 2001).

The bullwhip effect is illustrated in Fig. 1 on a straightforward supply chain with just few businesses: a store, a wholesaler, and a manufacturer. Retailers sell to customers and purchase from wholesalers, while wholesalers sell to retailers and purchase from factories, and factories sell to wholesalers and purchase from unidentified suppliers. The three organisations' ordering patterns all have one thing in common: an upstream site's variability is always higher than a downstream site's. The standard deviation of orders is used to calculate the bullwhip effect.

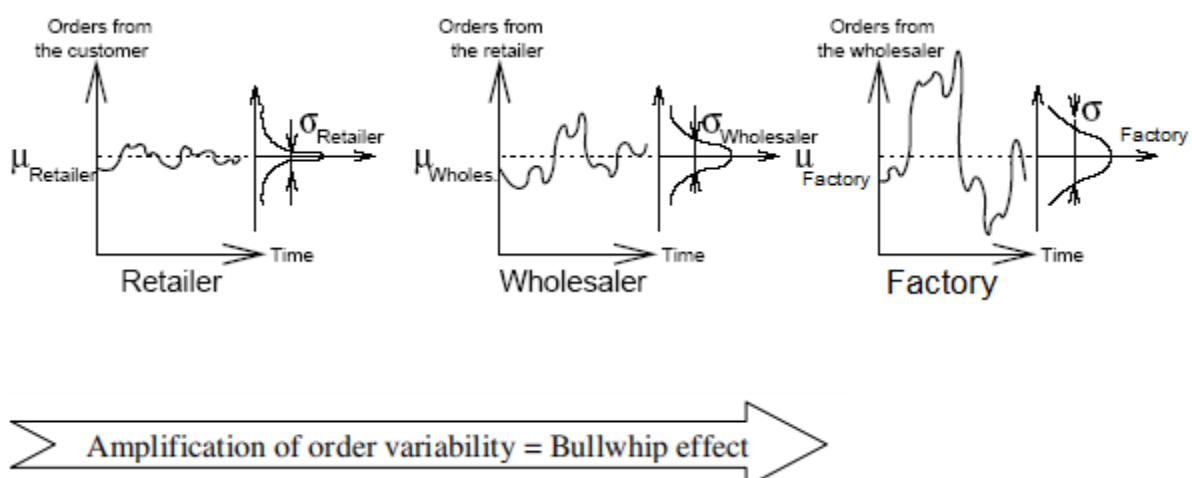


Figure 1: The Bullwhip Effect (Lee et al 1997)

One of the main reasons for inefficiencies in a SC has been recognised as the bullwhip effect, and these include:

- Significant demand and supply fluctuations necessitate keeping large inventories in order to avoid stock outs.

- Subpar customer service since not all demands may be satisfied.

- Due to significant order swings, capacity planning and production scheduling become challenging.

- Additional plant growth to meet peak demand.

- Fighting among SC gamers.

The logic network topology shown in Figure 2 demonstrates why a lack of customer demand visibility results in decreased profitability. Large forecasting errors result in frequent schedule revisions, difficulty managing real capacity constraints, lengthy lead times, and the maintenance of speculative inventories.

Additionally, it might be challenging to develop only those products that are viewed as the most demanded, mostly for the creative types of goods, because to a lack of knowledge about customer wants.

#### **1.4. Information sharing**

The manufacturing sector intends to play a crucial role in boosting economic growth. Manufacturers must completely rethink their approach to collaboration only if the need to find in the global market of the present. As a result, they must offer means for firms to exchange the most recent information. However, just providing the necessary gear and software is insufficient. The participants should be eager to take part in information-sharing activities. Businesses today operate in networks with numerous different partners and do not operate independently.

Transmission of useful information to organisations, people, or systems is referred to as the sharing of the information. to find the answer the organisation should answer these four important question first: The first questions are: "What should I share, with whom should I share it, how should I share it, and when should I share it?" With higher-quality responses,

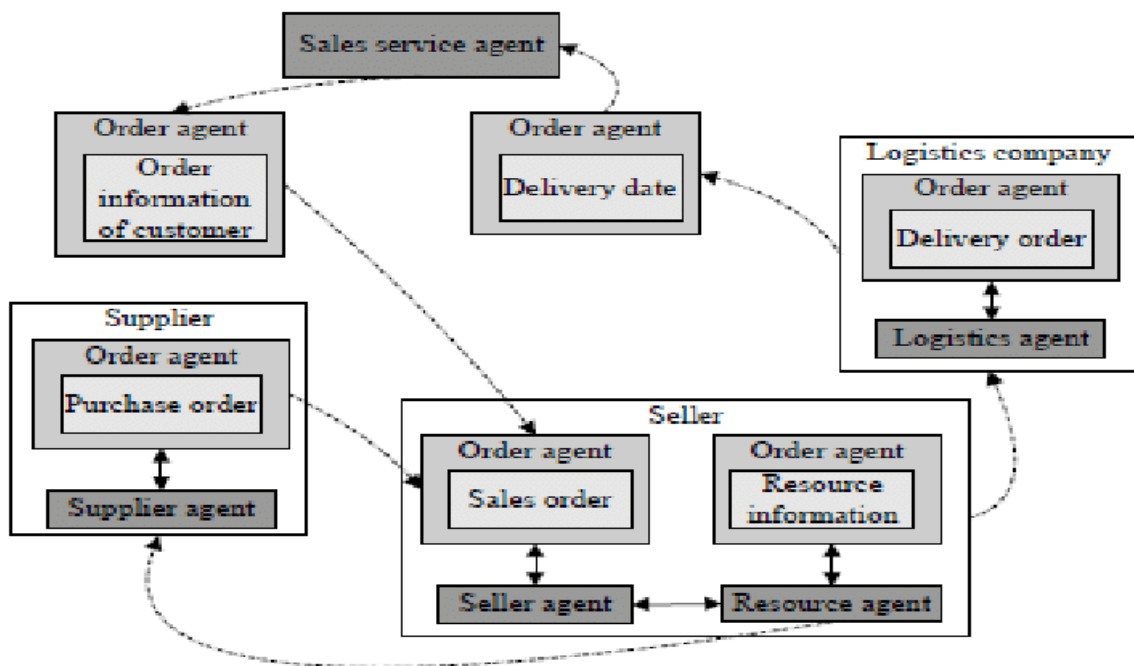
The effect of information sharing on supply chains has grown as a result of recent IT breakthroughs. Studies that focus on the impact of information sharing on product quality have also been conducted. However, more investigation is required to specify precisely how and what information should be presented, as well as the advantages for raising quality.

Supply chain management (SCM) coordination and integration have long piqued the curiosity of both the academic and business worlds. To survive in the modern economy, supply chain partners must strengthen their competitive advantages through information sharing.

Information technology improvements can be used to model various network structures to enhance collaboration between supply chain participants. A more advantageous and effective supply chain is produced as a result of this collaboration and coordination. As information flows increase, uncertainty may be reduced, and the end customers receive higher-quality products at cheaper costs in less time,

According to Pandey et al.'s structure, information like as sales and purchases, manufacturing costs, technological know-how, and order tracking need to be exchanged.

Polanyi and Sen separated knowledge into two categories: explicit knowledge and tacit knowledge. Explicit knowledge is affable knowledge, as its name suggests. It can be expressed in writing, numerically, graphically, and using formulas.



Information flow chart in supply chain management

Contrary to what might be believed, explicit knowledge is easier to describe and convey since it is more concrete. However, according to researchers, communicating tacit knowledge is just as important for information sharing as disseminating explicit information. Information exchange, in the opinion of Min et al., is crucial to the supply chain collaboration. This suggests that knowledge exchange requires more attention. A relationship developed between two different supply channel members is known as a supply chain partnership. It is produced by raising the level of information sharing, in an effort to cut expenses and inventories overall.

#### *4.1 What Information is Shared?*

Answering this question requires consideration of both the types of information, that must be provided and the standard of the sent information. Since restricted information exchange and poor information quality seem to have an impact on how well SC performance works

##### *1.5. Types of shared information in supply chain*

A supply chain can facilitate the communication of a wide range of data and information, including the logistical, commercial, and the strategic data. There are many well-known types of information, including:

- 1)The information about inventories,
- 2) The information about sales,
- 3) information about sales forecasting,
- 4) information about orders,
- 5) information about product capabilities,
- 6) information about the exploitation of newly developed products, and
- 7) additional information.

The most common type of data exchanged between partners is inventory information. We can avoid product runout and duplication by sharing this. The exact level of maintaining the stock and the cost to maintain it are also reduced, enabling more accurate forecasting and decision-making. Sharing the data of sales can help to prevent order blow-ups, lessen loss caused by shortages or overproduction of innovative products, and correctly reflect the demand of the customer.

Each partner in a supply chain makes their own projections. Sharing sales forecasts improves projections, which could boost the advantage of the competitive nature of the supply chain. Sharing order of the information would raise the level of client services by rapidly detecting the supply chain's bottleneck. Information on product capacity flow may aid in preventing bullwhip effect causes and slowing down possible shortage games. If information about new



products is shared, producers can obtain a timely supply of goods from suppliers when they discover the genuine demand from merchants.

Numerous research studies have addressed the issue of "what information to share". Li et al. (2001), for instance, investigate four popular ways for a SC of a particular product to share information: There are four different kinds of information sharing:

(1) orders information of sharing, in which each stage of supply chains only has access to the orders from its quick downstreams stage;

(2) demand of the informations sharing, in which each stages is fully aware of consumer of the demand;

(3) inventories information of sharing, in which each of the stage communicates its inventory levels and demand information with its immediate upstream stage; and

(4) shipment informations of the sharing, in which each stage communicates its shipments information with all the stage immediately upstream.

They learn that a hybrid information-sharing approach that makes use of the distribution network's demand information-sharing policy and makes use of the inventory.

Huang et al. (2003) identified six categories of production data that might be shared with SC partners or have an effect on SC performance. The information is segmented into categories such details on goods, procedures, inventories, assets, orders, and plans (see table 1). The need of sharing production data to reduce order and inventory level unpredictability is the main emphasis of their research.

Depending on the level of decision-making in SC, information sharing might be strategic, tactical, or operational (see table 2). A strategic supply chain decision is one about facility allocation.

outsourcing, and safety stock decisions are all examples of tactical SC decisions. On the other side, choices about orders of replenishment and the shipments fall within the heading of operational SC decision-making.

## **1.6 Types of information shared**

A supply chain's information can be categorised in a number of ways, including tactical or strategic, logistical, or consumer-related. And Lee and Whang discuss the advantages of the various forms of shared information. For example, swapping order status can reduce human expenses, speed up payment processes, and enhance customer service. Exchange of retail sales data aids in minimising all the bullwhips effect. Table 2 lists the many types of information that various researchers have considered in their studies, based on Huang et al.'s classification of information into six categories (see Table 1) linked to products, processes, resources, inventories, orders, and plans.

Production information classification (Huang, Lau et al., 2003)

Information on Category Production

Product Organisation

Process Lead Time Lead Time Variance for Materials Order Transfer Process Cost Quality Shipment Lead Time Inventory set-up costs, inventory levels, backlog costs, service level categories, and production data

Variance in Resource Capacity

Demand Demand Variance Order Variance Order Due Date, Order Batch Size, Demand Correlation, and Planning Order scheduling, demand forecasting, forecasting models, and time fence

Additionally, it has been found that the benefit of information sharing relies on a number of factors. For instance, simchi demonstrated that there are no appreciable benefits to demand

pooling for a manufacturer with very few capacity. Demand information exchange is more valuable, according to Lee et al, if the demand is highly as the connected the across time, which is approx. the highly changeable, or even lead of the time is lengthy.

The value of various sorts of information is also influenced by the product's characteristics. There are significant benefits to sharing demand forecasts for goods with significant demand fluctuations. The relationship between trading partners has an impact on the type of information that is chosen to be exchanged. For example, communicating production schedules with part suppliers helps reduce part inventories without increasing the chance of stock-outs. Shipping information can be sent to logistics professionals to improve customer experience. Information sharing agreements are based on situational considerations. The majority of recent studies only focus on the sharing of manufacturing-related information, although other information, such market and customer intelligence, might also be important. According to Lee and Whang, sharing market data improves promotion strategy The Information-sharing and strong collaboration among the manufacturers and retailers may make things easier to develop new projects.

### **1.7. Benefits of information sharing**

To establish all the benefits of information sharing in businesses and the organisational units, numerous studies have been carried out. This study looks into a few of these advantages.

These are the common Benefits of the information sharing-

1. The reduction in inventory and effective inventory management is a list of the sources of these advantages.

2. Cost cutting

3. Increasing visibility (substantial uncertainty reduction)

4. A notable decrease in or removal of the bullwhip effect

5. Increased resource efficiency

6. Enhanced output, improved organisational performance, and enhanced services

7. Strengthening and establishing social ties

8. Early problem identification

9. Swift in action

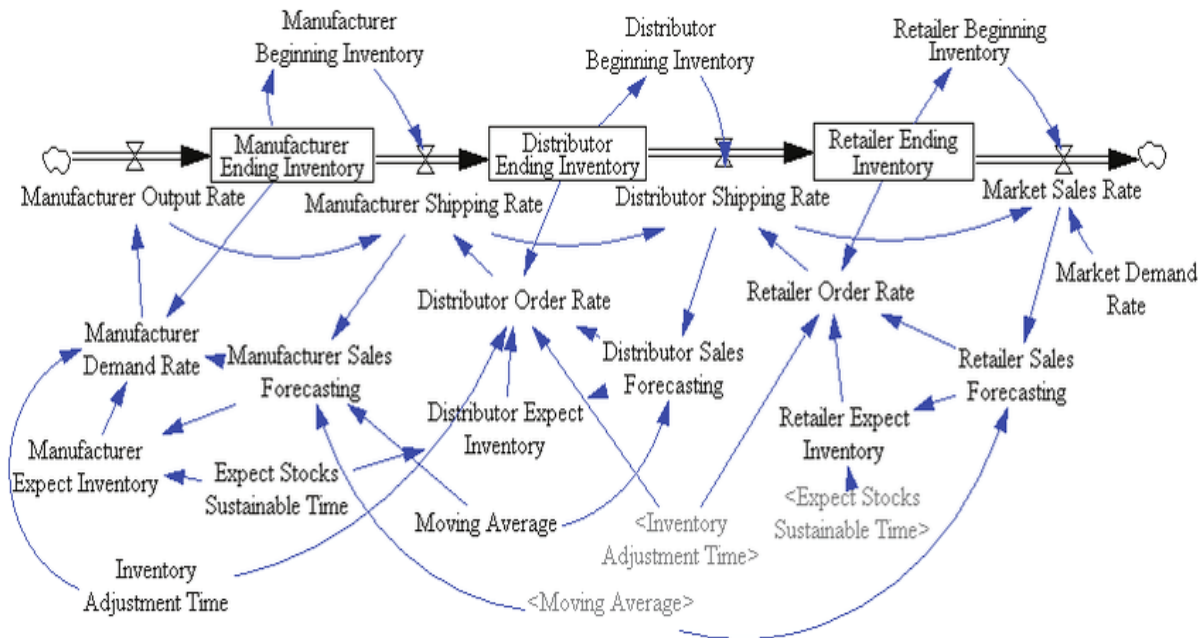
10. Shorter order to delivery cycle time

Improved tracking and tracing

11. Quicker time to market

12. Increased network

## 14. Optimised capacity use



The interpersonal and social ties between the information givers and receivers are built and strengthened, according to Marshall and Bly, as a result of the shared information. Information sharing also has other benefits, like improved organisational performance and efficiency.

### 1.8 Barriers to information sharing

Access to information inside a supply chain may present certain challenges. Some of these obstacles include the privacy of the information shared, antitrust laws, the permanence and accuracy of the shared information, and lastly the creation of tools that allow companies to use the information effectively.

One of the most common types of barrier to interpersonal information sharing may be worries about information privacy. A trustworthy network is necessary so that people can share

information. Lack of mutual trust among organisation members may impede information exchange.

It has been demonstrated that teaching workers in a supply chain how to use IT systems requires time and effort. Knowledge exchange could be improved by using user-friendly IT systems. A dysfunctional and unpleasant system would make it harder to communicate expertise and information, which would be bad for information sharing.

### **1.9. Information Quality**

Along with the accessibility of the various information types, information quality is crucial to SC management. Sharing information will only be useful to SC partners if it helps them make better decisions and perform better.

"Information quality" is a metric used to assess the value that information offers its users. Since "quality" is frequently viewed as subjective, the information's quality can differ between users and between uses.

Four information quality dimensions are identified by Wang & Strong (1996); each dimension is made up of many components that are used to evaluate the subjective information quality

(1) The four qualities of intrinsic information are accuracy, objectivity, credibility, and reputation;

(2) The five qualities of contextual information are relevance, added value, timeliness, completeness, and quantity of information;

Flexibility and access security have been included in the quality of accessible information. High-quality information must therefore be available, well displayed, and contextually suited for the task. Numerous academics have identified crucial information quality traits required for SC management. Monczka et al. (1998) stress that information quality should include accuracy, timeliness, adequacy, and credibility of information exchanged. Forslund and Jonsson (2007) used similar attributes to measure information quality. Miller (2005) measured information quality based on accuracy, believability, objectivity, precision, and reliability of the information, relevancy, timeliness, completeness and information

appropriateness, comprehensibility, interpretability, consistency, conciseness, format and appearance of the information, accessibility, security, and availability. Lee et al. (1997) focused on timeliness and accuracy in measuring information quality. Their study suggests that in order for the upstream SC members to perform the necessary tasks, sales information needs to be communicated to them in a timely manner. If businesses had access to the correct information at the right time, they could lessen uncertainty, adapt more quickly to shifting market conditions, and enhance planning, all of which would increase profitability. Poor information quality, on the other hand, results in dissatisfied customers, higher expenses, low employee morale, unproductive decision-making, and the inability to put good strategies into practise. The expense of correcting errors brought on by inaccurate information also rises (Omar et al., 2010).


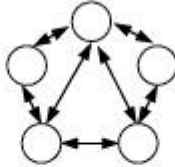
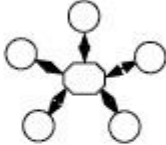
### ***1.10 How to Share the Information?***

Choosing which partners to involve and how to communicate information in the supply chain are important decisions. The supply chain of organisation will influence this choice. Lambert and Cooper (2000) contend that not all supply chain links require integration and coordination, and that businesses must carefully choose which partners require close integration. According to their definition, primary members are independent businesses or strategic business units that do operations that add value to the business process, whereas supporting members only supply primary members with resources, information, services, or assets.

Based on the supply chain topology, Rong and Kumar (2003) divide information exchange into three types. In a straightforward arrangement known as sequential information sharing, the product of one partner's activity flows into the next trade partner as its input. Sharing information in a reciprocal fashion is more complicated because communication between

partners might occur in both directions at the same time. A central hub that connects with all partners is the foundation of the hub-and-spoke information exchange structure, and an internet-based e-hub functions as a virtual marketplace, supporting a wide range of business activities and communication between the partner in trading. The hub makes choices, arranges their communication to all partners, gathers, stores, and maintains information about each partner.

Depending on the supply chain structure, many approaches can be used to share information, warehouses data's management. The hub-and-spoke information sharing arrangement relies heavily on standardisation, and all partners are required to adhere to the same guidelines for information definition, storage, and exchange. However, integrating and harmonising many information systems can be difficult and expensive.

Information Sharing	Sequential	Reciprocal	Hub-and-Spoke
Structure			
Level of collaboration	Between neighboring partners only (one-way)	Two-way, multiple partners	Two-way, centralized
Coordination Mechanism	Information flow upstream, goods downstream	Multiple information flows	Intelligent hub
Technologies	EDI	Networking, email, videoconference	Web services

However, other businesses seem to approach information sharing quite differently. They behave as though sharing is a habit ingrained in corporate cultures. Only when businesses are ready and able to disclose crucial—and frequently confidential—information used to make decisions can trust be built and collaboration encouraged. Technology now serves as a tool to enhance, encourage, and support knowledge exchange and genuine collaboration (Rash et al. 2010). In order to improve the effectiveness and impact of SC decision-making, it makes sense that technology capability and information sharing willingness should cooperate (Fawcett et al 2007).



## **Objectives -**

i) To study about various channels and tools through which information is shared between all the stakeholders involved in the supply chain management process.

ii) To analyse and prioritize the factors affecting the information sharing on supply chain performance

## **Scope of the Study**

The study of information sharing in supply chain management (SCM) includes many distinct facets of information sharing amongst diverse supply chain participants. In this field, some possible study areas include:

1. How the information sharing affects the overall performance of the supply chain might entail determining the relationship between the type of degree of information sharing among the supply chain partners and important performance metrics like inventory levels, order fulfilment rates, and customer satisfaction.
2. The function of technology in promoting information sharing: This may involve investigating the application of various technologies, such as RFID, EDI, and IoT, to make it possible for supply chain participants to share real-time information.
3. The variables that affect information sharing in SCM: This may entail examining the different variables, such as incentives, communication, and trust, that can either encourage.
4. The effect of cultural differences on information sharing in SCM: This may entail assessing how cultural variations among supply chain partners may impact their capacity and desire to exchange information.
5. The advantages and disadvantages of information sharing in SCM: This could involve examining the advantages of sharing information, such as increased productivity, lower costs, and improved collaboration, as well as the disadvantages, such as the loss of a competitive edge and the exposure of sensitive information.

In general, research on information sharing in SCM can aid practitioners and researchers in better comprehending the dynamics of the interactions in the supply chain and locating opportunities to increase the efficacy and efficiency of supply chain operations.

## **LITERATURE REVIEW**

Supply chain management entails the timely and cost-effective delivery of the ideal goods to the ideal location. Manufacturers and retailers have been working to achieve this goal by redesigning their supply chains to cut expenses associated with shortages and inventories. Quick response, which concentrates on lowering lead times for fashion products, is one such tactic. Other tactics, like effective consumer response, ongoing replenishment plans, and cooperative planning, forecasting, and replenishment, enable manufacturers and retailers to share inventory and demand information, minimising the "bullwhip effect" in a distribution channel (Lee et al. 1997). The exchange of information is essential to these strategies, but its trustworthiness may be in question given that each side may have a motive to falsify its own information.

With an emphasis on defining what information we have to share, and with which of the partner it must be shared, and how it must be shared to be maximise the competitive environment and profitability, and what problems exist when sharing information, this project investigates the effects of the information sharing on the supply chains.

So the main factors which influence the information sharing in Supply chain management are-

- 1.Trust among the Supply chain Partners
- 2.Competitive advantage
- 3.Standardized data format
- 4.Communication between the partners
- 5.Use of IT facilities
- 6.Effective leadership
- 7.Collaboration
- 8.Incentive

9. Visibility

10. Cultural Difference

The list of research papers on information sharing in supply chains includes:

1. Prioritizing the factors for coordinated supply chain using analytic hierarchy process (AHP) by Rajesh Kumar Singh: Through this research paper I learned that how I can prioritize the factors influencing the information sharing in supply chain management through AHP.
2. Nils Rudi and Martin A. Lariviere's "the sharing of supply chain Incentives for Information Quality and Order Smoothing" (2007). This study investigates how information sharing affects order smoothing and supply chain cooperation. It examines how the effectiveness of the supply chain is impacted by suppliers' incentives to share accurate and timely information.
3. Gad Allon and Achal Bassamboo's article was published in 2008. In a supply chain where demand is non-stationary, the advantages of sharing real-time demand information are examined in this research. It looks at how this can lower inventory costs and increase the responsiveness of the basic chain of supply.
4. Yu-Lee Tzeng and Ming-Lang Tseng's "The Impact of Information Sharing and Forecast Accuracy on Bullwhip Effect and Inventory Performance" (2010). The bullwhip effect and inventory performance in a supply chain are examined in this research along with the effects of information sharing and forecast accuracy. It looks at how exchanging precise and timely information might lessen demand cyclicalities and boost supply chain effectiveness.
5. Onur Boyabatli, Tamer Boyaci, and Saibal Ray's study "The Impact of Information Sharing on Supply Chain Performance: A Simulation Study" was published in 2014. In order to investigate the effect of information sharing on supply chain performance, simulation modelling is used in this paper. It examines how information sharing might raise order fulfilment rates, shorten lead times, and boost supply chain efficiency.
6. Jayanth Jayaram and Shantanu Bhattacharya's: "A Literature Review" from 2016. The literature on the collaborative planning, forecasting, and restocking (CPFR) is thoroughly reviewed in this work. It addresses the elements that support successful CPFR implementations as well as the advantages and difficulties of doing so.

## **RESEARCH METHODOLOGY-**

The material obtained from both the primary and the secondary sources will be the foundation of the project research purpose i.e. the data which I have collected through survey and interviews from various supply chain professionals from different industries and students and the data which is already available on the internet which I have collected from various sources like research paper, articles, books, e.t.c. and data collected by government agencies, trade associations or other businesses in supply chain industry. I have collected the primary data through my friends of supply chain domain, known persons who are working in supply chain area for the last few years. Following the definition of the primary objectives, secondary and primary research is gathered. After the primary and secondary research is finished, MS Excel software is used to analyse the data. Once the secondary and primary research will be completed, an analysis of the data has been done through SPSS and MS Excel software. Both descriptive and inferential statistics have been used to find the result. Finally, conclusions and recommendations is made possible after analyzing, interpreting, and compiling the data in the form of charts graphs and interpretation of the data. In descriptive statistics we have found the mean, median and the mode of the data available to us while in the inferential statistics I have done analytic hierarchy process (AHP) to compare and prioritize the factors affecting the supply chain management.

## DATA ANALYSIS-

	Age	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	22	2	5.6	5.6	5.6
	23	4	11.1	11.1	16.7
	24	6	16.7	16.7	33.3
	25	1	2.8	2.8	36.1
	26	6	16.7	16.7	52.8
	27	3	8.3	8.3	61.1
	28	5	13.9	13.9	75.0
	29	3	8.3	8.3	83.3
	30	1	2.8	2.8	86.1
	31	3	8.3	8.3	94.4
	32	1	2.8	2.8	97.2
	36	1	2.8	2.8	100.0
	Total	36		100.0	100.0

Majority of the participants were freshers or have a work ex of less than 4 years and the mean age of the participants is 26.67 years. There are participants from 0 years of experience to 12 years of experience in the field of Supply chain management.

Statistics		
Age		
N	Valid	36
	Missing	0
Mean		26.67
Median		26.00
Std. Deviation		3.180
Range		14
Minimum		22
Maximum		36



<b>Parameters</b>	C1	C2	C3	C4	C5	
<b>DM1</b>	4	5	4	4	5	
<b>DM2</b>	2	4	2	5	5	
<b>DM3</b>	4	5	4	5	5	
<b>DM4</b>	4	5	4	5	5	
<b>DM5</b>	4	5	4	5	5	
<b>DM6</b>	5	5	4	5	5	
<b>DM7</b>	2	4	4	5	5	
<b>DM8</b>	3	5	3	5	4	
<b>Parameters</b>	C6	C7	C8	C9	C10	C11
<b>DM1</b>	5	5	3	5	4	
<b>DM2</b>	4	5	2	5	2	
<b>DM3</b>	4	5	3	5	3	
<b>DM4</b>	4	5	3	5	3	
<b>DM5</b>	5	5	3	5	3	
<b>DM6</b>	5	5	4	5	4	
<b>DM7</b>	2	3	3	5	1	
<b>DM8</b>	1	5	4	5	3	

In This Table a data has been collected for the analysis process through Analytical Hierarchical process (AHP) where different criteria were taken as C1 to C11 and decision makers DM1 to DM8. AHP is one of the best decision-making tools which is used to prioritize and choose the best alternative among different options based on multiple criterions.

Where,

C1-The lack of trust between the supply chain partners hinders information sharing

C2-The fear of losing competitive advantage deters the companies from sharing information with their partners

C3-The absence of a standardized data format makes it very difficult to share information effectively.

C4-A lack of communication among the supply chain partners impedes information sharing

C5-The use of information technology facilitates information sharing among supply chain partners

C6-Effective leadership can foster a culture of information sharing among supply chain partners

C7-To what extent do you agree with the statement: "Information sharing helps us to build trust and collaboration among the supply chain partners"?

C8-Companies with a history of successful collaboration are more likely to share information with their supply chain partners

C9-The availability of incentives encourages companies to share information with their supply chain partners

C10-The perceived benefits of information sharing, such as improved supply chain visibility and reduced inventory costs, motivate companies to share information

C11-Cultural differences among supply chain partners can affect their willingness and ability to share information with each other

Criteria	C1			C2			C3			C4			C5			C6		
<b>DM1</b>	5	7	9	7	9	9	5	7	9	5	7	9	7	9	9	7	9	9
<b>DM2</b>	1	3	5	5	7	9	1	3	5	7	9	9	9	7	9	9	5	7
<b>DM3</b>	5	7	9	7	9	9	5	7	9	7	9	9	7	9	9	5	7	9
<b>DM4</b>	5	7	9	7	9	9	5	7	9	7	9	9	7	9	9	5	7	9
<b>DM5</b>	5	7	9	7	9	9	5	7	9	7	9	9	7	9	9	7	9	9
<b>DM6</b>	7	9	9	7	9	9	5	7	9	7	9	9	7	9	9	7	9	9
<b>DM7</b>	1	3	5	5	7	9	5	7	9	7	9	9	7	9	9	1	3	5
<b>DM8</b>	3	5	7	7	9	9	3	5	7	7	9	9	5	7	9	1	1	3
Criteria	C7			C8			C9			C10			C11					
<b>DM1</b>	7	9	9	3	5	7	7	9	9	5	7	9	7	9	9			
<b>DM2</b>	7	9	9	1	3	5	7	9	9	1	3	5	7	9	9			
<b>DM3</b>	7	9	9	3	5	7	7	9	9	3	5	7	7	9	9			
<b>DM4</b>	7	9	9	3	5	7	7	9	9	3	5	7	5	7	9			
<b>DM5</b>	7	9	9	3	5	7	7	9	9	3	5	7	7	9	9			
<b>DM6</b>	7	9	9	5	7	9	7	9	9	5	7	9	7	9	9			
<b>DM7</b>	3	5	7	3	5	7	7	9	9	1	1	3	5	7	9			
<b>DM8</b>	7	9	9	5	7	9	7	9	9	3	5	7	7	9	9			

(1,1,3) Very Poor  
(1,3,5) Poor  
(3,5,7) Fair  
(5,7,9) Good  
(7,9,9) Very Good

1	1	1	3
2	1	3	5
3	3	5	7
4	5	7	9
5	7	9	9

The AHP data reported here displays the ratings given on a 9-point scale by 8 decision makers (DMs) for 11 criteria (C1 to C11). The pairwise comparison matrix, where each row is a DM and each column denotes a criterion, displays the ratings for each DM. The values in the cells show how significant the DM believes the criteria on the left are in relation to the ones at the top. The values are between 1 and 9, with 1 denoting equal importance and 9 denoting extraordinarily high importance.

Criteria	Beneficial			Beneficial			Beneficial			Beneficial			Beneficial				
Parameters	C1			C2			C3			C4			C5				
Weights	3	5	7	3	5	7	3	5	7	3	5	7	3	5	7		
<b>DM1</b>	0.6	0.8	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.6	0.8	1.0	0.8	1.0	1.0		
<b>DM2</b>	0.1	0.3	0.6	0.6	0.8	1.0	0.1	0.3	0.6	0.8	1.0	1.0	0.8	1.0	1.0		
<b>DM3</b>	0.6	0.8	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.8	1.0	1.0		
<b>DM4</b>	0.6	0.8	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.8	1.0	1.0		
<b>DM5</b>	0.6	0.8	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.8	1.0	1.0		
<b>DM6</b>	0.8	1.0	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.8	1.0	1.0		
<b>DM7</b>	0.1	0.3	0.6	0.6	0.8	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.8	1.0	1.0		
<b>DM8</b>	0.3	0.6	0.8	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0	0.6	0.8	1.0		
Beneficial	Beneficial			Beneficial			Beneficial			Beneficial			Beneficial				
C6	C7			C8			C9			C10			C11				
3	5	7	3	5	7	3	5	7	3	5	7	3	5	7	3	5	7
0.8	1.0	1.0	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0
0.6	0.8	1.0	0.8	1.0	1.0	0.1	0.3	0.6	0.8	1.0	1.0	0.1	0.3	0.6	0.8	1.0	1.0
0.6	0.8	1.0	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0
0.6	0.8	1.0	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0	0.3	0.6	0.8	0.6	0.8	1.0
0.8	1.0	1.0	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0
0.8	1.0	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0
0.1	0.3	0.6	0.3	0.6	0.8	0.3	0.6	0.8	0.8	1.0	1.0	0.1	0.1	0.3	0.6	0.8	1.0
0.1	0.1	0.3	0.8	1.0	1.0	0.6	0.8	1.0	0.8	1.0	1.0	0.3	0.6	0.8	0.8	1.0	1.0

The values in the matrix are used to generate the criteria weights, which can be used to make decisions or assess alternatives based on the relative weights of each criterion, in order to interpret the results. The AHP method offers a means to calculate the weights of the criteria by combining the DMs' assessments and accounting for the consistency of their conclusions. The eigenvalue and eigenvector of the matrix are calculated mathematically in order to calculate the weights.

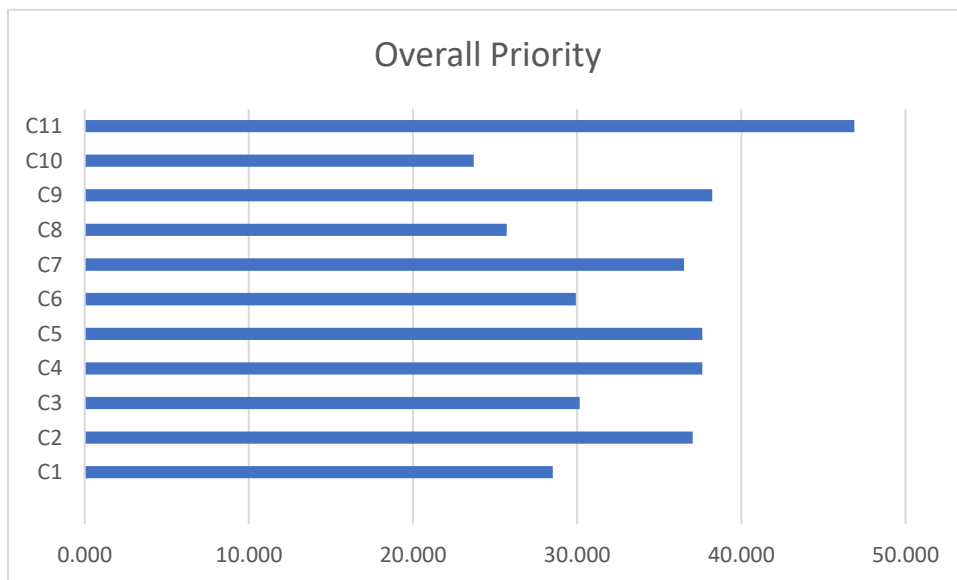
Criteria	Beneficial			Beneficial			Beneficial			Beneficial			Beneficial				
	C1			C2			C3			C4			C5				
Weights	3	5	7	3	5	7	3	5	7	3	5	7	3	5	7		
<b>DM1</b>	1.7	3.9	7.0	2.3	5.0	7.0	1.7	3.9	7.0	1.7	3.9	7.0	2.3	5.0	7.0		
<b>DM2</b>	0.3	1.7	3.9	1.7	3.9	7.0	0.3	1.7	3.9	2.3	5.0	7.0	2.3	5.0	7.0		
<b>DM3</b>	1.7	3.9	7.0	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0	2.3	5.0	7.0		
<b>DM4</b>	1.7	3.9	7.0	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0	2.3	5.0	7.0		
<b>DM5</b>	1.7	3.9	7.0	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0	2.3	5.0	7.0		
<b>DM6</b>	2.3	5.0	7.0	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0	2.3	5.0	7.0		
<b>DM7</b>	0.3	1.7	3.9	1.7	3.9	7.0	1.7	3.9	7.0	2.3	5.0	7.0	2.3	5.0	7.0		
<b>DM8</b>	1.0	2.8	5.4	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0	1.7	3.9	7.0		
Beneficial			Beneficial			Beneficial			Beneficial			Beneficial					
C6			C7			C8			C9			C10			C11		
3	5	7	3	5	7	3	5	7	3	5	7	3	5	7	3	5	7
2.3	5.0	7.0	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0
1.7	3.9	7.0	2.3	5.0	7.0	0.3	1.7	3.9	2.3	5.0	7.0	0.3	1.7	3.9	2.3	5.0	7.0
1.7	3.9	7.0	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0
1.7	3.9	7.0	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0	1.0	2.8	5.4	1.7	3.9	7.0
2.3	5.0	7.0	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0
2.3	5.0	7.0	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0
0.3	1.7	3.9	1.0	2.8	5.4	1.0	2.8	5.4	2.3	5.0	7.0	0.3	0.6	2.3	1.7	3.9	7.0
0.3	0.6	2.3	2.3	5.0	7.0	1.7	3.9	7.0	2.3	5.0	7.0	1.0	2.8	5.4	2.3	5.0	7.0

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
Weights	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
<b>DM1</b>	4.19	4.78	4.19	4.19	4.78	4.78	4.78	3.07	4.78	4.19	6.00
<b>DM2</b>	1.96	4.19	1.96	4.78	4.78	4.19	4.78	1.96	4.78	1.96	6.00
<b>DM3</b>	4.19	4.78	4.19	4.78	4.78	4.19	4.78	3.07	4.78	3.07	6.00
<b>DM4</b>	4.19	4.78	4.19	4.78	4.78	4.19	4.78	3.07	4.78	3.07	5.44
<b>DM5</b>	4.19	4.78	4.19	4.78	4.78	4.78	4.78	3.07	4.78	3.07	6.00
<b>DM6</b>	4.78	4.78	4.19	4.78	4.78	4.78	4.78	4.19	4.78	4.19	6.00
<b>DM7</b>	1.96	4.19	4.19	4.78	4.78	1.96	3.07	3.07	4.78	1.07	5.44
<b>DM8</b>	3.07	4.78	3.07	4.78	4.19	1.07	4.78	4.19	4.78	3.07	6.00

Higher values indicate greater importance, and the values in the matrix represent the relative importance of each criterion to the decision-makers. As a result of each decision maker's individual ratings for each criterion, each DM's row is distinct.

<b>Criteria</b>	<b>Overall Priority</b>	<b>Rank</b>
<b>C1</b>	28.519	9
<b>C2</b>	37.037	5
<b>C3</b>	30.148	7
<b>C4</b>	37.630	3
<b>C5</b>	37.630	3
<b>C6</b>	29.926	8
<b>C7</b>	36.519	6
<b>C8</b>	25.704	10
<b>C9</b>	38.222	2
<b>C10</b>	23.704	11
<b>C11</b>	46.889	1

Therefore, after applying AHP on the various factors given it was found that among all these factors Cultural difference was ranked 1 by decision makers followed by incentive, use of IT facilities, communication, competitive advantage, trust and collaboration, standardized data format, effective leadership, trust, collaboration and visibility. This is the priority list of all the factors which affect the information sharing in Supply Chain Management.



## **FINDINGS AND CONCLUSION**

Supply chain optimisation in supply chain management (SCM) depends on information exchange. The value of sharing information has been widely acknowledged in SCM research, and several case studies from different sectors serve as examples of this.

The current study aims to investigate the advantages and difficulties of information sharing in SCM and how it can be used productively to enhance supply chain performance. In the research demonstrates that efficient information sharing improves teamwork, cuts down on lead times, lowers inventory costs, and boosts customer satisfaction.

But putting information sharing into practise in SCM comes with its own set of challenges. These include issues like data security, the need for a uniform data format, and difficulties like the need for supply chain actors to have trust in one another.

According to the findings of the study, it is essential to address these problems through effective communication, the use of technology, and the building of strong connections among supply chain partners.

Overall, the research project has demonstrated that information sharing is essential to achieving supply chain optimisation. To accomplish common goals, supply chain partners must be motivated to exchange information and work together. It is consequently necessary to change corporate culture and foster confidence among supply chain partners.

As a result, effective information exchange in SCM can significantly improve supply chain performance, boosting a company's overall competitiveness. Businesses must invest in information exchange technology and build strong bonds with their supply chain partners if they are to achieve supply chain optimisation. And among the various factors given it was found that among all these factors Cultural difference was ranked 1 by decision makers followed by incentive, use of IT facilities, communication, competitive advantage, trust and collaboration, standardized data format, effective leadership, trust, collaboration and visibility. This is the priority list of all the factors which affect the information sharing in Supply Chain Management.

## **Case Study 1**

Company A, a multinational producer of automotive parts, encountered difficulties controlling its supply chain as a result of long wait times for raw materials from suppliers. Production was halted as a result of these delays, which also raised the cost of inventory. In order to resolve these problems, Company A put in place a thorough information-sharing system that made it possible to track inventory levels and delivery progress in the same time expected in supply chain.

Company A was able to proactively anticipate possible supply chain interruptions and take corrective action before they had an adverse effect on production thanks to the information-sharing system's visibility into supplier operations. Enhanced supplier cooperation and communication also resulted in shorter lead times and more reliable deliveries.

Suppliers are now able to recognise and respond to quality issues in real-time thanks to the information-sharing system's ability to share quality data. With the help of these initiatives, Company A was able to cut supply chain expenses by 15%, increase on-time delivery performance by 30%, and decrease inventory levels by 20%.

Customer satisfaction grew as a result of the improvements in supply chain performance, which also increased the company's ability to compete in the market. This case study emphasises the significance of information ways to share it in supply chains and the ways in which it may enhance supplier collaboration and communication, shorten lead times, boost delivery reliability, and ultimately enhance the exact performance and efficiently of the supply chain.



## **Case Study 2**

The exact collaboration among the players like Walmart and Procter & Gamble (P&G) is one of the most well-known case studies on sharing of the informations in the supply chain. Due to poor communication and the coordination, Walmart and P&G had trouble managing their supply chains in the early 2000s. While P&G had trouble forecasting demand and maximising output, Walmart struggled with stockouts, excess inventory, and a lack of visibility into supplier operations.

To solve these issues, Walmart and P&G established the "Continuous Replenishment Programme" (CRP), a joint initiative in which P&G provided Walmart with real-time sales information so that the retailer could modify its inventory levels and order quantities immediately. Additionally, P&G acquired access to Walmart's point-of-sale information, which aided the business in improving demand forecasts and streamlining production planning.

Walmart was able to significantly save costs by reducing stockouts by 16% and excess inventory by 12% as a result of the CRP effort. P&G, on the other hand, was able to enhance order fill rates by 5%, cut inventory by 20%, and minimise stockouts by 10%.

A more responsive and effective supply chain was produced as a result of Walmart and P&G's better collaboration and communication thanks to the CRP programme. Since the initiative's success, suppliers and retailers all over the world have partnered together in similar ways.

This case study exemplifies the crucial benefits of the information sharing in the supply chain management as well as the significance of cooperation and coordination in attaining supply chain optimisation. Walmart and P&G addressed supply chain difficulties and made substantial progress by exchanging real-time data which help in improvement of supply chain efficiency.

### **Case Study 3**

A well-known case study of information sharing in supply chain management in the automobile industry is the collaboration between Toyota and its suppliers.

Toyota encountered significant issues with supply chain management in the 1990s, including protracted lead times, frequent stockouts, and poor quality. To solve these issues, Toyota developed a collaborative strategy with its suppliers that involved exchanging information and working together to improve the entire supply chain.

The "Toyota Production System" (TPS) approach required regular communication and coordination among suppliers and involves exchanging production schedules, inventory levels, and quality data. Toyota has achieved success by working closely with its suppliers to cut lead times, improve quality, and increase manufacturing efficiency.

In addition, the TPS strategy relied on a "just in time" form of inventory management, where inventory levels were kept to a minimum and deliveries were planned to coincide with production requirements. This strategy enabled for better cash flow management, decreased inventory expenditures, and increased supply chain responsiveness.

The TPS method led to significant improvements in Toyota's supply chain performance, including shorter lead times, higher-quality products, and increased efficiency. Numerous companies in the automotive industry and beyond have now adopted the method, proving the importance of collaboration and information sharing in achieving supply chain optimisation.

The automotive sector case study illustrates the significant benefits of information sharing in supply chain management as well as how supplier collaboration and coordination may enhance supply chain performance. Toyota was able to overcome its supply chain issues and achieve notable gains in supply chain performance by collaborating closely with its suppliers and sharing information.

## **Case Study 4**

The relationship between Apple and its suppliers is a well-known case study on information exchange in supply chain management in the smartphone sector. Apple developed close relationships with its suppliers and put in place a comprehensive information-sharing system that allows for real-time monitoring of inventory levels, delivery status, and quality data throughout the supply chain. This is due to the complicated global supply chain that Apple uses to source components from numerous suppliers in different countries.

Apple was able to proactively identify possible supply chain interruptions and take corrective action before they had an impact on production because to its information-sharing system, which gave the business visibility into supplier operations. As a result, Apple was able to improve the quality of its products and optimise its production planning by allowing suppliers to exchange data about their production processes.

Additionally, Apple worked closely with its suppliers to enhance working conditions and lessen their influence on the environment throughout the supply chain. The business established a thorough programme for supplier accountability, which included audits and assessments to make sure compliance with labour and environmental requirements.

With the use of these techniques, Apple was able to significantly improve the performance of its supply chain, which resulted in shorter lead times, higher-quality products, and more supply chain sustainability. Since then, the company's supply chain procedures have evolved into industry standards for companies both inside and beyond the smartphone sector.

In the smartphone sector, this case study demonstrates the benefits of sharing all the data and information with our vendors or partner as well as the significance of supplier cooperation and coordination in attaining supply chain optimisation.

## **LIMITATIONS OF THE STUDY:**

- ❖ The size of the sample collected is small due to time constraint and technical questions.
- ❖ Cost Constraint.
- ❖ The research may be biased as per the perception of the respondents.
- ❖ Some respondents might not have given the correct information as they consider it as wastage of their time or they think that they can't share the confidential information.

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