

# Acceptance and Adoption of the Technology in Supply Chain

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## Abstract

*The use of technology in supply chain is considered as a prerequisite for the effective control of today's highly competitive marketplace. Modern technologies help to create better visibility within supply chain, reduce operational costs and also enhance customer satisfaction and retention. Despite the acknowledged importance of technology in supply chain management (SCM), the use is limited. Organizations are skeptical for the investment in technology. Based on empirical data from twenty four industrial and service companies, this paper classifies the areas where companies are using technology or intend to use in future and their short term objectives for this Performance Company is looking for. Data collected from Mumbai with 24 respondents of supply chain professionals has been taken for study. Finding of the research are company is selective in technology but planning to implement advance technology in future. The objective is advancement of technology available with cost reduction, delivery time, integrate functions.*

*Keywords: Supply chain management, Technology, warehouse, Objectives of supply chain, type of technology*

## 1. Introduction

In today's supply chain landscape, technology is becoming the key driver of an organization's success. But technologies like Drones, Big Data, the Internet of Things and other new technologies will influence supply chain management in the future (GT Staff, November 20th, 2017). Studies assessing the use of IT in the supply chain context explain about the strong relationships among data gathering technologies, transactional capabilities and firm performance, in terms of both efficiency and effectiveness. Gartner had predicted that the supply chain planning market will reach an inflection point soon due in large part to the adoption of current and evolving technologies (KPIT, 2017). The utilisation of information technology(IT), is considered an imperative requirement for managing multi-company networks, and has been associated with significant supply chain efficiency improvements (e.g. Lee and Billington, 1992; White and Pearson, 2001). Despite of technology is the future of supply chain the technology adoption in the companies are not much as revealed from literature. Thus the objectives of this study are to investigate (1) why firms achieve more or less SCT utilization and (2) what are the reasons (3) which type of technology they are using and planning to use in future (4) Considering warehouse as an example which technology use and relate it with the performance.

## 2. Research Questions

Adoption of technology in the supply chain performance is not a new research problem. Over the years, different approaches and models have been introduced in the literature to explain this relationship between technology and supply chain performance. But is necessary to understand the actual level of implementation of technology. Therefore the research questions formulated are

RQ1: What are the factors responsible for bringing changes in supply chain?

Rationale: Answering this question can help to identify the forces for the use of technology in supply chain.

RQ2: Which areas of supply chain planning to implement technology & why ?

Rationale: This question aims to identify the areas most prevalently use technology and what are the reasons behind it.

RQ 3: Are planning to implement technology in future?

Rationale: Answering this research question can help identify how the technology can change the future market. Will companies really looking for adoption of advanced technology.

RQ 4: What research has been performing in the relation between technology and Supply Chain?

Rationale: This question aims to locate and catalogue the research studies have been performed to understand the level of adoption of technology in Supply Chain and the challenges for accepting it.

RQ 5: What is the impact of technology on warehouse?

Rationale: This question aims to identify the impact of technology on the performance of warehouse were mostly the technology is used.

RQ 6: What findings can be drawn from existing studies?

Rationale: Answers to this research question can help to identify the level of adoption of technology in different functions of supply chain and suggest areas for further investigation.

### 3. Literature Review

#### 3.1 Importance of Supply chain

The results of the major international survey of supply chain performance conducted by a Harrison and C. New (2002) reported that 93% of the surveyed firms confirmed that the technology is playing very important role of the supply chain performance in achieving competitive advantage.

Effective and efficient supply chain reduces cost to the company and also provides competitive advantage. Use of technology can help to fulfil these objectives. Research shows that there is use of technology in supply chain. But less or no work has been done for understanding the actual level of technology use and what are the areas of concern for the company before actual implementation.

#### 3.2 Importance of technology in supply chain

Technology is a vehicle to enhance supply chain competitiveness and performance by enhancing the overall effectiveness and efficiency of logistics system. Moreover various innovations in technology have made the task easier and faster besides being less laborious (Rajiv Bhandari, 2015).The Web based technology provides a virtually free platform for enhancing transparency, eliminating information delays and distortions, and significantly reducing transaction costs( EnverYücesan, 2007), IT is the cause criteria leading to marketing performance and customer satisfaction. Information Technology is defined as a critical factor to enhance the supply chain performance, and the huge advances in information technology over the past two decades enabled the emergence of modern supply chain management (Fawcett, S.E., Wallin ,2011), with its power to provide timely, accurate, and reliable information (Li, G., Yang, H., Sun, L. and Sohal, A.S. ,2009) , to enhance collaboration and integration between partners, and to improve the agility and flexibility of both the focal firm and the partners in the supply chain.

#### 3.3 Adoption of technology

According to 2018 MHI Annual Industry Report, 71% or respondents from the survey of 1,116 industry professionals said they were considering adopting Next-generation technology including robotics, the internet of things (IoT), predictive analytics, artificial intelligence (AI) within five years.

Better-known technologies have a high rate of adoption from respondents (35% or more) while emerging technologies are much less popular (25% or less). It is expected that the emerging technology will have overall a compound annual growth rate for the next five years twice as high as the mature technologies.

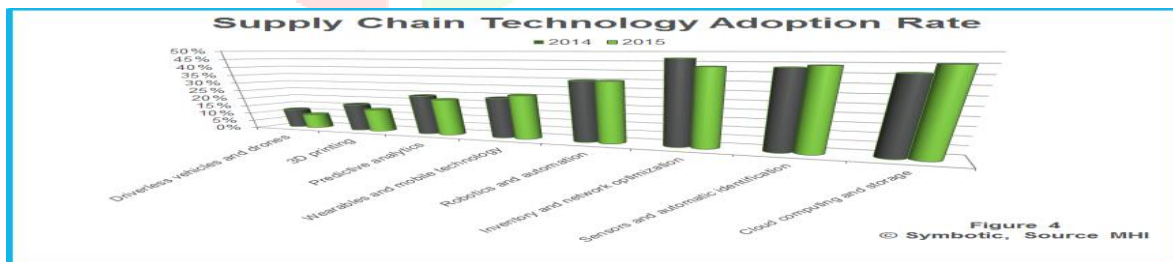
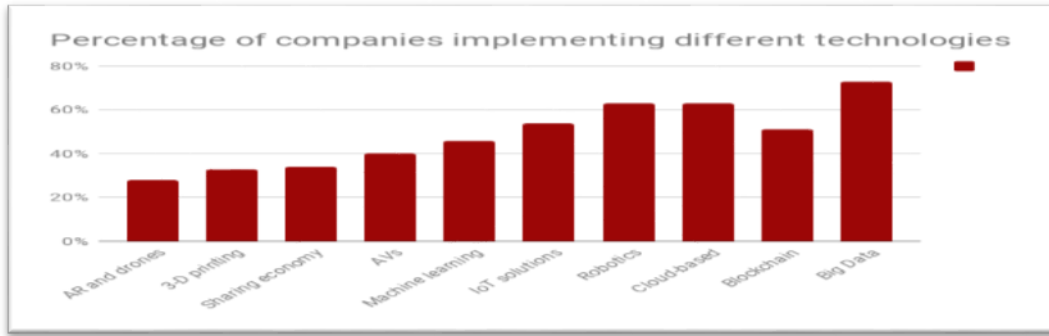


Figure 4 © Symbotic, Source MHI

Source: <http://www.symbotic.com/2016/11/14/3-biggest-challenges-facing-supply-chain-industry/>

According to the DHL report, Survey of 350 supply chain and operations professionals 73% of the respondents are investing in Big Data analytics, 63% in cloud-based applications and robotics, 54% in internet-of-things (IoT) solutions, 51% in blockchain, 46% in machine learning, 40% in autonomous vehicles (AVs), 34% in the sharing economy, 33% in 3-D printing and 28% in augmented reality and drones.



Source: APICS 2018 End to end supply Chain Education,

### 3.4 Challenges in adoption

According to a DHL report, March 6, 2018, of 350 supply chain and operations professionals surveyed, 95% believe they haven't seen the benefits of digitization. Respondents told DHL two big reasons for the lack of results are 1) "New technology is developing so quickly that businesses find it challenging to keep up with innovations and best practices," and 2) "organizational challenges" prevent technology from being implemented properly, efficiently and effectively.

There is a need for firms to invest in IT resources to improve supply chain performance but before, they need to invest in developing some critical success factors and developing some supply chain characteristics that allow them to derive performance advantage from IT capabilities.

Adoption of proper Information Technology tools in the frame work of the supply chain is the most important factor to maximize the efficiency. Service related public and private companies in UAE are facing many challenges and obstacles while implementing technological tools in their supply chain. To handle these challenges, it is essential to categories them according to the nature of the service organization Habib (2015).

## 4. Research Methodology

For the purposes of examining the use of technology in Supply Chain, two a priority constructs were developed:

1) The types of technology use in Supply Chain and 2) the forces of use with its objectives. Descriptive research methodology is used for the study. Characteristics of the respondents are mention in the following table 1.

Table 1: Characteristics of the respondents

Name of organisation	Sector/Industry	Number of employees in Organization	How long has your organization been operating in the Indian market?
Piaggio Vehicles pvt. Ltd.	Manufacturin/Automobile	More than 1000	2 to 5 years
Stellar Value Chain Solution	3 PL	More than 1000	Less than 2 years
Ramco	IT	More than 1000	More than 5 years
Raptakos Brett	Healthcare	500 to 1000	More than 5 years
Agility Logistics Pvt Ltd	3PL	More than 1000	More than 5 years
Lacoste	Apparel Retail	More than 1000	More than 5 years
Reliance Jio infocomm	Telecom	More than 1000	More than 5 years
Wipro Limited	IT	More than 1000	More than 5 years
Life Care Logistic Pvt Ltd	3PL	500 to 1000	More than 5 years
Mazagon dock shipbuilders limited	Defence	More than 1000	More than 5 years
Orient Electric	ElectricL	More than 1000	Less than 2 years
Capgemini	IT	More than 1000	More than 5 years
Bigbasket	Scm	More than 1000	More than 5 years
ETG Agro	Agriculture	More than 1000	More than 5 years
Stellar	Contact logistics	51 to 500	Less than 2 years
Connect India E Commerce Services Pvt LTD	Logistics	51 to 500	2 to 5 years
Furlenco	Consumer Durable	51 to 500	More than 5 years
Life Care Logistic Pvt Ltd	3PL	500 to 1000	More than 5 years
Coca-Cola	Beverage	More than 1000	More than 5 years

Honeywell	Electrical	More than 1000	More than 5 years
Idemia	Smart cards	More than 1000	More than 5 years
Bharti Airtel Limited	Telecom	More than 1000	More than 5 years
Pee Aar Automotive Technologies Pvt LTD	Automotive	51 to 500	More than 5 years
Larsen & Toubro	Control & Automation	51 to 500	More than 5 years

**Data collection**

Structured questionnaire were use for primary data collection. The questionnaire were sent to the company representatives who are handling supply chain function .The questionnaire contained closed end questions including multiple choice, short answer, and Likert -scale. The data gathered through questionnaire was further supplemented by information acquired from secondary information sources, such as annual reports and company web-pages, research papers, company research reports etc. All the data collected was analyse using graphs and tables.

**5. Data Analysis**

**5.1 Reasons for adoption of Technology in Supply chain**

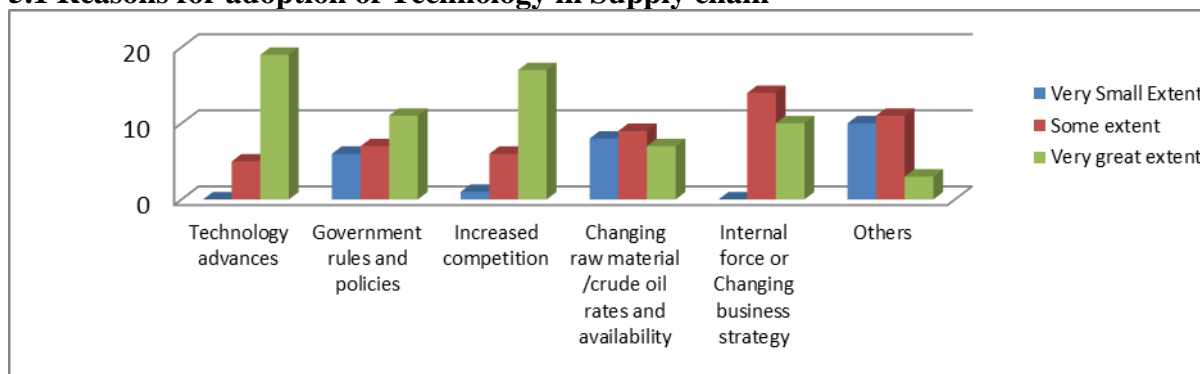


Figure 1: Reasons for adoption of Technology in Supply chain

Major reasons for the use of technology in supply chain is technological advancement & increase competition

**5.2 Objectives of Improvement in Supply Chain**



Figure 2: Objectives for overall improvement in Supply Chain

Basic objectives of improvement in supply chain are to integrate with other function , cost reduction, reduce delivery time which in turn satisfy consumer need, redesign distribution network etc.

**5.3 Use of Technology in Supply chain**

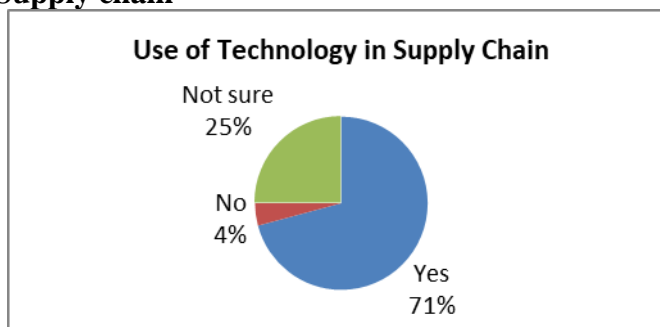


Figure3: Use of Technology in Supply Chain

Out of 24 respondents 71% told they are using technology in their supply chain.

**5.4 Reasons for not using technology**

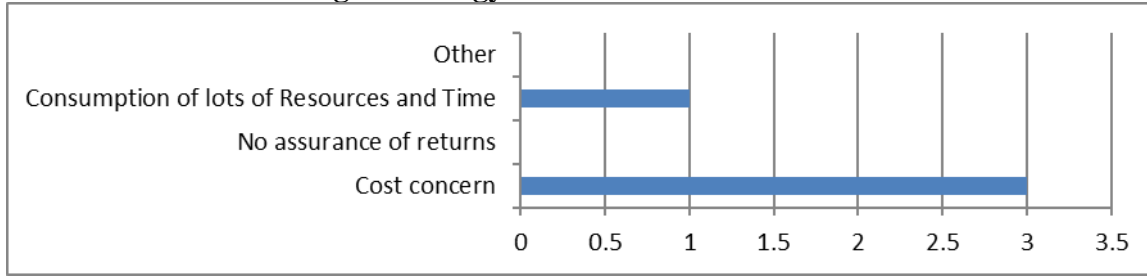


Figure 4: Reasons for not using technology

Major reasons for the use responded by 5 are cost seconded by consumption of resources and time

**5.5 Parts of Supply Chain where Organisation Planning to implement Technology**

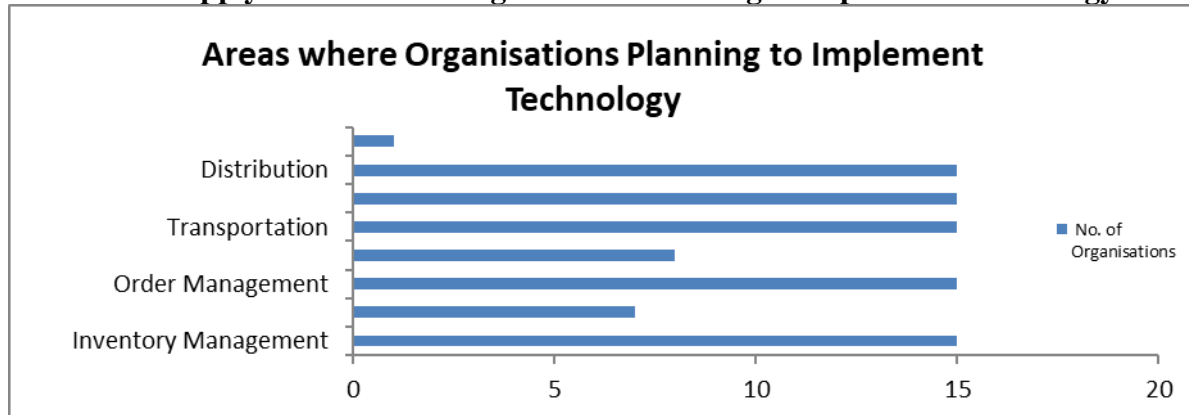


Figure 5: Areas where Organizations Planning to Implement Technology

Ware house , distribution, transportation, order management and inventory management are the areas where organisations re planning to use technology

**5.6 Technology in Supply Chain influences the following factors**

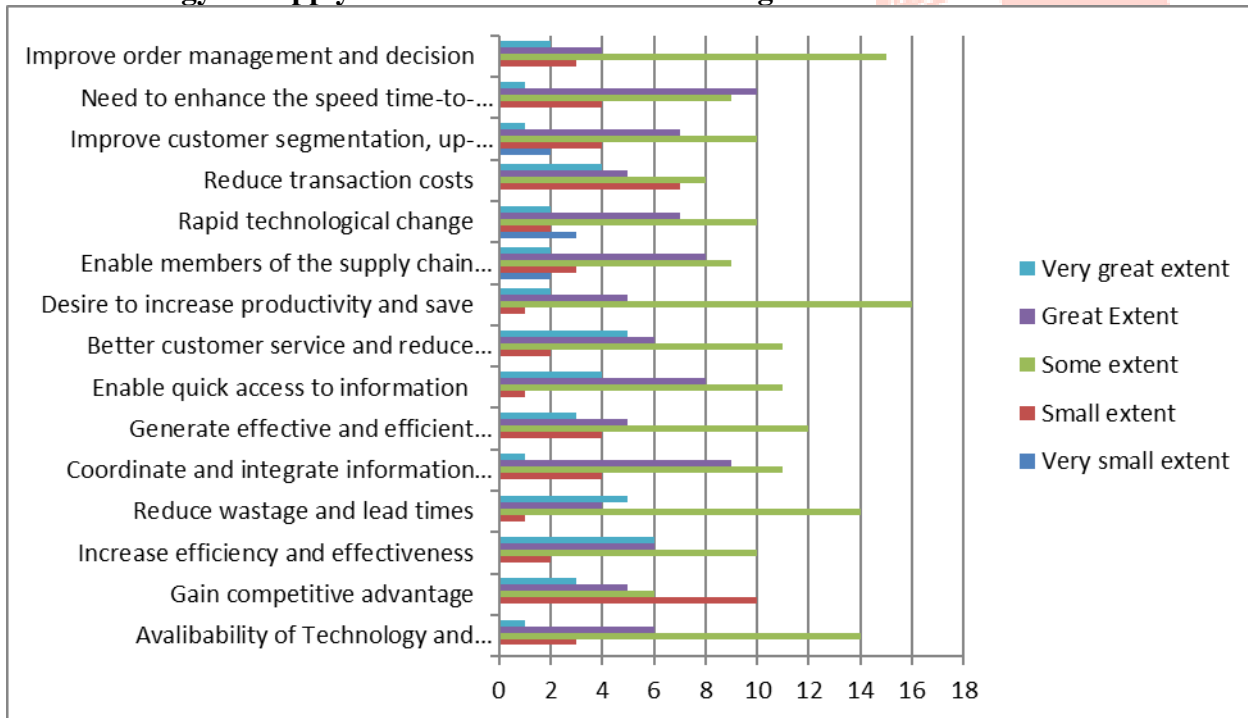


Figure 6: Technology in Supply Chain influences the following factors

Most of the respondent believe that technology can help to solve the problems only some extent .

**5.7 Size of Warehouse**

Table 2: Size of Warehouse

Less than 10000 sq ft	1	4.2%
10000sq ft to 50,000 sq. ft	7	29.2%
50,000 sq ft to 100000 sq ft	3	12.5%
More than 1 lakh sq ft	13	54.2%

### 5.8 Type of Technology currently using in warehouse

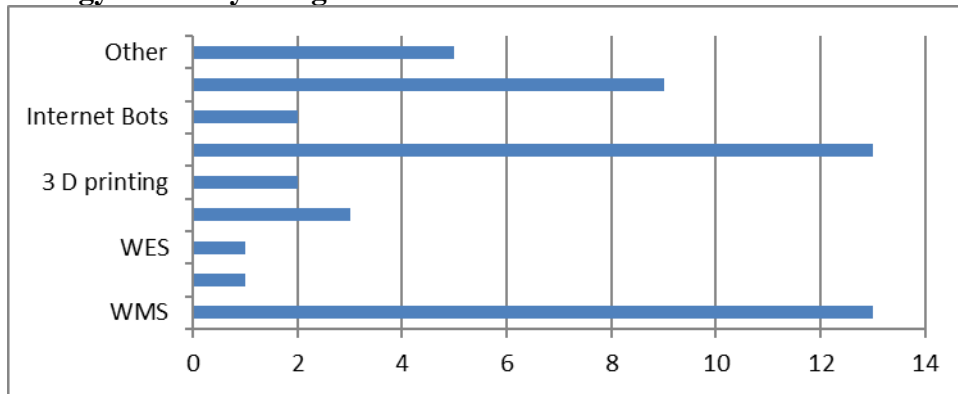


Figure 7: Type of Technology currently using in warehouse

### 5.9 Performance outcome after implementing technologies

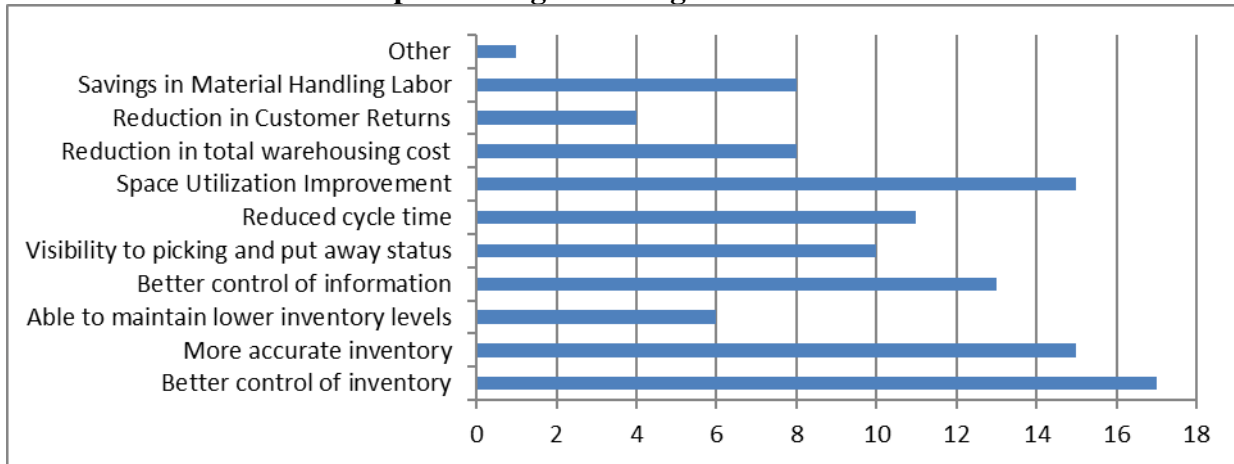


Figure 8: Performance outcome after implementing technologies

### 5.10 Technologies planning to implement in near future in warehouse

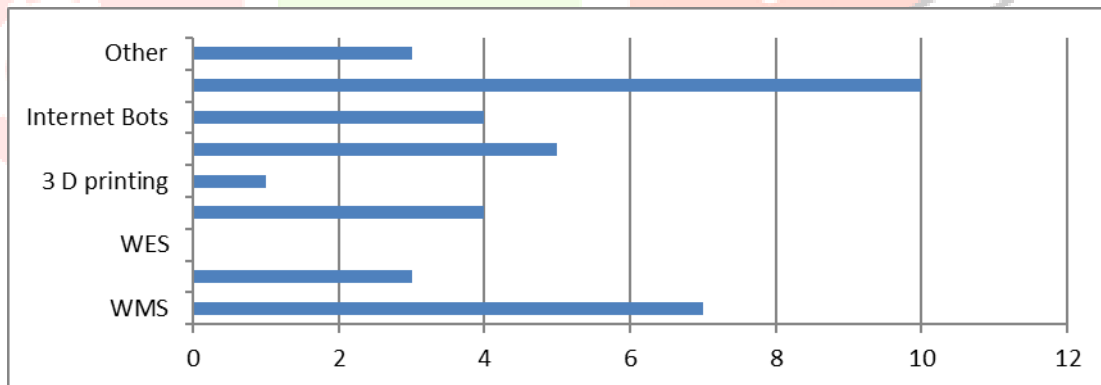


Figure 9: Technologies planning to implement in near future in warehouse

## 6. Discussion

The findings of this study explain that there is a if and buts in the industry about the use of technology in supply Chain. Major reasons for the use of technology in supply chain are technological advancement & increase competition. Other factors like government rules and regulation, internal business strategy is also an important factors. Basic objectives of improvement in supply chain are to integrate with other function, cost reduction, reduce delivery time, redesign distribution network which in turn satisfies consumer need, visibility and improved performance etc.

Although the work has been done on technology use in supply chain and even world survey explain the usage of and intention to use but in Mumbai which represent Indian scenario it is very less. Still today companies are thinking to accept the changes but maybe there is delay due to availability of cheap man power with major reason mention of cost. Companies have the pressure on the part of market to perform but at better quality of product and services at lesser price.

Order fulfilment optimisation technologies with WMS use in warehouse are the basic technology in the world of advance technology like IOT, BOTS, 3D, Block chain. The major objective for this intended was Inventory management, order fulfilment, space utilisation and cost reduction

Major finding from the study are organisation wanted to implement but they are uncertain about outcome. Technology adoption is there but advancement need to be taken care.

## Conclusion

Integration of supply chain activities and the technologies to accomplish it have become competitive necessities in most industries. Greater numbers of organisation adopt technologies to improve inventory management and faster delivery purpose. They are looking for technology coordination to improve operational efficiency and very often lower cost. But the most commonly use technology when considering the warehouse is WMS and order delivery fulfilment. Companies are also planning to implement advance technologies like BOTS, 3 D in future for increasing need from customer for faster delivery and improved services and also to improve internal performance.

## References

- APICS, Report (2018), End to end supply Chain Education, <https://www.supplychaindive.com/news/digitization-supply-chain-adoption-failure/518418/>
- Fawcett, S.E., Wallin, C. Allred, C., Fawcett, A.M. and Magnan, G.M. (2011) Information Technology as an Enabler of Supply Chain Collaboration: A Dynamic-Capabilities Perspectives. *Journal of Supply Chain Management*, 47, 38-59. <http://dx.doi.org/10.1111/j.1745-493X.2010.03213.x>
- GT Staff( November 20th, 2017) , Info graphic: How is Technology Enhancing Supply Chain Management?, Global Trade, revealed from <http://www.globaltrademag.com/global-logistics/infographic-technology-enhancing-supply-chain-management>
- Harrison, A and New, C. (2002) The Role of Coherent Supply Chain Strategy and Performance Management in Achieving Competitive Advantage: An International Survey. *Journal of the Operational Research Society*, 53, 263-271. <http://dx.doi.org/10.1057/palgrave.jors.2601193>
- Jaana Auramo (· July 2008) The roles of information technology in supply chain management, Reserch Gate
- KPIT, (2017), "Supply chain optimization using technology in manufacturing, Forbes India revealed from <http://www.forbesindia.com/blog/technology/supply-chain-optimisation-using-technology-in-manufacturing>
- Lee, H. and Billington, C. (1992), "Managing supply chain inventory: pitfalls and opportunities", *Sloan Management Review*, Vol. 33, No. 3, pp. 65-73.
- Li, G., Yang, H., Sun, L. and Sohal, A.S. (2009) The Impact of IT Implementation on Supply Chain Integration and Performance. *International Journal of Production Economics*, 120, 125-138. <http://dx.doi.org/10.1016/j.ijpe.2008.07.017>
- Ming-Lang Tsenga(2011), Information technology in supply chain management: a case study, *Procedia - Social and Behavioral Sciences* Volume 25, 2011, Pages 257-272
- Samadi, E. and Kassou, I. (2016) The Relationship between IT and Supply Chain Performance: A Systematic Review and Future Research. *American Journal of Industrial and Business Management*, 6, 480-495. <http://dx.doi.org/10.4236/ajibm.2016.64044>
- Yücesan E. (2007) Impact of Information Technology on Supply Chain Management. In: Jung H., Jeong B., Chen F.F. (eds) *Trends in Supply Chain Design and Management*. Springer Series in Advanced Manufacturing. Springer, London
- Ming-Lang Tsenga(2011), Information technology in supply chain management: a case study, *Procedia - Social and Behavioral Sciences* Volume 25, 2011, Pages 257-272
- <https://www.supplychaindive.com/news/digitization-supply-chain-adoption-failure/518418/>
- [http://www.dpdhl.com/en/media\\_relations/press\\_releases/2018/95\\_per\\_cent\\_of\\_companies\\_yet\\_to\\_realize\\_full\\_benefits\\_of\\_digitalization\\_technologies\\_for\\_supply\\_chains.html](http://www.dpdhl.com/en/media_relations/press_releases/2018/95_per_cent_of_companies_yet_to_realize_full_benefits_of_digitalization_technologies_for_supply_chains.html)
- <https://www.supplychaindive.com/news/MODEX-2018-survey-MHI-Deloitte-next-gen-tech/521345/>
- <https://www.mhi.org/publications/report>
- <http://www.symbolic.com/2016/11/14/3-biggest-challenges-facing-supply-chain-industry/>
- <http://www.digitalistmag.com/digital-supply-networks/2018/05/03/key-to-customer-centricity-creating-touchless-supply-chain-06134756>