

Role of Technological advancements in Effective Supply Chain Management: An Empirical Study

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Abstract

Emerging advancement of technology in numerous sectors because of internet services, the sector of supply chain management has grabbed the most of the opportunities for the establishment of its hand in Indian economy. This movement of information technology is the key for supply chain management as majority of its activities are transferred to web-based technology. The movement of information between suppliers and company, company to consumer is essential for its success. Using technology in supply chain management is highly pre-condition for effective control in today's highly competitive market. Advanced technology is helping in creating better visibility in supply chain management, reduction of operational costs and enhancement of satisfaction and retention of customers. Despite the importance of technology acknowledgement in supply chain management, it is not utilised fully. The companies are shifting towards digital supply chain with the assistance of swift changes in technology and application of information technology like "Electronic Data Exchange (EDI), Radio Frequency Identification (RFID), Bar Code, Electronic Commerce, Decision Support system, Enterprises Resource Planning (ERP) package, etc." 211 respondents were considered in the study as a sample size. Mean and T-test was applied in the study to find the outcome.

Keywords: Information Technology, Supply Chain Management, internet, digitalization of SCM

Introduction

From the past few decades, in India supply chain has been a major developing field. The major threat is investing in technology and security. Due to over-population, majority of marketers are not giving a thought for customer care. Business enterprises are not very much worried about online breaches and theft of data and information. This challenge can be dealt by implementing fully secured technology for e-businesses. Major attitude transformation

required in communication field to give continuous services. Indian laws and regulations in recent days are giving serious thought towards theft of data and information and cybercrimes. Solving these challenges would mean now e-businesses would get more attention and developmental opportunity (Arivazhagan, 2020). Information technology and supply chain management are incomplete without each other. Business organization of today's modern era has not forgotten the advantages on advanced technology so that it is the responsibility of companies to enable supply chain to flourish and become a support management of supply chain. A dissimilarity can be generated between the volume of information and affluence of information exchange. It is certain that the significance of information technology and required information would play a significant role for business organizations. The organization would take care about the information from cyber and IT risks from saving their information to get misused. Organization would be not completely dependent on IT as in case the tools would misbehave it would turn harmful for the organization (Sharma & Kaur, 2017). Integration of activities of supply chain with the technology for accomplishment making it a necessity for majority of sectors. To almost every organization is adopting technologies for improvement in inventory management and for the purpose of faster delivery. They are seeking coordination of technology for improving operational efficiency and low cost. Main reason for using technology in supply chain management are increasing competition and technology advancement. There are some other factors such as internal strategy of business, and rules and regulations are also considered important. Main purpose of improvement in supply chain are integration with other functions, reduction in costs, reduction in delivery time, re-designing of distribution network turning satisfied customers, visibility and improvement in performance (Laddha & Agarwal, 2018). Quickly changing technology, particularly in the industry of supply chain and production cycle is transforming it more efficiently and effectively. Therefore, re-designing of the process of supply chain management to enjoy the advantages of technology by organizations. One of these benefits of information is when the data among different business organization, among distinct types of data and structures are re-organized differently. Elements in acknowledgment of IT in supply chain are playing important role like organization size, its rate of success, pressure of other supply chain partners and support of senior management of the organization. Today, the system of supply chain has developed a course match and supply chain intelligence, a collaboration features of novel network and across distinct groups for dealing with dynamic system like failing suppliers and uncertain demands (Biniazi et.al., 2011). Information is center to prime making in business. A significant part of the second-hand information to current amongst practical areas in a business organization and associating supply chain enterprise were based totally on papers. In majority

of cases, such business that are based on papers and statements were doubtful and untrustworthy. In demanding knowledge of the internet along with assembling deal mixing services have given organization better probability to network with SCM partners. To survive in competitive market and in order to beat the competitors, one has to direct the potential. One of the future means of organizations is management of information. To take the supreme information to the maker of decision at the right place and right time and arranging automation of the process of collection of data, its collations and alteration, companies must accept and adapt information technology (Sidhu, et.al., 2014). The managers of supply chain are in a position to make a considerable contribution towards the efforts with the aim to bring improvement in the sustainability of business enterprises. Economic, environmental, and social dimensions are the three pillars of sustainable development and are impacted by how the process of supply chain works. Information technology advancement known as the enabler of sustainable initiatives and drivers of supply chain is playing vital part in this equation. By investing in information technology, association between partners of supply chain and the process performance can be enhanced (Ata, 2015).

Literature Review

Sarite, Iravo & Ismail (2018) revealed about the positive and significant impact of technology integration on the performance of business organizations. Companies are therefore motivated to make investment in improving the coordination of efforts by using technologies that are cost-effective like e-mail communication between companies and suppliers. Additionally, these investments must also be used for addressing technology integration for transferring of buying orders, funds or invoices thus acquiring costs related to delays and mistakes in buying orders, combined information system for tracking or accelerate shipment, technology integration in purchasing of products and services digitally to reduce delay in buying, mistakes in buying and high costs involved in manual buying of good and services and integration of technology in order for buying of products and services which are supplied reduces delay in payments to suppliers and even delays in delivery in future to the company.

Khan & Manzoor (2021) studied about the most prominent technologies which are used in supply chain like big data analytics, UAVs, artificial intelligence, IoT (Internet of things), blockchain technology, and 5G technologies. The main barriers in technology integration with supply chain are technology infrastructure, higher costs of investments, government incentives, rules and regulations, insufficient trained and skilled human resources. All the emerging technologies mentioned are categorized under the industry 4.0 revolution, and using all these

technological tools make significant impact on the operations and inventions in global supply chain. The connectivity can be enhanced by using these technologies along with increasing the joint trust among the global partners.

Jaiswal, Balaji & Bhargava (2019) observed marketplaces where there are various types of players, few of them are strong and some are weak. Every type of player have their own importance level towards understanding about supply chain. Not every company have the capability of making investment in strategies of supply chain, metrics, and IT. But every company who have the capability of investing and implementation of blend of mentioned factors are certainly on the path of achieving competitive benefits. It is only supply chain level where the investment level in any business can be adjusted. If an organization makes the needed investment level for enhancement of operations of supply chain, it is very much advantageous for the company in the long-run.

Apiyo & Kiarie (2018) highlighted that today business organization need effective and efficient information technology tools that would provide them access to essential and relevant information more easily and on time that would enable them to maintain competitive advantage in the market. Information Technology has made the interactions possible between companies among with the supply chain, therefore, enabling sharing of data and exchanging of information at high speed and with accuracy and helping them to meet the demands of customers on timely basis, therefore meeting set standards of services for customers. The requirement to stay ahead in competitive market need companies to utilize advanced technological tools in their everyday operations. Competent and effective management of material handling can only be accomplished with the assistance of effectual departments handling supply chain. With the effective implementation of information technology tools, the organization would be benefitted resulting them to save operational costs turning into high profits. It will also help them reduce holdings of inventory therefore releasing capital.

Varma & Khan (2014) stated that in order to survive in the competitive market, business organizations found that conservative supply chain management would have to get extended outside its limits to join all stakeholders, and for these efforts it is necessary to accept and adopt tools of information technology. Author also discussed about the role of information technology as an enabler in “supply chain management” with huge advantages for business organizations by complete application of information technology tools along with restricting digital risks. Technological tools are known as a double-edged sword. IT tools can be utilized for “rigging of bids, bidding of phantom, nepotism, substitutions, false counting,

counterfeiting, creating fictitious accounting entities e.g., ghost employee, fake vendor, fake customer or vendor payments, falsified hours etc.”

Reddy et.al., (2015) revealed that advancement of technology, the expectations of customers are increasing and firms the becoming inclined towards uncertain atmosphere. Companies with the changing time have found that traditional supply chain system needs to be expanded beyond their boundaries. Using information technologies for planning and collaboration of supply chain is less in comparison to usage of information technology for processing of transactions. For suppliers, almost half of the firms are using information technology for the planning of supply chain and its collaboration and very less are using planning of supply chain and collaboration with its customers. Majority of organizations are using information technology for planning of supply chain and its collaboration in a way that they use information by sharing between system of IT to run a particular cross organizational process. There are companies where demand forecast is shared with suppliers so that they are confirm if they are capable of meet the future demands.

Study's Objectives

1. To know Role of Technological advancements in Effective Supply Chain Management.
2. To ascertain how Technology advancement impact the effectiveness of Supply Chain Management.

Methodology of the Study

Nature of study is empirical. 211 is the sample size. Structured questionnaire was prepared to collect the data. Mean and t-test was applied to find the outcome of research. Convenience sampling is the method of sampling.

Result of Demographics

Table 1. Show respondent's gender details, 53.55% are male, and 46.45% are female. Looking at the Age of respondents, 30 – 35 years are 33.65%, 35 – 40 years are 29.86%, and those who are above 40 years are 36.49%. With regards to Departments, 27.96% are suppliers, 32.70% are Warehouse owners, and 39.34% are Manufacturers.

Table1. Details of Participants

Variables	Number of Respondents	%
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Gender		
Male	113	53.55
Female	98	46.45
Total	211	100
Age		
30 – 35 years	71	33.65
35 – 40 years	63	29.86
Above 40 years	77	36.49
Total	211	100
Departments		
Suppliers	59	27.96
Warehouse owners	69	32.70
Manufacturers	83	39.34
Total	211	100

Table2. Role of Technological advancements in Effective Supply Chain Management

Serial No.	Statement of Survey	Mean	T-Value	Sig.
1.	IoT devices help in tracking goods on real-time basis, provides end-to-end visibility in supply chain and ensures better management of inventory	4.29	19.068	0.000
2.	Technology advancement ensures security, transparency, and records of transactions, improves trusts and accountability among supply chain partners	4.21	17.999	0.000
3.	IT tools enable scrutiny of large set of data for identification of patterns, prediction of trends, and optimization of operations	4.07	16.170	0.000

4.	IT tools systematize decision-making by recognizing inadequacies and suggesting improvements like ideal transportation routes or supplier selection	4.13	16.732	0.000
5.	Advanced software solutions improve the storage, tracking of inventory, and order processes of fulfilment	4.27	19.114	0.000
6.	IT tools facilitate real-time communication and sharing of data across global supply chains, and enable improved collaboration among stakeholders	4.13	16.720	0.000
7.	Develop virtual models of supply chain to pretend and forecast results, assisting companies to get prepared for possible troubles	4.11	16.579	0.000
8.	Monitor environmental conditions for reduction of wastes and ensuring compliance with sustainability standards	3.19	2.850	0.002
9.	IT tools help in protecting sensitive data from cyber threats, and ensures uninterrupted supply chain operations	3.21	3.113	0.001
10.	Technology improves customer satisfaction as it provides real-time updates on the status of their orders	4.00	15.081	0.000

Table 2. Shows mean value of “Role of Technological advancements in Effective Supply Chain Management”. The first statement with the mean score of 4.29 is IoT devices help in tracking goods on real-time basis, provides end-to-end visibility in supply chain and ensures better management of inventory, second statement is Technology advancement ensures security, transparency, and records of transactions, improves trusts and accountability among supply chain partners, it has scored the mean value of 4.21, third statements is IT tools enable scrutiny of large set of data for identification of patterns, prediction of trends, and optimization of operations has the mean score of 4.07. IT tools systematize decision-making by recognizing inadequacies and suggesting improvements like ideal transportation routes or supplier selection is the fourth statement has the mean score of 4.13. Advanced software solutions improve the storage, tracking of inventory, and order processes of fulfilment is the fifth statement with the mean value of 4.27, IT tools facilitate real-time communication and sharing of data across global supply chains, and enable improved collaboration among stakeholders is the next statement with the mean of 4.13. seventh and eighth statement is Develop virtual models of supply chain to pretend and forecast results, assisting companies to get prepared for possible

troubles and monitor environmental conditions for reduction of wastes and ensuring compliance with sustainability standards with the mean score of 4.11 and 3.19. The last two statements are IT tools help in protecting sensitive data from cyber threats, and ensures uninterrupted supply chain operations the mean is 3.21 and Technology improves customer satisfaction as it provides real-time updates on the status of their orders has the mean of 4.00. T-value of survey statements in context of Role of Technological advancements in Effective Supply Chain Management are identified as significant as t-value of all statements are positive and significant as significant value is less than 0.05.

Conclusion

Supply Chain Management is the management of flowing of goods and services, it starts from the origin pr product and finishes with the consumption of product. It is also comprised of movement and storage of raw materials that are intricated in the work-in-progress, inventory and fully-furnished products. The advantages of using information technology in supply chain are very high. Additionally, by using information technology tools has a direct communication with transforming process, most of its advantages are over-lapping with each other. Thus, the unique source of such advantages is highly difficult. With the changing time, information technology is easily getting converted into automatic forces which would develop high efficacy. Therefore, to use strategies of information technology it is highly essential to attend the required time to change. In present time, the management of supply chain is advocated as one of the prominent elements in business organizations. Attention given to this element can be effective to take lead business organization from competitors and making it successful. In supply chain management, the important factor is their information and its management. The advanced tools of information technology can assist in this association. Remarkable progress is seen in every part of supply chain management with the adoption and implementation of technology advancement. T-value of survey statements in context of Role of Technological advancements in Effective Supply Chain Management are identified as significant as t-value of all statements are positive and significant as significant value is less than 0.05.

References

1. Arivazhagan, D. (2020). The Role of Technology in Supply Chain Management, *International Journal of Scientific & Technology Research*, 9(2), 249-252.
2. Sharma, R., & Kaur, D. (2017). Role of Information Technology in Supply Chain Management, *Biz and Bytes*, 8(1), 33-36.

3. Laddha, S., & Agarwal, A. (2018). Acceptance and Adoption of the Technology in Supply Chain, *International Journal of Creative Research Thoughts*, 6(2), 495-501.
4. Biniazi, K., Ghahremani, R., Alipour, H., Soofi, Z.T., & Akhavan, S. (2011). Position and Role of ICT in Supply Chain Management (SCM), *Australian Journal of Basic and Applied Sciences*, 5(8), 827-831.
5. Sidhu, L.S., Sharma, J., Sharma, H., & Kaur, N. (2014). Role of Information Technology in Supply Chain Management, *COMPUSOFT, An international journal of advanced computer technology*, 3(12), 1443-1445.
6. Ata, U.Z. (2015). The Role of Information Technology in Supply Chain Sustainability, *Journal of Emerging Trends in Economics and Management Sciences*, 6(5), 354-358.
7. Sarite, S.K., Iravo, M.A., & Ismail, N. (2018). Role Of Technological Integration in Supply Chain Collaboration on Performance of Manufacturing Firms in Kenya, *European Journal of Logistics, Purchasing and Supply Chain Management*, 6(1), 1-12.
8. Khan, M.R., & Manzoor, A. (2021). Application and Impact of New Technologies in the Supply Chain Management During COVID-19 Pandemic: A Systematic Literature Review, *International Journal of Economics and Business Administration*, 9(2), 277-292.
9. Jaiswal, V., Balaji, M., & Bhargava, S. (2019). The role of supply chain in achieving competitive advantage, *International Journal of Advance Research, Ideas and Innovations in Technology*, 5(4), 635-638.
10. Apiyo, R.O., & Kiarie, D. (2018). Role Of ICT Tools In Supply Chain Performance, *International Journal of Supply Chain Management*, 3(1-2), 17-26.
11. Varma, T.N., & Khan, D.A. (2014). Information Technology in Supply Chain Management, *Journal of Supply Chain Management Systems*, 3(3), 35-46.
12. Reddy, P.R., Afsar, S., Nadendla, G., Kesaboina, D., & Chandramahanty, T. (2015). Information Technology in Supply Chain Management, *International Journal of Computer Science Engineering and Information Technology Research*, 5(1), 111-116.