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Inventory Management

Description of Radio Frequency Identification (RFID)

RFID or radio frequency identification is an electronic device that communicates the identity of an object through the application of radio waves (Bagchi et al. 71). Common RFIDs consists of a tag, a reader, and a middleware that decodes the tag data and transmits it to application software. Even though RFID technology has been existing for the longest time, it is only in recent times that its significance in enhancing the performance of supply chains has been acknowledged and gradually embraced (Bagchi et al. 71).

RFID Functioning

Radio Frequency Identification is part of a group of equipment known as AIDC (Automatic Identification and Data Capture). Automatic Identification and Data Capture mechanisms spontaneously distinguish objects, gathers information about them, and feeds the information to computer applications with minimum human involvement (American Barcode and RFID). For this to become possible, RFID techniques apply radio waves. At its most basic level, RFID frameworks are comprised of an antenna, a smart label/an RFID tag, and an RFID scanner. The smart label has an antenna and an integrated circuit, which are utilized to convey information to the RFID interrogator. Afterward, the scanner translates the radio waves into more functional data (American Barcode and RFID). Data gathered from the smart labels is then transmitted via a communications interface to a host computer system that stores and analyses it.

Possible Applications of RFID

There are different applications of RFID in logistics and supply chain visibility. An effective supply chain implies improved quality, increased efficiency, and decreased errors. In fast-paced distribution, manufacturing, and shipping contexts, real-time data on the condition of individual items offers understandings that could be converted into enforceable measures (American Barcode and RFID). Moreover, there are applications of RFID in item-level inventory tracking. Although the tracking of assets on the item level is valuable across a wide spectrum of industries, the retail sector has the highest potential of benefiting from the utilization of RFID technology (American Barcode and RFID). Using an appropriately designed inventory system that exchanges data across each business unit, a business can have a beneficial reserve of usable data

Benefits and Risks of using RFID

RFID technology can lead to a decrease in out-of-stock conditions. The moment an item is out of stock, the client is usually dissatisfied, either eluding the purchase or shifting to a rival to obtain the product. Ensuring there are no out-of-stock conditions through improved RFID inventory visibility/prediction and product tracking can have an instant top-line revenue effect and lead to residual effect through enhancing customer satisfaction and service (Bagchi et al. 71). Again, RFID can lead to the reduction of distribution labor and warehouse expenses. RFID technology substitutes the exhaustive use of cases, individual products, and tracking pallets with sensors that can detect the location of these items in the warehouse with painstaking accuracy (Bagchi et al. 71). As a result, there are decreases in labor expenses and service charges of store shelf inventory and regular stock management.

Accuracies in inventory are vital in assisting to reduce missing/excess write-downs, inventory, and losses (Bagchi et al. 71). Through the application of RFID, there is a decrease in inventory inaccuracies thereby guaranteeing the business that the inventory specified is the one currently available. Additionally, it is estimated that losses retailers experience because of theft is over $30 billion annually. Using RFID technology, products can be located in the supply chain and inventory errors leading to loss of shipments can be eliminated (Bagchi et al. 71). Moreover, RFID technology can be used to the place and time a product went missing. RFID can and has been efficiently implemented in retail stores, especially on higher cost products, to assist in averting theft.

A decrease in point-of-sale labor expenditure. Products that have RFID technology facilitates checkout via a fast scan of every item in cart assisting to lower point-of-sale labor expenses (Bagchi et al. 71). Existing scanning elements of self-service checkout are enhanced, aiding to boost adoption, decrease fraud, and lessen self-service checkout times. Furthermore, RFID technologies enhance planning and prediction. Enhancement in visibility across the supply chain assists in boosting the forecasting abilities to assist in improving inventory tracking (Bagchi et al. 71). RFID technology also leads to a boost in customer experience. Using the technology, there can be the tracking of cart items and offers can be automatically connected to the items.

Although RFID technology has some benefits, it also has its risks. It is known that RFID technology comprises smart labels, information systems, readers, location services/lookup, and communication procedures. These specialized components facilitate the collection of any quantity of quality data on the tagged object or individual (Bagchi et al. 71). Moreover, the gathered data can be accessed and searched for a visibly defined group of individuals. Security

risks arising from RFID technology may not only be associated with the technical elements or the business tasks they are meant for, but also may incorporate any other security appropriate circumstance (Bagchi et al. 71). Since some businesses currently prevent entry to their premises with camera-enabled smartphones to avert spying, security threats may also come from tagged items.

How RFID Improves Walmart's Inventory Management

The advantages of RFID in inventory management comprise Wal-Mart suppliers progressing with EPC (electronic product code) RFID enforcements to achieve operational enhancements. These improvements include 100% visibility of inventory; tracking lot and expiration dates; considerable decreases in losses and shrinkage; allowing RFID tags to contain real-time item metadata databases; allocating special serial numbers to products; work in process data management; and the exchange of EPC with supply chain partners. By applying this creative endeavor, Walmart offered a significant speed to RFID enforcement in supply chains (Rosenblum). Research demonstrates that out-of-stock items assigned with RFID tags were restocked three times faster than those assigned barcode technologies. The University of Arkansas reveals that Wal-Mart was able to implement the RFID technology and decreased out-of-stocks by 16% (Rosenblum). The same study also shows that the retail giant faced a 10% decrease in manual order leading to a decline in excess inventory (Rosenblum).

How RFID Improves Lululemon Inventory Management

International athletic clothing firm Lululemon indicates that it increased its store revenue by applying RFID in each of its stores to track the movement of its merchandise upon arrival at its stores. This has led to a 98% increase in the firm's inventory accuracy (RFID Journal). Lululemon's capacity to retrieve RFID-centred inventory data and decide to sell products online

or in-store led to 8% of online revenue in its third quarter in 2015 (RFID Journal). Through the implementation of RFID technology, Lululemon endeavored to decrease the time spent by its store staff to count inventory and improve product visibility in every store. As a result, this allows shoppers online and in the store to locate their preferred product.

Comparison of Efficiency

Walmart is doing better because it can achieve a higher visibility of its inventory through operation enhancements. However, Lululemon is trying since it has made a 98% increase in its inventory accuracy. Both companies are making strides in inventory visibility and accuracy.

Recommendation on the Future of RFID

Indeed, experts have been forecasting a growth in the implementation of RFID technology for the last ten years. Still, there is slow growth in the market. However, a report predicts global sourcing of RFID tags to achieve a compound yearly growth rate of 22.4% through next year (Lowry Solutions). Various analysts indicate that the passive RFID tag market will expand to nearly 7 billion tags by 2018, mainly by retailer implementation of UHF RFID tags for shelf-level restocking (Lowry Solutions). The figure is projected to grow to 25 billion tags in three years for retail shoes and apparel, with more tags installed on high complexity, high-end retail products (Lowry Solutions). Moreover, analysts predict a fast growth of RFID utilization in the drug market for counteracting counterfeits. Together with a broader enforcement, new technologies will assist in ensuring that RFID is more cost-effective and reliable for a wider range of uses.

Furthermore, enterprises are experimenting with 3D printing technology that could facilitate direct electronic printing in items. Whereas RFID tag printing inside items might not be currently possible, the technology is quickly changing to achieve this realization. In addition,

developments in printed technology have assisted in designing new types of very thin, flexible RFID tags that can be integrated with thin-film photovoltaic solar cells, printed sensors, and printed batteries (Lowry Solutions). Following new conductive ink and electronic printing technologies, firms could feasibly create their personalized RFID tags.

Also, integrating intelligence into the RFID tag and the item being tagged should be expected. There will be tags that have more memory at a reduced cost to facilitate these uses. High-end asserts will be an initial use of the technology, since the costs of the assets will make it simpler to repay the higher cost of the increasingly robust tags (Lowry Solutions). In the future, there might be the development of new antenna designs. The solution to the proper performance of RFID tags is the design of the antenna. The antenna assists in knowing the place and the way a tag can be applied, and its possible performance (Lowry Solutions). In the next decade, there are predictions that there will be new inlays and antennas.

Lastly, RFID technology will progressively become a component of a landscape of communication and sensor technologies that will aid firms to better supervise and handle shipments and assets. Passive sensors for vibration, temperature, moisture will be integrated into RFID technology. All these developments will lead to enhancement in the application of RFID technology.

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