

## **Operational Performance through Supply Chain Management Practices**

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### **Abstract**

*The present work attempts to find the gap between agreement level and adoption level of various supply chain management (SCM) practices in paint companies who are operating in India. An empirical study was carried out with paint companies. Paired samples t- test was used to find out the difference in agreement and adoption level of various SCM practices and multiple regression analysis was used to check the relationship between dependent and independent variables. A significant difference was found between the agreement level of SCM practices and adoption level of such practices in the responses of Indian paint companies. A significant correlation was found between the operational performance of companies and SCM practices. The study was limited to Indian paint industry which needs to be generalized.*

**Key words:** Supply Chain Management, Operational Performance, Paint Industry.

### **1.1 Introduction**

The increasingly flattening world is constantly evolving and impacting the way companies do their businesses. The success of a company depends on developing innovative supply chain strategies that help the company to win, in turns and make money from information while driving continuous improvement. Supply Chain Management (SCM) practice enables world's leading organizations to re-align their supply chains to the flat world paradigm by providing functioning solutions for company needs in supply & demand planning and forecasting, sourcing & procurement, supply chain execution and enterprise asset management. Now-a-day many organizations become a part of at least one supply chain. They have to perform equally well, in order to achieve better performance. It also requires elimination of interfacing between many techniques across applications and individual departments. The supply chain is the flow of information, fund and material through a manufacturing company, from the supplier to the customer. Traditionally the flow of material has been considered only at an operational level, but this approach is no longer adequate. It is now essential for business to manage the supply chain in order to improve customer service, achieve a balance between costs and services and thereby give the company a competitive advantage.

Managers must work to integrate the supply chain; i.e. to ensure that all the functions and activities involved in the chain are working harmoniously together. Supply chain management works to bring the supplier, the distributor and the customer into one cohesive process. The manufacturers, suppliers, transporters, warehouses, retailers and customers are involved in a dynamic but constant flow of information, products and funds. SCM has also become known as the supply network or the supply web because they show how each unit interacts with the others. The suppliers and distributors that were once adversaries are now becoming partners for the betterment of both corporations. Effective management must take into account coordinating all the different pieces of the chain as quickly as possible without losing any of the quality or customer satisfaction, while still keeping costs down. The effective management of product and information flow is clearly a key aspect of SCM.

Businesses and supply chains have become substantially more global over the last decade. Between 1995 and 2010, the numbers of transnational companies have increased more than double. In addition to spreading geographically, supply chains now involve more companies. Maximum companies are expecting the number of collaborative relationships with suppliers and third parties to increase and an ever-broader range of activities is being outsourced (Corsten & Kumar, 2005). Supply chains must also compete with rapidly expanding and contracting product portfolios. Supply chains can't keep pace with cost volatility. Now companies rank cost containment as their number one responsibility to the business far ahead of enterprise growth and product/service innovation (Lee & Kwon, 2007). The intense focus on controlling costs is also quite evident in their activities and programs. However, what used to be a methodical, continuous improvement process has turned frenetic.

Shocks to integral costs; rapid wage inflation in previously low cost labor markets, spikes in commodity prices, or even sudden credit freezes are becoming more common. Companies also find themselves reacting to whatever the cost issue of the day happens to be. Escalating fuel prices, scrambling companies to reevaluate distribution strategies, engage third-party logistics providers more extensively or even shared loads with competitors (Malek et al, 2005). New designs are outdated before companies can implement them. Leading supply chains focused on flexibility (Kristal et al, 2010). When it comes to managing costs, companies with top supply chains take a longer-term view. They are moving more quickly toward agile supply chains that allow rapid response to changing market conditions and variable cost structures that ramp up and down with revenues (Stavrulaki & Davis, 2010). Flexibility is the antidote for cost volatility. Now a day's when information is abundant and connectivity is more feasible than ever, companies still taking visibility as their greatest management challenge. Although more information is available, proportionally less is being effectively captured, managed, analyzed and made available to people who need it. Visibility and the collaboration required to get information and make decisions with it was not attracting much attention in terms of activities and programs (Attaran, 2007).

Companies are focusing more on strategy alignment, continuous process improvement and cost reduction. Making matters worse, the majority of those companies who have tried to improve external visibility describe their efforts as largely ineffective, making external visibility projects the least effective of all initiatives executives are undertaking. Though it may seem logical to blame poor visibility and collaboration on inadequate IT, companies were pointed elsewhere (Attaran, 2007). Not surprisingly, organizational silos are the biggest barrier. But organizations are too busy to share information or they simply do not believe that collaborative decision making is important. Companies have implemented practices aimed at improving visibility, such as continuous replenishment and inventory management with customers. In contrast, leaders of top supply chains are much more focused on improving visibility.

## **1.2 Supply Chain Management and Indian Paint Industry**

The de-regulation of the Indian economy in the last two decades has attracted global players in every industrial sector and has unleashed a new competitive spirit in the Indian organizations. According to Sahay (2000), India was counted among the richest with regard to cheap skilled labor, scientific and technological resources and entrepreneurial talents. However, India lags behind in competitiveness because of various factors. These include continued reliance on licensing rules, price controls and state ownership of crucial undertakings, currency controls, barriers to trade along with political instability and a high level of corruption. Another distinct characteristic of the Indian economic environment is the inadequacy of basic inputs normally required to support organized economic activity. The Indian infrastructure comprising roads, railways, airports, seaports, information technology (IT), telecommunications and energy production is considered very poor as compared with other developed and developing countries. International retailers had until January 2006 been able to operate in India only through franchise arrangements with local partners.

The Indian Government passed a regulation in January 2006 allowing entry of foreign single retail brands without the need for franchise arrangement. Starting from February 2006, foreign single retail brands are allowed to open their own stores in India, or own up to 51% of local joint ventures. Boom in Indian Housing Sector: Increasing urbanization, cheaper housing loans and a shift from semi-permanent to permanent housing structures have been driving growth in decorative paints segment, which constitutes 70% of the paint industry in India. An average growth of about 10% in the automobile sector provides 50% of the revenues to the industrial paints segment. Industrial paints account for 25% of the paint industry revenue in India. New projects in roads, ports and industrial segments increase revenues from protective coatings for civil applications and road-marking paints to all parts of the building paints sector, whether interior, exterior, waterproofing or floor coatings.

Over 40% of the industrial sector takes the form of OEM finishes, which is expected to grow steadily as a result of increasing demand for consumer goods in India as well as India's position now as a leading manufacturing hub for the supply of goods to the South East Asian and other world markets. About 65% of the demand for decorative paints stems from repainting. Lifestyle based spending by Indian middle class is helping decorative segment of this industry. Contemporary wood finish formulations are replacing the more traditional lacs and exterior emulsions take over from cement paints. Four Major Players control 50% of the market share. The demand for paints is relatively price elastic but is linked to the industrial and economical growth. The four major players have successfully raised average prices over the last 3 years without losing market share.

The industry majors have a vast dealership network and are required to maintain high inventory levels. Global Strategic tie-up takes place in technology and R&D.

According to CMIE, over the next few years, the ratio of industrial paints to decorative paints is expected to be 50:50, more in line with the global trend. Currently it is 25:75. With the decorative segment bottoming out, companies are increasingly focusing on industrial paints. Demand for paints from new housing is expected to constitute approximately 30% of total demand; the rest comes in from repainting, mainly after the monsoon rains and before the festive season. This is a function of disposable income, so improvement in rural incomes will boost the growth in the paint sector. Lending institutions continue to make it easier for a consumer to gather up the finances needed to buy homes. Within the decorative coatings segment, considerable growth is being observed in the exterior coatings segment. Paint manufacturers have launched premium products in this category which are doing well due to superior quality and durability. Market Growth of paint industry would be about \$200 - \$400 million per year over next 5 years. Growth rate in the organized sector expected to be 15 – 17% per annum. Now a day's Paint companies are mulling price hikes to pass on the rise in input costs of crude based derivatives to the end users. Akzonobel and Kansai Nerolac have plans to increase product prices by 2-4% in coming times. However it will be a partial pass on and the companies will take a hit on their profitability (CMIE, 2010). New capacities added will help the industry to cater to the rising demand.

The purpose of the study is to explore, understand and analyze the impact of adopted SCM practices by Indian paint companies on their operational performance and then to suggest measures and recommendations to improve the performance through SCM practices. The paper constituted in seven sections i.e. first chapter is Introduction section which provided the details of SCM, second section is Review of Literature which critically examined and evaluated various literatures related with SCM, third section is Research Methodology which focuses on the adopted research methods for present study, fourth section is Analysis of Data and Interpretation which analyze the data collected from respondents, fifth section explain the Results, Conclusions and Recommendations and sixth section discusses the Limitation and Future Research Scope of the study.

## **2.1 Review of Literature**

The concept of SCM has been considered from different perspectives, such as purchasing and supply management, logistics and transportation, operations management, marketing, organizational theory, management information systems (Croom et al, 2000). The focus of SCM is integration of three broad functions namely supplier relationship management (SRM), internal supply chain management (ISCM) and customer relationship management (CRM) with a view to managing the smooth flow of product, information and funds among the supply chain partners and delivering superior value to the end customers (Chopra & Meindl, 2006). As per the definition of Supply Chain Council (2002), the supply chain encompasses every effort involved in producing and delivering a final product from the supplier's supplier to the customer's customer. Most of the SCM definitions cited material/physical, finances, services and/or information flow as key concepts of activities. Zsidisin et al. (2000) described the primary goal of SCM as effectively managing the flow of materials and information from supply sources to the final point of sale. SCM has also been described as the management of raw materials, in-process materials and finished-goods inventories from the point of origin to the point of consumption and the planning and control of materials and information from suppliers to end customers.

Mentzer et al. (2001) defined SCM as 'the systematic, strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain, for the purposes of improving the long-term performance of the individual companies and the supply chain as a whole'. According to Walters and Lancaster (2000), supply chain management is the management of the interface relationships among key stakeholders and enterprise functions that occur in the maximization of value creation which is driven by customer needs satisfaction and facilitated by efficient logistics management. Elmuti (2002) defined supply chain management as the works to bring the supplier, the distributor and the customer into one cohesive process. According to Dainty et al. (2001), supply chain management has recently concentrated on closer relationships between parties involved in the flow of goods from the supplier to the end-user. However, the concept of SCM adding value for consumers and stakeholders highlights that the value-added components of SCM, such as technical support and training services, clearly separates it from traditional logistics management (Jones & Towill, 1997). Further, the concept of adding value in the supply chain is becoming even more important.

Each supply chain member performs a specific added value function in relation to the product/service as it progresses towards the final consumer. According to Mowat & Collins (2000), understanding and meeting consumer needs has principal importance in SCM as a way of optimizing value to customers and improving return to all stakeholders in the supply chain. According to Kuei et al. (2001), SCM practitioners must maintain and sustain a customer-driven culture. Others argued that the most basic purpose of SCM is conforming to customer requirements and one of the two most important aspects of SCM is that it focuses on customers at the end of the chain (Taylor, 1997). Throughout the 1990s, supply chain management continued to evolve, as outsourcing became a more approved practice. Since supply chain management is consumer-driven, it is imperative that requirements are met quickly and accurately with as minute waste and as few defects as possible. The essence of SCM was the co-ordination and integration of different processes throughout the supply chain both upstream and downstream. The SCM concept had been advanced mainly from two bodies of knowledge (1) purchasing and supply management and (2) transportation and logistics management (Tan et al, 1998). According to purchasing and supply management perspective, SCM was synonymous with rationalization of supply base and integration of suppliers into product development and manufacturing activities (Krause, 1997).

Further according to transportation and logistics management perspective, the focus of SCM was on reduction of inventories both within and across the organizations in the supply chain and improvement of service level (Alvarado & Kotzab, 2001). As global markets evolved, supply chain managers were faced with continuously changing market dynamics, new global markets and stressful competitive environments (Mehra & Inman, 2004). Dealing with traditional tradeoffs was no longer an option and firms were finding the need to optimize their supply chain strategies over a much broader base (Meredith & Roth, 1998). Because supply chains extended across several functions and many organizations, each has its own priorities and goals (Narayanan & Raman 2004). Additional challenges were presented by the availability of electronic links for improving supply chain performance (Poulymenakou & Tsironis 2003), which made it much more difficult for organizations to observe other firms' actions (Narayanan & Raman, 2004) and caused an increased focus on cost cutting and efficiency (Liker & Choi, 2004). Thus, serious threats from competition and declines in markets have forced a change in supply chain management. Initiatives such as quality management offered the potential for dealing with these challenges (Mehra & Inman, 2004). Traditional supply chain management, where suppliers were selected based on price (Chen & Yang, 2002) may lead to results that deter an organization from competing in global markets.

Suppliers were pitted against each other to obtain the lowest price, buyers believed that their position was enhanced by having a large number of competing suppliers and Internet-based technologies have led companies to the conclusion that the immediate benefits of low cost global suppliers outweigh the long-term benefits of investing in relationships (Liker & Choi, 2004). Supplier development practices were traditionally perceived as uneconomical (Forker et al., 1999), exemplified by the existence of large supplier bases and arms-length relationships. Low cost, efficient supply chains were often unable to respond to unexpected changes in demand or supply, due to their scale economies (Lee, 2004). In an effective supply chain network, members maintain and sustain a customer driven culture, offering the right product in the right place, at the right time and at the right price (Kuei et al. 2001). Although customers may blame the final producer for quality problems, they were often part of a broader problem related to how the supply chain was managed (Trent & Monczka, 1999). Thus, customers were the drivers of supply chain management. Ascertaining customer requirements completely and accurately were of the utmost importance (Crosby & LeMay, 1998) and establishment of a close communication loop was critical in establishment of what Ferdows et al. (2004) referred to as a super responsive supply chain. In fact, this was a two-way relationship; in addition to helping a buyer compete on speed, the best suppliers can also provide quality and design insights to the buyer. Maximum efficiencies, logistics and product distribution are key in supply chain management.

Supply chain performance has never been as important as it is today. In an economy where supply chains and not companies, battle one another, how a supply chain performs determines who will win the battle. To achieve maximum competitive advantage through the supply chain, the supply chain must be performing at its best or anything it has gained will be short-lived. Yet, many companies are not aware of how their supply chains are performing or even what supply chain they are in. Competitive advantage is the extent to which an organization is able to create a defensible position over its competitors (McGinnis & Vallopra, 1999).

It comprises capabilities that allow an organization to differentiate itself from its competitors and is an outcome of critical management decisions. The empirical literature has been quite consistent in identifying price/cost, quality, delivery and flexibility as important competitive capabilities (Tracey et al., 2005). In addition, recent studies have included time-based competition as an important competitive priority. A company works hard to maximize its individual functions. The goal of individual departments is to be the best department in the company. Organizational effectiveness is not the focus. Instead, each organizational element attempts to function well on its own. Each division/department applies its own strategy for applications used. If an organization hopes to pursue supply chain excellence, it must look within itself, eliminate and shape any boundaries between departments and facilities and begin a never-ending journey of continuous improvement. Its individual link must be evolved to make it the most efficient, effective, responsive and holistic that it can possibly be. Supply chain collaboration work better when the links between supply chain partners were performing to the best (Cassivi, 2006)). The more effective companies are internally, the more effective their supply chain will be. Supply chain excellence required that all links work together and links work better when they were shared information. Visibility established the groundwork for information sharing (Attaran, 2007). It minimizes supply chain surprises because it provides the information links need to understand ongoing supply chain processes.

Collaboration is achieved through the proper application of technology and true partnerships. Through collaboration, the supply chain can determine how best to meet the demands of the marketplace. The supply chain works as a whole to maximize customer satisfaction while minimizing inventories. The most important work a company can do today is to fully understand and advance its supply chain contribution. Strategic sourcing and logistics are fundamental enablers to achieving lowest total-cost producer status. Beginning with defining a customer's wants and needs and culminating with fulfilling them; any organization's supply chain represents a complex array of business processes, decisions and resource commitments, unsurpassed by any other dimension of the organization. Best-in-class companies, who routinely achieve double-digit price/cost reductions are characterized by intense focus, impeccable definition and aggressive, systematic execution in realizing the full contributions available in strategic sourcing and logistics. Waste and costs are stripped out. Critical supply chain capabilities were integrated with core business competencies to create customer value and promote profit (Defee & Fugate, 2010)). Cross-functional teams empowered to establish lowest-total-cost sourcing and logistics strategies, business practices and decision hierarchy are the hallmark of supply chain success.

The efficiency and effectiveness of these processes are quickly becoming the industry-competitive differentiators. Supply chain integrates core business and customer needs with best-in-class supply base capabilities (Chen & Paulraj, 2004). It helps companies routinely achieve double-digit price/cost reductions and drives profitability upwards. In fact, profits soar when supply chain costs are reduced by double digits. A company requires a defined mission and philosophy, creative and innovative strategies. Goals, expectations and performance measures must be established. Strategic sourcing and logistics are customer-focused. Competitive, coordinated initiatives and enablers build distinctive competencies that competitors cannot easily duplicate. Best practiced supply chain management integrates user expectations, commercial requirements and the flow of purchased materials and services. It establishes a lowest-total-cost life cycle relationship with the supply base. It competes at the customer end item level. It wins customers by providing better value. It rewards shareholders by enhancing profitability and providing better returns. Companies should understand the importance of driving integrated supply chain solutions that provides a sustainable competitive advantage for today's and tomorrow's, changing business environment (Korgaonker, 1999). Companies should prioritize and focus on the best supply chain opportunities for cost reduction, process improvement and profitability enhancement in the shortest amount of time.

Using aggressive, practical strategic sourcing and logistics philosophies, strategies, techniques and practices, integrated strategies takes supply chain concepts to reality and converts cost to profit. Working shoulder-to-shoulder with clients, integrated strategies' team members roll up their sleeves and focus on two critical results that drive customer success, client profitability enhancement and knowledge transfer. It is not enough to simply enhance client profit one time; profitable competitive advantage must be sustained over time. Companies should consider the front-end of the supply chain as important as the back-end in maximizing economic yield. Smart companies treat the front-end with much greater emphasis, since companies are getting more demand from different places such as the Internet, through partnerships, or online marketplaces. Paying closer attention to demand and managing it effectively through yield management can pay off substantially; as it lets the company sell what it has rather than make what it sells.

Supply chains are becoming too complex for any one party to dominate with its own resources and several exceptional capabilities are worth more than a lot of good ones. When delivering new offerings or products to the market, it may be faster, cheaper and more efficient to collaborate with partners than to build the capabilities himself. The ability to integrate new and innovative capabilities with the business model will drive higher levels of value creation. A company's ability to adapt and change itself will prove even more critical to its future success; those that can't migrate will be the ones who get left behind. Companies that can work efficiently with multiple partners will gain the most benefits, while those who are too difficult to work with will be ignored.

### **3.1 Research Methodology**

Now a day's competition between Indian paint companies is increasing rapidly. In order to retain and sustain in such high competitive business environment paint companies are now trying to improve their operational performance and achieve competitive advantage effectively and efficiently. In such situation supply chain management can play an important role in improving operational performance and achieving competitive advantage. Through supply chain management practices paint companies can minimize their system wide costs and also provide maximum value to their customers. In such scenario the problem is to how strategize and manage the supply chain practices so that the Indian paint companies may improve their operational performance and achieve competitive advantage in highly competitive Indian paint market?

### **3.2 Objectives of Study**

The objectives of the study are:-

1. To identify and suggest the strategies for filling the gaps between various agreed but not adopted SCM practices in Indian paint industry.
2. To assess the impact of information & communication technology (ICT) tools and techniques on operational performance.
3. To assess the impact of strategic sourcing & supplier relationship practices on operational performance.
4. To assess the impact of supply chain manufacturing on operational performance.
5. To assess the impact of inventory and warehousing management system on operational performance.
6. To assess the impact of transportation and distribution management on operational performance.
7. To assess the impact of customer relationship management practices on operational performance.

### **3.3 Research Hypotheses**

The study has been carried out with following hypotheses:

- H1:** There is significant difference in agreement level and adoption level of various SCM practices in Indian paint companies.
- H2:** Information & communication technology (ICT) tools and techniques would serve as enabler in supply chain management to improve operational performance.
- H3:** Strategic sourcing & Supplier relationship practices would serve as enabler in supply chain management to improve operational performance.
- H4:** Supply Chain Manufacturing System would serve as enabler in supply chain management to improve operational performance.
- H5:** Inventory & Warehousing management system would serve as enabler in supply chain management to improve operational performance.
- H6:** Transportation & Distribution management would serve as enabler in supply chain management to improve operational performance.
- H7:** Customer relationship management practices would serve as enabler in supply chain management to improve operational performance.

### **3.4 Research Design Strategy**

To explore and understand the supply chain management practices in Indian paint industry, the study used descriptive cum analytical research. It requires a clear specification of the who (paint companies operated in India), what (SCM practices), when, why (higher cost and less profit) and way (survey) of the research. It is used to describe the characteristics of Indian paint industry, such as players in paint market and their shares in market. It is useful to estimate the percentage of paint companies in a specified population i.e. in Indian paint industry using SCM practices and their awareness about SCM practices. Whereas analytical research helps in determining the degree to which adopted SCM practices and performance of paint companies are associated.

The study employed descriptive cum analytical research in the form of a survey undertaken to quantify the importance of the different SCM practices for improving operational performance of Indian paint companies. In the present study, structured questions were asked to respondents of paint companies about their agreement and adoption level of SCM practices in their organization and also the impact of these SCM practices on their operational performance. Indian paint companies have not been able to minimize their supply chain cost efficiently. To minimize the supply chain cost and improve their performance, it is necessary to know the answers of why, how, when etc. that is why, the study, in order to know these entire why, how and when about the implementation of SCM practices, used the survey method.

### **3.5 Sampling of Paint Companies**

The SCM issues are technical in nature where respondents need to be conversant with the SCM issues such as SCM strategies, policies, methods and terms of supply chain management. Hence the present study targeted those managers or executives of paint companies who were dealing with the supply chain operations. The population for the present study includes all paint companies, which are operating in India and the sampling frame consists of all paint companies which are registered in Confederation of Indian Industry (CII). For the present research study, initially simple random sampling was adopted. Nearly one third of the sample elements i.e. around 100 companies were targeted to get response of questionnaire through email. The response rate was dismal. Thereby, in the second stage, the judgmental sampling was adopted so as to cover top 15 companies of Indian paint industry that included both the segments i.e. decorative as well as industrial coatings. Later on 17 more companies were included based on availability of proper contacts at top level of organization. Secondary data was collected through CII reports, CMIE, research reports and website of paint companies. Various Libraries and online journal web sites such as sciencedirect.com, emeraldinsight.com and jstor.org were consulted for literature review.

The collection of primary data for business research is of main importance to assist management in making decision. Generally, information regarding a large number of characteristics is necessary to analyze any problem pertaining to management. The collection of primary data requires a great deal of deliberation and expertise. Primary data was collected through questionnaire for paint companies. Interviews were conducted to understand the management dilemma and define the research problem. Interviews with managers and executives were carried out to understand the difference in opinions observed in responses to various questions. A questionnaire with structured questions on agreement and adoption continuum on five point Likert type scale were developed based on the attributes identified from literature and discussions with paint companies officials for their suitability.

The study used operational performance as dependent variable and the SCM enablers used as independent variables. It includes independent variables such as- Information & communication technology (ICT) practices, Strategic sourcing & supplier relationship practices, Supply chain manufacturing practices, Inventory and Warehousing Management System, Transportation and Distribution management system and Customer relationship management practices. The study used operational performance parameters such as procurement cost, manufacturing cost, inventory carrying cost, distribution cost, transportation cost, order fulfillment cycle time, inventory turnover (no. of times), on time delivery, frequency of stock out, product rejection rate, backorder and cash-to-cash cycle time as independent variables. Once the questionnaire was ready, it was pre-tested by administering it to experts in academics and industry. Questionnaire was 'self-administered' to the respondents. A personal interview pretest method used for debriefing or protocol approach.

### **4.1 Data Analysis**

The data obtained through questionnaire was subjected to split-half technique to check the reliability of used scales in the question. Cronbach's alpha value for part 1 and part 2, in the questionnaire was 0.990 and 0.975, while Guttman-split coefficient value was .895. Correlation between forms was .910. The values were more than 0.6, showing high correlation between two halves, indicating scale is having high reliability. The agreement and adoption continuum questions, which appeared in the questionnaire, were analyzed by calculating mean to know the views of the respondents. Agreement and Adoption continuum questions, which appeared in the questionnaire, were subjected to Paired T-Test to check the difference in opinion of responses.

The data collected as responses to questionnaire was entered into the computer using Microsoft Excel software. The data was then subjected to analysis using an application software packed named as Statistical Package for Social Sciences (SPSS) version 16.0. The data generated from the questionnaires were subjected to different data analysis techniques as shown in Table- 5.1.

**Table- 1.1: Types of Questions and Data Analysis Techniques Used**

Sl.	Type of Question	Data Analysis Technique	Remarks
1.	Dichotomous questions	Frequency count	To know views of the respondents.
2.	Agreement continuum and adoption continuum questions.	Paired Samples T- Test	To check the difference in agreement and adoption level of SCM practices.
3.	Range of performance measurement questions.	Multiple Regression analysis	To find the predictor variables for various performance measuring variables.

**5.1 Conclusion and Recommendations**

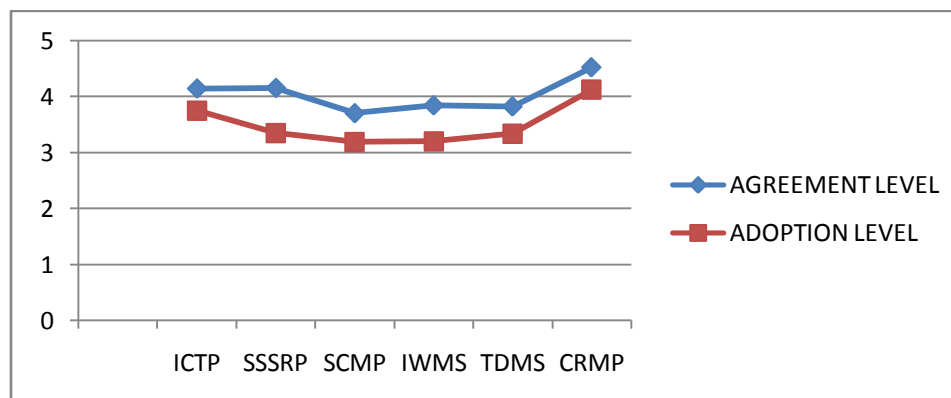
Significant difference in opinion about agreement and adoption level of various SCM practices in paint companies were found that lead to acceptance of alternate hypothesis. Results of paired sample t-test are clearly shown in table 1.2.

**Table-1.2: Result of Paired Sample T- test**

Sl.	Factor	T	P
1.	Information and Communication Technology Practices	5.233	.044
2.	Strategic sourcing and supplier relationship practices	8.392	.038
3.	Supply chain manufacturing practices	6.764	.009
4.	Inventory and Warehousing Management System	9.302	.008
5.	Transportation and Distribution management system	7.918	.022
6.	Customer Relationship Management	6.854	.035

The mean values were used to know the differences between agreement level and adoption level of various SCM practices by Indian paint companies. A significant difference in opinion about agreement and adoption level of various SCM practices was found. There was less difference found between agreement level and adoption level in the case of Information & Communication Technology Practices, Transportation and Distribution Management System, Customer Relationship Management Practices, while in case of Strategic Sourcing and Supplier Relationship Practices, Supply Chain Manufacturing Practices, and Inventory & Warehousing Management System, a significant difference was found. There were various reasons behind the differences between agreement and adoption level of different SCM practices such as lack of information and awareness about various ICT practices and tools, ICT enabled techniques such as ERP practices, data warehousing and data mining techniques and understanding the utilities of such techniques among paint companies.

Companies did not adopt strategic sourcing and supplier relationship practices up to significant level because they were less aware about the strategic sourcing and strategic partnership practices and also worried that if they select few suppliers and one of those suppliers suddenly unable to deliver a product or service that is key to their core business, it could bring their operation to a close down. Paint companies were adopted only few manufacturing practices as per their production objectives and customers. There was a significant difference in agreement and adoption of tracing and tracking system for vehicular movement because maximum paint companies outsourced their logistic activities through 3PLs and these 3PLs were monitoring and managing the entire logistic activities of companies. That is why paint companies did not adopt such system to a significant level. In case of customer relationship management practices, maximum small companies were in dilemma of its adoption. The result of trend analysis is clearly shown in graph 1.1.



**Graph 1.1:** Trend analysis of agreement and adoption level of various SCM practices in paint companies operating in India.



## **5.2 Recommendations**

In order to achieve all the objectives, paint companies should do following activities-

1. Paint companies should have a separate supply chain management department in order to manage all the activities of supply chain.
2. Paint organizations should implement ERP (enterprise resource planning) software to align business objective with latest technology solutions and for optimum utilization of organization's resources and assets.
3. Paint companies should implement different strategies for different suppliers of product and service.
4. Paint companies should minimize the cost through increased centralization because economies of scale can be achieved with larger storage cycles to a certain level.
5. Paint companies should outsource their logistic activities through 3PLs which includes activities apart from transportation, warehousing and custom clearance a whole range of other activities such as freight bill payment, auditing, contract manufacturing and assembly operations, packaging and labeling etc.
6. Paint companies should use a combination of milk runs, cross-docking and TL & LTL carriers along with package carriers in some cases. High demand products to high demand retail outlets may be shipped directly, whereas low-demand products or shipments to low demand retail outlets are consolidated to and from the distribution center (DC).
7. Paint companies should provide platform to receive complains & feedback from customers. Paint companies need to develop their own websites for receiving the customer complaints and feedback and providing all information required by customers. Paint companies can also create their own blog spots, Facebook and MySpace pages and Twitter accounts in addition to monitoring customers' complains and feedback.

## **6.1 Limitations and Scope of Future Research Study**

Since it was a descriptive type of study, accuracy depends upon the correct information given by the respondents, i.e., managers and executives of paint companies. Respondents may have been reluctant to express poor performance on the attributes pertaining to their or respective departments functioning. Questionnaire has been used for survey in the present study. Though every effort was made to make questionnaire as simple as possible, with definitions of the terms, still some respondents may not have been able to comprehend it fully. Respondents may not have given the true feelings in the responses with the fear that their identity cannot be strictly kept confidential due to the fact that population was small. The data collected was based on the perceptions of the paint company's employees. Thus, there could be difference in perception of the respondents to that of the organization as whole. The study was limited to Indian paint industry. It should be incorporated with other industry also to generalize such concept. The study although included the responses of all top paint companies and market leaders in India but the sample size was small. The study did not include the green and environmental aspect of SCM which is now a day's one of the most important issues for paint companies. Big paint companies adopted the SCM practices, but still maximum small paint companies were unaware about latest SCM practices. The study has provided the important knowledge and scientific propositions about SCM practices which will be applicable to paint companies in general. The study has provided the possibility of improvement in SCM practices adopted by paint companies in order to minimize the cost and maximize the customer values.

Because of the limited number of observations (32), the revalidation of constructs was not carried out in this research. Lack of systematic confirmatory research impedes general agreement on the use of instrument. Future research should revalidate measurement scales developed through this research. As the concept of SCM is complex and involves a network of companies in the effort of producing and delivering a final product, its entire domain cannot be covered in just one study. Future research can expand the domain of SCM practice by considering additional dimensions such as geographical proximity, cross-functional coordination, logistics integration, green practices and agreed supply chain leadership, which have been ignored from this study. The future study can also test the relationships/dependencies among twelve dimensions of SCM practices. It will also be of interest to use the respondents from pairs of paint organizations at two ends of supply chains. By comparing different view of SCM practices from paint organizations across the supply chain, it is possible to identify the strength and weakness of the supply chain and also the best common SCM practice across the supply chain. It will also be interesting to examine the impact of supply chain structure (supply chain length, organization's position in the supply chain, channel structure, and so on) on SCM practice and competitive advantage.

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