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RFID TECHNIQUE: BARRIERS TO OVERCOME IN THE INDIAN SUPPLY CHAIN MANAGEMENT

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ABSTRACT

This paper explores the current barriers to adoption of radio-frequency identification (RFID) for the Indian supply chain applications. The findings show that the three main barriers to RFID adoption are: the cost of RFID implementation (especially ongoing tag costs), lack of customer awareness and education, and a technology which is only at the beginning of its lifecycle curve in terms of supply chain deployment. Prospective customers are also finding it difficult to justify a business case solely on RFID. This paper argues that both barcode and RFID technologies will coexist in parallel, each with its specific function and set of advantages.

KEYWORDS: Radio-Frequency Identification, Barcode, Adoption, Convergence

INTRODUCTION

This paper will explore the interplay between the retailer's dilemma of product shrinkage and the solutions advocated by RFID vendors and associations to minimize product shrinkage.RFID as an emerging technology holds the potential to fulfill the needs of Indian stakeholders in the supply chain. Despite the current standards supporting the growth of the technology in India there still remain a number of challenges that prevent RFID from widespread adoption in the Indian industry. These challenges involve overcoming barriers and inhibitors to the adoption of RFID implementation for the tracking of goods.

RFID: THE EMERGING TECHNOLOGY

An RFID tag is a small and inexpensive microchip (like the size of a grain of salt) that emits an identifier in response to a query from a nearby reader. Once it is attached to an object, the small radio can send information specifically about the object to a computer network. The Electronic Product Code (EPC) is a unique number that identifies a specific item in the supply chain and it is this EPC that is stored on an RFID tag. Once the EPC is retrieved from the tag, it can be associated with dynamic data such as from where an item originated or the date of its production or it's current location. In 2003, Wal-Mart made it mandatory for its top 100 suppliers to put RFID tags on all cases and pallets that roll out of the manufacturer's base. The Department of Defense has ordered its suppliers to make all the supplies RFID enabled and Gillette has ordered at least 500 million of these. Michelin, which manufactures 80,000 tires a day, is planning to put RFID tags in each of its tires. There is no law requiring a label indicating that an RFID chip is in a product; every item purchased with an RFID tag is "numbered, identified, catalogued and tracked". Since many organizations require their vendors to

supply RFID tagged products, the competitive race began so much that small and medium size companies could not cope or afford the cost and challenges of implementing full-fledged system of RFID. Thence, we propose that RFID technology be hosted in the cloud so as to enable small and medium size companies to subscribe to on-demand services or pay-as-you-go which will not be cost or capital intensive. This will help these companies to survive instead of being crunched.

BENEFITS OF RFID TECHNOLOGY IN BUSINESSES

Due to its speed, range and durability, RFID has made a place for itself in high-end technologies and businesses, while the relatively cheaper and easy to use barcode is widely used in everyday applications, specifically by small and medium enterprise (SMEs). There are no tight controls on where an RFID tag should be positioned. Unlike barcode labels, which need to be read automatically and must adhere to standard positioning, the only requirement for the RFID tag is that it must be within the field of the reader and not blocked by metals or water. Additionally, the reader can read numerous tags at the same time. RFID tags provide robustness and security for asset, document and software tracking, but it does not have to stop there. Companies are increasingly realizing the potential for RFID technology to be used in patient and people tracking, within the supply chain, in retail and in manufacturing; when used for tracking assets, RFID can greatly reduce the loss or misplacement of goods, minimize shrinkage and provide additional security for tagged items. Moreover, E pedigree, pharmaceutical, event ticketing and airline baggage tagging will also see business benefits.

Many organizations such as the U.S. Department of Defense, Toyota, Pfizer, Wal-Mart and a number of retail stores currently utilize RFID systems as part of their supply chain processes [1] Wal-Mart, in particular is often highlighted as an exemplary in the industry for their successful deployment of RFID technology in the early 2000''s. RFID technology has significantly contributed to Wal-Mart's low cost strategy by allowing them to create an inventory control system that is highly efficient. Another retailer that has experienced a return on investment with respect to implementing an RFID system is American Apparel, a clothing retail chain headquartered in Los Angeles, CA. American Apparel boutiques regularly display over 26,000 Stock-Keeping Units (SKUs) which limits them to displaying a single article of clothing in a given color or style on the sales floor at a time. The use of RFID tags on all items coupled with handheld readers allows employees to determine which items are on the sales floor versus the stock room. This system has reduced the time that was traditionally spent dealing with inventory by more than 90%.

Similarly, Giant Food Supermarkets and Pharmacies have strategically put RFID technology into practice. The following were reported by Mr. Newborn, a former stock clerk at Giant Food Inc. (Brock & Laryea, 2009) regarding the deployment of RFID technology as it relates to inventory control:

- Shortened ordering process which would normally take approximately 3-4 days of ordering products throughout the week. But this is now automated, so it is done within a matter of minutes

- Significant decreased the number of employees needed for inventory control

- More accurate form of documenting inventory, less mistakes than with manual entry by humans

- Automatically created sales reports, so the managers could easily track performance

Other Benefits of Implementing an RFID System

There are several benefits for companies who are implementing RFID technology in their business processes:

- Improves overall supply chain performance primarily because it provides managers with real-time data that enhances decision-making: Enables effective Materials Management & Inventory Control by reducing bottlenecks in the flow of materials, which ultimately ensures that products are located at the right place at the right time and consequently helps to reduce inventory levels and minimize overstocking warehouses and distribution centers.

- Facilitate contingency planning and proactive practices: Allows forecasting demand for goods more accurately since these estimates are based on real-time data. Business managers are thus able to sense vulnerabilities at an earlier stage and act upon them in a timely manner.

- Improve and strengthen customer-supplier relationships by fostering communication and information-sharing between business firms, suppliers and customers. Inventory management is enhanced as the tags and readers can be programmed in such a way that an automatically signal is sent when replacement orders are needed. The two-way communication makes it possible for timely shipment of orders; a key priority for customers.

- Mitigates costs by reducing the time and labor needed to manually input data. These systems improve data accuracy, which directly benefits sales and operations planning and is a practical way to help firms stay afloat given the current economic climate. A brief discussion on cost savings is provided in the next section of this paper.

- Cost Savings: Estimated savings of at least 30% of the 2 to 4% in operational expenses that organizations typically spend on warehouse and distribution costs

Barriers to Adoption

There are a number of challenges that are currently hampering the diffusion of RFID in the Indian industry as a SCM solution and as a means to minimize product shrinkage.These barriers to adoption were identified as cost, lack of awareness, immaturity of RFID technology.

Cost this study revealed that RFID is currently too expensive to be implemented by a retailer. Although the technology has improved dramatically over the past decade, the cost of various RFIDcomponents remains a significant inhibitor to its adoption. Itwas agreed on by both the retailer and the RFID vendors andassociations that cost was the most dominant barrier to theintegration of RFID in a retail setting. In addition, RFID wasdismissed as a possible SCM solution on most occasions solely based on this factor RFID readers and tags were found to be costly outlays in anRFID implementation. However, RFID tags in a supply chain solution require constant replenishment. RFID readers on the other hand have an initial outlay, but in most cases requirelittle maintenance. A large scale operation, such as integrating RFID within a retail supply chain, requires a large number of RFID tags, and the cooperation of all the entities in the value chain. Consequently, it was discovered that tags represented the larger expense of the two.The price of an RFID tag is relative to the law of economies of scale. Economies of scale refers to the decreased per unit costas output increases [3]. In other words, when RFID tags can be produced on a larger scale with less input costs, economies of scale are achieved. The latest silicon technology and other advancements in RFID are to influence production volumes due to the lower costs of such materials. As the price of RFID tags fall and become more affordable, the adoption of RFID will increase. Prospective customers also need to change the way they are evaluating the business case for RFID in their organization. Traditional models focus on the cost-benefit justification between barcode and RFID, which is limiting in scope when one considers the high probability of convergence. It is most likely that an RFID solution for a retail supply chain would need to integrate

a middleware application.Middleware was also found to be an expensive component of an RFID system. It is most likely that an RFID solution for a retail supply chain would need to integrate a middleware application.Middleware was also found to be an expensive component of an RFID system. Many vendors were providers of hardware-based solutions and relied on a third party to integrate middleware and the communication between RFID tags and a Warehouse Management System.It was therefore confirmed that the overall costs involved in an RFID implementation are a barrier to itsadoption in Indian Supply chain management The technology may exist to build an RFID solutionfor a retail supply chain, yet it all comes down to developing business cases improving the generalawareness of the technology in the Indian industry.

Lack of Awareness

Another barrier exists due to a basic lack of understanding of the approaches to integrating the technology into the existing IT infrastructure. Though commonalities among RFID implementations exist, it is specific to companies based on their size, industry, and relationships to other business. For example, a manufacturing company (supplier) that will be placing RFID tags on its products will have different implementation needs than the retail company that receives the tagged products. These consumer-goods manufacturers initially will be most concerned about how to efficiently modify their warehouses and production lines, and how to tag products and/or pallets with the RFID tags, while retail companies will initially be more concerned with processing the data received from the tagged products.

Manufacturing companies must implement the approach that best fits and will satisfy their business needs. Without a clear understanding of the different approaches to being RFID compliant, these organizations will remain resistant and not overcome barriers to implementing RFID technology into their business operations another commonly occurring concept was "think" which represents the lack of awareness of RFID technology in India and the hesitation that prospective customers have about their RFIDvision. It was found that the overall awareness of Gen-2 RFID within the retailer studied was generally low. Loss Prevention staff members had a reasonable understanding but failed to recognize the true potential of RFID as a retail SCM solution and an effective loss prevention mechanism. This lack ofawareness requires information sources to be directed at retailers to instigate a solution. The RFID Association involved in the study was a non-profit organization, solely established to increase awareness of RFID through communication and forming a knowledge base. An interesting point raised by the RFID Consultant was that RFID "brings different knowledge into the same room". This suggests thatintegrating RFID across the supply chain may require more than just the retailer and an RFID vendor. Other stakeholders, such as standards bodies, government agencies, product manufacturers, logistics companies, wireless and other innovative technology providers need to communicate. Oneway to do this is to form a consortium.

Immature Technology

To be become a well established and accepted technology, like barcode, RFID needs further development in India. Further, Indian retailer's have got some pretty good systems that have matured over time and it would be difficult to see where RFID could actually improve those systems. In this instance, the vendor is referring to legacy barcode systems. Retailers have invested an immense amount of money in moving their products from their distribution centers out to their stores and they do that quite well in this point in time.Moreover, the suppliers of RFID equipment are also limited. In this light, RFID may well be a reality, yet in an Indian context it is still considered to be in its infancy. The barriers toentry expand even further when considering user perceptions of the technology

RFID and Product Shrinkage- Differing Views

The Indian retail organizations found product shrinkage to be an issue that is over-looked by some employees working within retail outlets. As emphasized by the Loss PreventionInvestigator, "retail sales are more important or considered more important and Store Managers tend to focus more on sales and trying to get sales". Whereas, a Loss Prevention Department is solely focused on preventing loss through theft, fraud and poor work disciplines (Loss Prevention Investigator). Therefore, it could be advised that both Store Managers and Loss Prevention Departments work towards acommon goal in an effective loss prevention strategy. The RFID vendors and associations had differing views of product shrinkage. Whilst some thought that it only included misplaced and damaged goods, other vendors had pastexperience in the retail industry and thus a broader perspective of product shrinkage. It was found that product shrinkage was considered by the majority of vendors as a primary reason toadopt RFID.

CONCLUSIONS

This paper discussed the current issues surrounding RFID as an emerging technology for Indian SCM solution and as part of a loss prevention strategy for a retailer. Primary themesdiscussed included the barriers to RFID adoption, encompassing the costs involved, lack of awareness, RFID as an immature technology and the differing perceptions of product shrinkage and RFID. As each barrier to entry was examined, reciprocal relationships were found to exist between the retailer and RFID vendors and associations involved in this study. Investments made by retailers inlegacy systems, was found to influence the convergence of RFID and barcodes supported by smart labels and tag data standards. With the various levels of RFID taggingavailable, it was determined that both pallet-level and carton-level tracking were most appropriate for an Indian retail application. Source-tagging products at the point of manufacture was also supported by both the Indian retailer and RFID vendors and associations as a means to minimizeproduct shrinkage at various point across the Indian supply chain, other than point of sale. These types of initiatives are likely to reinforce the overall success of an RFID SCM solution aspart of a loss prevention strategy. Finally, it was discovered that the incorporation of retail supply chain stakeholders is critical to the overall effectiveness at which an RFID solution can function in order to minimize product shrinkage in Indian supply chains.

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