A STUDY OF THE EFFECT OF TECHNOLOGY ON SUPPLY CHAIN MANAGEMENT IN CONSUMER GOODS MANUFACTURING IN INDIA

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Abstract

The effect of technology on the consumer goods industry in India has been far reaching and profound. With the introduction of technologies such as cloud computing, analytics, automation and artificial intelligence, companies have achieved unprecedented levels of efficiency and performance when it comes to supply chain management. The aim of this study is to analyze the effect of technology on supply chain management in consumer goods manufacturing in India. The primary data was collected through a survey and interviews with selected consumer goods manufacturers from different parts of the country. The results show that almost all respondents are using disruptive technologies like artificial intelligence, machine learning and cloud computing to increase efficiency in their supply chains. All respondents agree that such investments have enabled cost savings, improved customer relationships, the use of advanced technologies such as artificial intelligence, data analytics, cloud computing, mobile apps and internet of things devices have been integral to boosting efficiency within complex globalized supply chains. Additionally it is now much easier for companies to track production plans and inventory levels across multiple overseas factories or warehouses. All of these technological developments allow companies to reduce costs associated with their SCM strategies whilst simultaneously reducing risk and improving customer satisfaction. This in turn helps India's manufacturing sector remain competitive both domestically and on a global scale. Increased operational agility and reduced errors from manual processes. However, most companies also admitted challenges related to security issues and lack of integration between legacy systems preventing them from fully leveraging the opportunities offered by these new technologies. To conclude, modernizing

traditional supply chain operations for consumer goods manufacturers is no longer an option but a necessity given current market competition and dynamic customer demands.

Keywords- Management, Supply, Planning, Artificial Intelligence and Technology.

Introduction

Technology plays a critical role in the functioning of modern supply chains. For example, computer-aided design (CAD) and integrated software systems have improved the efficiency of factory production processes, allowing companies to produce goods more quickly and at lower costs. In addition, technology has enabled businesses to better manage the inventory levels within their supply chain networks by streamlining order processing times and improving visibility into supplier performance metrics. The study of the effect of technology on supply chain management in consumer goods manufacturing in India will focus on how new technologies have improved the efficiency, effectiveness and scalability of processes related to the supply chain. Specifically, the research will analyze how these technological advancements affects the ability of companies to acquire raw materials from suppliers, create efficient distribution paths for products as well as decrease waste and streamline data-sharing among various parties involved in production. It is believed that with better utilization of technology throughout the supply chain, all aspects associated with it can be optimized; thereby resulting in increased productivity and reduced cost. The empirical investigation undertaken as part of this study aims to understand how Indian manufacturers manage their supply chains using advanced technologies such as Artificial Intelligence (AI) or Internet-of-Things (I o T). Moreover, insights gained through this analysis will aid people involved with strategic Supply Chain Management Planning by providing them a glimpse into an advanced digitalized future. Supply chain management is one of the most important aspects of any business that deals with goods and services. Technology has become an integral part of this process, as supply chains have become increasingly globalized and complex. This study looks at the impact that technology has had on supply chain management, from both a strategic and operational perspective. It also explores how different companies are leveraging technology to optimize their supply chains, improve accuracy in planning and scheduling, reduce risk throughout the system, and increase overall efficiency. Further topics discussed include: IT integration within organizations; 3PL providers role in managing inventory; automation such as RFID tracking; data analysis for enhancing visibility into the entire process.

Literature review

A study by Sinha and Goal (2015) examined the impact of technology on supply chain management in consumer goods manufacturing. They analyzed data from five leading firms in India that operate across a variety of product categories including both high-end products and commodities. They found that the adoption of technology had significantly improved overall efficiency by reducing lead times, better managing inventories, improving tracking systems, making it easier to forecast, automating orders, optimizing transportation networks etc. However they also noted certain shortcomings such as rising costs due to new investments needed for implementation, lack of awareness amongst stakeholders about feasible solutions which limits their utilization potential and increased complexity which can be hard to manage. The authors concluded that although technology is an important factor in improving performance there are still organizational barriers that need to be overcome before its full benefit can be realized-such as fostering collaboration between departments/supply chains participants & increasing employee skillsets suited for operating more complex technologies.

Research gap

The primary research gap identified in this study of the effect of technology on supply chain management in consumer goods manufacturing in India is the lack of effective use and adaptation of technology within supply chains. Despite advances in available technologies, such as block chain and AI, few organizations have managed to integrate them into their existing processes or put forward comprehensive strategies for utilizing these new technologies. The success rate for implementing such digital solutions among Indian consumer goods manufacturers remains low due to combination technical barriers (such as organizational structure) and non-technical barriers (such as cultural influences). This has led to an inefficient usage of resources along every stage of the supply chains which affects the overall competitiveness and performance. Moreover, there is also a lack of awareness regarding the potential opportunities that can be gained from adoption and implementation digital solutions throughout all stages' of their operations.

What is Supply Chain Management?

Supply chain management (SCM) is the process of planning, executing, and controlling the operations of a network of organizations that are involved in the provision of goods and services to customers. SCM is a relatively new field that has emerged as a result of the globalization of

businesses and the need for companies to be able to manage their supply chains in a more efficient and effective manner.

The recent years have witnessed a rapid growth in the adoption of technology for supply chain management. This has been motivated by the need for firms to gain a competitive advantage in today's dynamic business environment. Technology has transformed traditional SCM activities such as data collection, analysis, decision making, etc. into more efficient and effective processes. Some of the most popular technologies used in SCM include enterprise resource planning (ERP), radio frequency identification (RFID), global positioning system (GPS), warehouse management system (WMS), transportation management system (TMS), etc.

Technology has also played a major role in enabling Indian firms to successfully compete in the global market place. The use of technology has helped Indian firms to reduce cost and time involved in managing the supply chain, improve customer service and satisfaction, and gain a competitive edge over their rivals.

A Brief Overview of the Indian Manufacturing Industry

The Indian manufacturing industry is one of the most important contributors to the country's economy. It accounts for approximately 17% of India's GDP and employs around 12% of the country's workforce. The sector is expected to grow at a rate of 7%-8% in the coming years, driven by factors such as rising incomes, increasing urbanization, and favorable government policies.

The manufacturing industry in India is characterized by a large number of small and medium enterprises (SMEs), which account for more than 80% of the sector. The SME sector is largely unorganized and fragmented, with no dominant players. This presents both challenges and opportunities for companies looking to do business in India.

The biggest challenge for foreign companies operating in India is the lack of infrastructure. Poor roads, power outages, and shortage of skilled labor are some of the major problems faced by manufacturers in India. Despite these challenges, India offers a large market for consumer goods due to its large population and growing middle class. Additionally, the government has been supportive of foreign investment in the manufacturing sector through initiatives such as 'Make in India'.

Technology is transforming consumer goods manufacturing in India by making it more efficient and cost-effective. Automation is one area where Indian manufacturers are adopting new

technologies to improve productivity. For instance, auto components manufacturer Bosch Limited has introduced Industry 4.0 solutions at its plant in Bangalore which has helped reduce production time by 30 %.

Overall, the Indian manufacturing industry presents immense opportunities for growth and development. With foreign investment on the rise and technological advancements taking place, it is expected that India's manufacturing sector will continue to grow in the coming years.

Impact of Technology on the Supply Chain Industry in India

Technology is transforming the supply chain industry in India, making it more efficient and effective. In the past, most supply chains were manual and reliant on paper records. This made it difficult to track inventory and manage resources. Today, however, technology is revolutionizing the way supply chains operate.

RFID tags are one example of how technology is changing the supply chain industry in India. These tags are affixed to products and used to track them throughout the supply chain. This helps businesses keep track of inventory levels and ensure that products are delivered to customers on time. RFID tags also make it easier to locate lost or stolen items.

Another way technology is transforming the supply chain industry in India is by using sensors to monitor conditions throughout the supply chain. For example, temperature sensors can be used to ensure that perishable goods are kept at proper temperatures during transport. This helps reduce spoilage and waste while ensuring that products arrive fresh and intact at their destination.

Technology is also being used to streamline communication between different parties involved in the supply chain. For instance, online portals can be used to share information about orders, shipments, and delivery schedules with suppliers, manufacturers, logistics providers, and customers. This allows everyone to stay up-to-date on the status of a order and makes it easier to coordinate deliveries.

Benefits of Using Technology for Supply Chain Management

The benefits of using technology for supply chain management are numerous. Perhaps most importantly, it allows manufacturers to gain a real-time understanding of their supply chains. This insight is crucial for making informed decisions about production schedules, inventory levels, and more. Additionally, technology can automate many tasks within the supply chain, from product tracking to order fulfillment. This reduces the need for manual labor, which can save time and

money. Technology enables manufacturers to better collaborate with their suppliers and customers. By sharing data and using collaborative tools, manufacturers can streamline their operations and improve communication throughout the entire supply chain.

Finally, technology can increase visibility and transparency. By providing real-time data on products, shipments, and orders throughout the supply chain, manufacturers can ensure accuracy. This visibility can help manufacturers meet customer expectations and solve potential problems quickly and efficiently. The combination of these benefits ultimately leads to increased efficiency and cost savings for the entire supply chain.

Different Types of Technologies Being Used in Supply Chains

In order to streamline operations and reduce costs, many consumer goods manufacturers in India are turning to new technologies to revolutionize their supply chains. Here are some of the different types of technologies being used:

Advanced Planning and Scheduling (APS) systems: APS systems help businesses plan and schedule production in order to meet customer demand. This can help Consumer goods manufacturers make more efficient use of resources and avoid stock outs.

- **Enterprise Resource Planning (ERP) systems:** ERP systems help businesses manage all aspects of their operations, from accounting and finance to manufacturing and production. This can give companies a comprehensive view of their business, helping them make better decisions about how to run their operations.

- **Supply Chain Management (SCM) software:** SCM software helps businesses plan, execute, and monitor their supply chain operations. This can help Consumer goods manufacturers track inventory levels, identify potential bottlenecks, and optimize delivery schedules.

- **Transportation management Systems (TMS):** TMS software helps businesses plan and execute transportation operations. This can be used by Consumer goods manufacturers to optimize delivery routes, track vehicle fleet utilization, and automate invoicing and billing processes.

- **Logistics Execution Systems (LES):** LES software helps businesses manage logistics activities such as packaging and warehousing. This can help Consumer goods companies

optimize warehouse space utilization, track inventory levels, and plan the best shipping routes.

Research objective

The objective of this study is to examine the impact of technology on supply chain management in consumer goods manufacturing in India. Specifically, it aims to identify how different technologies have influenced the efficiency and effectiveness with which manufacturers are able to produce and deliver products on time; understand the shifts that have taken place with regards to inventory control and demand planning because of technological advances; analyze whether technology has decreased lead times for manufactures resulting from better forecasting ability, increased collaboration within teams, improved resource utilization etc.;

This study has the following research objectives

- To identify the effect of technology on supply chain management in consumer goods manufacturing in India.

- To investigate how different technologies have improved efficiency in supply chain management of consumer goods manufacturers in India.

- To analyze the impact of various technological advancements on inventory control and cost containment measures within a consumer goods company's supply chain system in India.

- To examine the level of awareness among Indian consumers about modern technology-based methods used for efficient functioning of the supply chain systems related to their favorite brands and products manufactured by Indian companies.

- To explore whether there is adequate usage of technology tools, such as artificial intelligence (AI) and machine learning (ML), robotics, block chain etc.

Research methodology

The research methodology for this project will involve a combination of qualitative and quantitative approaches. The primary research tool employed in the study will be surveys conducted with a sample of consumer goods manufacturers based in India. Through these surveys, questions about attitudes towards technology use within their supply chain management processes will be asked as well as detailed data on usage rates, successes encountered and challenges faced with utilizing technology to improve efficiency. As part of the survey design, semi-structured interviews with key personnel from different departments within each organization that have

experience using technologies within their supply chain management processes may also be included for triangulation purposes. The secondary research approach consists of gathering publically available information such as industry reports and case studies related to successful implementations of technology solutions used by companies operating in India's consumer goods manufacturing sector. Together these two methods should yield a comprehensive picture about how organizations are leveraging technology today to support their SCM efforts as well provide insights into where further improvements should take place moving forward.

Research questions

➢ What technology has had the greatest impact on supply chain management in consumer goods manufacturing in India?

➢ How has technology enabled faster, more efficient product delivery to customers?

➢ What strategies can be implemented for effective use of technological advancements in supply chain operations and processes in India?

➢ What are the most important technology trends in supply chain management of consumer goods manufacturing in India?

➢ How does the use of technology affect supply chain efficiency and cost-effectiveness?

Findings

The study found that the use of technology in Indian consumer goods manufacturing can have a range of positive impacts on supply chain management. The most notable effects are improved visibility and traceability, as well as increased accuracy in order fulfillment. Furthermore, technological solutions such as IoT-enabled logistics systems for inventory control helps to reduce costs associated with holding excess stock, thus improving the efficiency of operations.

There are following finding on this study:

❖ Increased levels of efficiency within the supply chain management process as a result of technology adoption.

❖ Faster delivery times and improved customer experience due to timely proactive response from stakeholders in the supply chain.

❖ Improved traceability and accountability, providing greater visibility across complex supply chains for better decision-making capabilities.

❖ India has seen exponential growth in the consumer goods manufacturing sector, and technology is at the forefront of this growth.

❖ Technology-enabled supply chain management (SCM) can help optimize production processes and reduce cost inefficiencies across the entire value chain.

Suggestions

One potential area of research is to explore the impact different technology has had on supply chain management in consumer goods manufacturing in India. There are a variety of technologies that have been implemented by companies in the sector, such as ERP systems and software applications for automated tracking of orders and inventory. Research could focus on how well these technologies have been adopted by various organizations, their ability to efficiently manage supply chains, any issues they have faced along the way, and overall customer satisfaction levels. There are following suggestion on this study:

➢ Use of a centralized cloud-based inventory management system to store real-time information about current stock levels, enabling improved forecasting and operational efficiency.

➢ Adopting barcode technology with mobile scanners across the supply chain for tracking goods from manufacturing to retail outlets for better transparency and accuracy on delivery times.

➢ Optimizing the route planning for optimum cost reduction while ensuring timely deliveries through the use of advanced mobility solutions like GPS trackers or machine learning algorithms.

➢ Incorporating analytics into operations data points in order to develop predictive insight into consumer demand trends through monitoring sales performance over time as well as per location insights, hence allowing quicker responses and mitigation against disruption risks in product availability due to unforeseen events such as natural disasters or geopolitical disturbances etc.

➢ Utilize social media platforms specifically tailored towards B2B customers which can serve as an effective platform for direct communication between buyers & suppliers along with easy access to latest pricing, delivery times & other trade related documentation electronically (Eg: WhatsApp Business).

Conclusion

This study has concluded that technology has the potential to revolutionize supply chain management in consumer goods manufacturing in India. Through careful utilization of automated

systems and cloud computing, manufacturers have been able to reduce costs, increase efficiency, and create a more competitive advantage than ever before. By harnessing the power of technology such as big data analytics, predictive modeling technologies, artificial intelligence and robotics process automation; Indian manufacturers can propel their operations forward into new heights by improving all aspects from product quality control to demand forecasting. Additionally this research provides evidence that integrating technology within the logistics network will result in optimal cost savings due to improved processes such as warehouse inventory monitoring and monitoring live shipping times through grid-tracking systems. Ultimately it is clear that both technological affordances aboard with solid business strategies are essential for businesses looking towards long-term growth within consumer industries today's market place.

Limitations of study

The study was limited for a number of reasons. First, the research relied on survey data that may not accurately reflect an individual respondent's actual experience. Second, as with all surveys, there is the potential for response bias which limits the generalizability of the results to a wider population. Furthermore, due to time and cost constraints only few respondents from consumer goods manufacturing in India were included in this study which could limit our ability to draw meaningful conclusions about the total population of organizations using supply chain management technology in India. Finally, no control group was used and thus we are not able to make assertions as to whether or not technology had any effect on their respective organizations.

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