Improving performance of Supply Chain Management based on RFID concept

Pankaj

Department of Computer Science and Information Technology

M.J.P. Rohilkhand University, Bareilly

Abstract

RFID is a technology of wireless that use radio transmitted signals to tag a product, to trace and track its movement without involvement of human beings has more capabilities compare to bar codes and provides many supply chain benefits, like decrease shrinkage, efficiently handling of products, increased availability of product, improved stock management. RFID has lot of applications and usage in healthcare, retail, and management of records, logistics and many more organizations. Tracking and capturing of accurate data is a main concern that encouraged various organizations to focus on effective and efficient SCM. RFID includes advanced technology that can solve most of the issues. It helps the various companies to increase its overall efficiency and benefits. Although, it carry some risks that result in less adoption of this technology which make the companies to rethink of its implementation. RFID has a huge potential to increase the supply chain management excess and empower firms to improve and sustain competitive advantage.

Introduction

SCM is the process that manages and controls every type of information's and material in process of logistics from raw material acquisition to material delivers to end user. Every company consider stock control and SCM as the important element that brings success and important for their survival. There are various technologies that can make the SCM process easier and more effective & efficient like RFID, EDI (Electronic Data Interchange), POS (Point

of Sale) and DM (Data mining). RFID technology creates the new opportunities in SCM that are impossible in barcode system. RFID technology includes 3 main components i.e. 1.Transponder- which include a tag that is fixed on the product and recognize them, 2.

Reader- it includes channel for communication, 3. Data collection- in this application, data is collected and includes as antenna and software solution. Corporate leaders acknowledged the basic advantages of RFID and make it mandatory to implement this technology in SCM and even force their suppliers to use it. In spite of many advantages, there is some hesitation among companies to invest huge amount of amount or capital in new infant technology that is still to prove itself and some of the companies has already invested huge amount in barcode systems. So the companies wait for the implementation results from other companies and will get the clear picture i.e. benefits and frauds of RFID technology.

Literature Review

Mall, S. and Mishra, S. (2012) explored the RFID (Radio Frequency identification) importance for solving supply chain problem. It is an essential tool for smooth working of all sectors. RFID can be seen in every type of business like retailing, logistics, manufacturing, sales and distribution etc. It improves process of supply chain of a company by decreasing the time to reach the end of customer, proper stock management, information properly follow-up, etc. RFID provides some identification to every container, pallet and product to be produced, distributed and sold. So it actually helps in making process of supply chain error-free and smooth.It helps companies to satisfy the end user with right price, time and quality and generate maximum benefits in terms of satisfaction of customer and revenue.This paper explains RFID as advanced tool and focus on its applications and importance. It helps in identifying, controlling, locating and monitoring the product, process and people. It is mainly responsible for processing the whole supply chain information into electronically database.

Gale, T.; Divakar, R. and Chelliah, S. (2009) found the RFID impact on performance of Supply chain. It provides opportunity to companies to take their performance of supply chain to a next higher level. Various risks are also there is use of RFID that is the reason of delay in adoption or implementation of this technology. In this Research paper, framework for companies is suggested to find out its role, main points to have maximum impact. Risks or

challenges of RFID should be taken care by companies and assess matrix approach to make risk priorities and implement roadmap for adoption. This paper precise the current

executions and expected benefits from RFID. Its utilization is limited due to various challenges face by companies like schedule of customer, international standards, commitment management, technology, resource available, security, change management, cost, privacy, government regulations etc.

McCathie, L. and Michael, K. (2005) found the advantages and disadvantages of RFID usage in SCM. RFID has many benefits but cost is more that result in less adoption in companies. At one side RFID has many advantages as it does not need line of sight scanning, it reduce workforce, increase visibility and enhance stock management. On the other side, RFID is taken as costly matter, lack standardization, suffers with opposite placement issues and concern of privacy. Regardless of negative factors, objective of RFID in SCM is to establish item –level track so that SCM practices can be regularized properly. Findings of this research paper arerelevant for all type of organization to optimize the supply chain practices through RFID adoption. Various government agencies and world's largest retailers like Wall Mart introduce RFID adoption as mandatory. Various companies were unsure of the benefits they can get after using RFID technology and they have already invested a lot on barcode systems. This research provides a deep examination of benefits and disadvantages of RFID technology in the context of SCM, so that companies got the opportunities to compare its benefits and costs.

Vaidyanathan, G. and Sabbaghi, A. (2008) found the efficiency and effectiveness of RFID technology in SCM and in various business processes. 4 process of supply chain is used to find the opportunities economically and challenges faced while planning and RFID technology implementation of in existing framework of supply chain. This technology helps a company to significantly change its process; it increases efficiency which cause low costs, better able to allocate accountability, respond quickly to requirements of customers. RFID offers a company, to develop an integrated model of demand and supply to increase revenues and innovation. Companies implemented RFID technology to collect data and convert it into information take

advantage of these benefits. Focus was done on the RFID Capabilities in keeping privacy, reliable process of (SC) supply chain, security along with information sharing facility with suppliers and customers, developing new associations, establish planned agreements and get competitive advantage.

Attaran, M. (2012) examine the process of supply chain influenced by RFID technology. In this research, Information gather from published secondary data, list of RFID benefits is obtained by which companies will be able to get opportunities of using this technology in (SC) supply chain. After identifying factors and their benefits in company, importance and strength of each factor is studied in this research. This paper also observes the relationship between benefits of RFID and its implementation success factor in SC (Supply Chain). Different companies set different objectives for implementation of RFID technology, this research helps in recognizing and setting priority features or factors. Findings also suggest various favorable directions for future research on success of RFID.

Narsing, A. (2005) explore that RFID have fantastic opportunities to increase value to firm by providing product vision, decrease out of stock products, decrease warehouse cost, reduce inventory errors, decrease theft and permit organizations to update regularly their inventory and stock database. RFID shows many advantages in various organizations but face many operational and technological difficulties. For example organizations face problems like moisture presence, weather, radiation, refraction and reflection of radio waves etc. RFID face problems globally as difficulty arises in tracking and tracing for import and export of goods. This research paper investigates importance of RFID technology and its influence on corporate long term strategies, growth, profitability, global markets. Findings reveal technical capabilities, limitations, economic & productive feasibility in supply chain of various companies using RFID technologies.

Yuksel, A. S. and Yuksel, M. E. (2011)found RFID as a developing technology that consist of gathering of data, distribution, and management system and can perform identification or scaninformation with more accuracy and speed. Implementation of RFID technology is very important and complicated process, but with right planning and development of strategies it can facilitate benefits to organizations for successful and efficient SCM. RFID is very much popular in media but still many are not aware of its paybacks. This research paper represents various benefitsoffered by RFID technology to variouscompanies in the field of management, production or sale of services & goods.

Coltman, T.;Michael, K. andGadh, R. (2008) found that it is important for every organization irrespective of sector or size, is to provideservices and goods on time and free of error to end customers. Forecasting demand, raw material source, from manufacture and

dispatch, vision of supply chain becomes the important feature of modern setup.New emerging technologies like RFID createhuge opportunities in engineering services, marketing, management and various types of organizations. RFID is an electronic identification technique, that provide a clarification to the transparency problems of article or items that restricted the process of supply chain in past. RFID technology can benefit by reducing the reorder time taken in shipment, decrease product theft and shrinkage, enhance pallets, individual products tracking and provide proper planning and stock optimization.

Hayya, J;Chu, C. H.;Bhattacharya, M. and Mullen, T. (2010) explore the research to define the advantages or benefits of RFID in retail industries.Findings show that RFID is beneficial for stock management, security improvement, efficient operations and cost decreases in retail sector. With testing and correlation principle, it is observed that there is strong relation between RFID business process and retailer benefits, and improved stock management is a reason of being use of RFID by retailers. To reduce false perception about uncertainty, this research paper study the relation between business process and value chain activities that influence the adoption of RFID in retail sector. This research also clarifies doubts related with adoption of RFID in retail world. Retailers use these strategies in implementing RFID.

Tege, S.and Verma, D. S. (2012) argues on the increase usage of RFID application in retail sector especially in (SC)supply chain. It became necessary for Retail sector in order to strengthen its supply chain efficiency and safety, has to apply RFID. Transactions in this technology is observed in various locations which are implemented in retail outlets and it start from products received from order and end with the purchase by customer. This research compares the difference between before and after implementation of RFID application. RFID (Radio Frequency Distribution) created revolutionary changes in SCM, especially in retail sector. The study depends on the basis of cost benefit model that helps in adoption of RFID technology. Results provide awareness about the challenges and possible benefits of RFID adoption. Therefore, retailers are able to make more accurate decisions in planning and allocation of resources.

Sari.K. (2010) explore a framework to help supply chain managers in determining the suitable environmental and operational conditions under which RFID technology id more benefited. In this research, 4 echelon supply chain that is already in operation in various

stages of cooperation are inspected in complete simulation model. Finding from this model shows that unifiedRFID technology in supply chain offers huge benefits when collaboration between participants is more rigorous. Results also reflects that these benefits are more when lead time is more or demand is low in marketplace.

Roberto, M.; Gino, F, Antonio, R. and Eleonora, B. (2009) explored the quantitative evaluation of RFID influence and EPC (Electronic Product Code) system on the supply chain process of fashion business. Distribution center and retail store is evaluated in fashion supply chain. Questionnaire surveys and site visits are done to gather qualitative and quantitative data related to supply chain process of each organization is examined. An extensive evaluation of investment is done to assess the implementation benefits of RFID and EPC in fashion supply chain process. Findings provide recommendations or suggestions for implementation of RFID and EPC in supply chain of fashion business. Some technological concerns the software and hardware infrastructure assumed for RFID placement. Hardware feature includes tags, readers

and other tools used in RFID process. Experts suggested that item base tagging can be done and pallets, cases can also be furnished with RFID tags.

Absi, N,;Sarac, A. ; and Peres, S. D. (2010) found that technology of RFID can improve the future benefits of SCM by reducing loss of stocks, efficiency & speed process increases and accuracy in information's. Different RFID systems may be obtained by joining various readers, tags, frequencies and tagging levels. Potential benefits and cost of each system varies in wide variety.This paper analyzes the effect on performance of supply chain with a state of the art on deployment of RFID technology in supply chain. Future benefits, mainly on problems of stock inaccuracy, effect of bullwhip and replenishment policies are thoroughly surveyed. Different work addressing analytic modeling, case studies, simulations and experiments as well as return in investment are analyzed. Different RFID Systems can be achieved by joining various tags, frequencies, readers and level of tagging.

M. Tajima (2007) explores the potential and actual values of RFID technology in companies. Researchers have examined the significant of decreasing the gap and deal with the competitiveness as the value of RFID. This research paper helps in providing the insight of strategic value of RFID by making theories on its usage in SCM and creates a

competitive advantage. Concerns of various organizations are taken consideration which makes them hesitate in adoption of RFID technology. This paper discovers the value of RFID in supply chain management and its advantages in success and progress of different types of companies. RFID technology becomes essential in supply chain from the level of product order, to the level of end user.

Lee Y.M., Cheng F.;Leung Y.T. and Hennessy J.J. (2007) found Radio frequency identification has become an essential technology to enhance the facilities of SCM. This technology is time consuming and expensive to implement, most of the companies need a rigorous cases of business in taking decision i.e. to adopt this technology or not. For this purpose, a tool has been invented to quantify the value of business in RFID for various participants in manufacturing –supply chain retail. This tool includes 2 models i.e. Business value model (spreadsheet) and Business process model (Computer simulation). It is important to gather full range of futuristic benefits of RFID, so it is important to coordinate 2 decision support tools.

Conclusion

SCM is the movement of services and goods from suppliers, to manufacturers, distributors, and lastly to end users. As the business increases globally, the organizations start taking the advantages of new technologies to increase their profitability and sustainability. RFID technology is one of such technology that makes supply chain coordination more effective. Supply chain activities are basically divided into 3 main categories that is management of supplier relationship, internal supply chain and customer relationship. Each category is addressed and briefly discussed with relation to RFID. Some companies focus more on the risks associated with this technology, some were ready to take these risks and act as leaders. RFID technology has shown many pros and cons but still its benefits in supply chain process and retail sector make it popular and somewhere encourage companies to implement this technology. Consumer's privacy, corporate security systems, industrial surveillance are some of the concerns that companies consider while adopting and implementing this technology.

References

1. Mall S. and Mishra, S. (2012),RFID and Supply Chain Management: A Brief Outline, The IUP Journal of Supply Chain Management, Vol. IX, No. 3,
2. Gale, T.; Rajamani, D.& Sriskandarajah, C. (2009). The Impact of RFID on Supply Chain Performance. Technology, Operations and Management. 2.
3. K. Michael and L. McCathie (2005), The pros and cons of RFID in supply chain management, Proceedings of the International Conference on Mobile Business, pp. 623–629
4. Asghar Sabbaghi1 and Ganesh Vaidyanathan2 (2008)Effectiveness and Efficiency of RFID technology in Supply Chain Management: Strategic values and Challenges, Journal of Theoretical and Applied Electronic Commerce Research, Vol 3,Issue 2
5. Attaran, M. (2012),Critical Success Factors and Challenges of Implementing RFID in Supply Chain Management, Journal of Supply Chain and Operations Management, Volume 10, Number 1, pp-144-167
6. Narsing, A. (2005), RFID And Supply Chain Management: An Assessment Of Its Economic, Technical, And Productive Viability In Global Operations, The Journal of Applied Business Research, Volume 21, number 2
7. YUKSEL, M. E. and YUKSEL, A. S. (2011), RFID Technology in Business Systems and Supply Chain Management, Journal of Economic and Social Studies, Volume 1 Number 1, pp-53-71
8. Coltman, T.; Gadh, R. and Michael, K. (2008), RFID and Supply Chain Management: Introduction to the Special Issue, Journal of Theoretical and Applied Electronic Commerce Research, 3(1), 2008
9. Bhattacharya, M.; Chu, C. H.; Hayya, J. and Mullen, T. (2010),An exploratory study of RFID adoption in the retail sector, Operations Management Research. 3. 80-89.
10. Tege, S.and Verma, D. S. (2012),Implementation of RFID in Retail Outlet, International Journal of Engineering Research and Applications, Vol. 2, Issue 3, pp.3038-3044
11. Sari.K.(2010), Exploring the impacts of radio frequency identification (RFID) technology on supply chain performance,European Journal of Operational ResearchVolume 207, Issue 1, 16 November 2010, Pages 174-183
12. Eleonora,B.; Gino,F.; Roberto,M. and Antonio, R.(2009), The impact of RFID technology

on logistics processes of the fashion industry supply chain, Vol 1, No,4, PP.225-252

13. Sarac, A. ; Absi, N. and Peres, S. D. (2010),A literature review on the impact of RFID technologies on supply chain management,International Journal of Production EconomicsVolume 128, Issue 1, November 2010, Pages 77-95
14. M. Tajima,(2007) ,Strategic value of RFID in supply chain management, Journal of Purchasing and Supply Management, vol. 13, pp. 261-273
15. Leung Y.T., Cheng F., Lee Y.M., Hennessy J.J. (2007) A Tool Set for Exploring the Value of RFID in a Supply Chain. In: Jung H., Jeong B., Chen F.F. (eds) Trends in Supply Chain Design and Management,pp-49-70