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RFID Infrastructure for Product Take Back: Includes Establishing/Building a Prototype

Kai Hu and Nimishaben Patel
Department of Technology Management
Bridgeport, CT - USA

***Abstract*—as the global economic integration development, technology brings revolutionary technology to challenge the traditional model. The reverse logistics industry is also undergoing significant changes. In recent years, the economic benefits of reverse logistics in a significant increase and in estimated it will grow further in the future. The use of RFID technology solved some Long existence issues that hinder the development of reverse logistics, such as, the choice of location for return products, the value of recycled goods. Currently, there are a lot of companies have embedded RFID technology into reverse logistics and based on this technology developed a database. This paper based on review the previous literature, summarized some problems of the reverse logistics, created a model that collection of information through the RFID technology in reverse logistics, also, provide and analysis the promise and pitfalls that brought by RFID. Under this model, RFID technology combined supply, warehouse, manufacture, retailers and other departments' information, then through data center sharing these real-time data. Based on the information is transparency and it was sharing between each other, we add a virtual currency to replace the reality cash flow in the reserve logistics. This measure can greatly improve the utilization of funds and reduce the total cost of reverse logistics. The significance of this study is to improve the existing reverse logistics model, through using advanced technology products to solve some drawbacks that have long been existed in reserve logistics industry. The established of real-time data center will better coordination the operation of reverse logistics. The development of virtual currency will impact the funds control of the banks and improve the utilization of funds, also to avoid some loss which caused by funding policies in reality environments.**

I. INTRODUCTION

IN 1998, the director of the American Reverse Logistics Implementation Committee Dr. Rogers and Dr. Tibben-Lembke published the first book of the reverse logistics (Going Backwards: Reverse Logistics Trends and Practices), this book researched mainly from the primacy of reverse logistics, management of reverse logistics, reverse processing and secondary markets, the environment of reverse logistics, enterprises reverse logistics, reverse logistics industry and future trends seven aspects, and have a comprehensive comparison with literature. During 1992 to 1998, some scholars carried out the number of model of reverse logistics, Recycling and the value of reverse logistics study. In 1990s, a number of companies in developed countries began to practice in the field of reverse logistics, such as IBM, General Motors, Microsoft and Estee Launder; numerous of other well-known companies began to invest in reverse logistics system. Major companies involved promoting the further development of reverse logistics. In the early of 21th, the study of reverse logistics up to the strategic level, the academic refinement have begun involved various aspects in the industry; reverse logistics processing model was constructed by a third party logistics company supplying services and researched the inventory of reverse logistics, cost minimization and other aspects. At the same time, RFID technology has also been applied to various fields, the application in supply chain is particularly concerned. Many companies are faced with a similar dilemma of consider the radio frequency identification (RFID) technology as a new tool to improve the efficiency of the supply chain. They should embrace it, and if so, when, what are the potential benefits, what are the potential pitfalls? In fact, Gartner predicts that the majority of enterprises will be forced to redesign their value chain processes by the 2012, as RFID changed the storage, collection and the use of data relating to the goods in the supply chain. Unsurprisingly, solution providers are lining up to help these companies become standard RFID users.

II. LITERATURE REVIEW

Reverse logistics can be defined as the reverse process of logistics. According to the definition of Council of Logistics Management (CLM), reverse logistics is a series of planning, execution and control activities processes that management the products, inventory, finished goods and the corresponding information flow, capital flow between the initial source of supply and the final consumption, the goal is to treatment product properly or restore part of it value. Traditionally, reverse logistics has been viewed primarily as the process of recycling products. Today, definitions vary depending on what company or segment of industry is attempting to define it (Krumwiedea & Sheu, 2002). Reverse logistics is not the symmetrically opposite of forward logistics. The difference between reverse and forward logistics can be interpreted in form of various attributes such as quantity, category, cycle time, stock keeping unit and distribution paths. Returned products are usually small in quantity and have many different types. The cycle time of collecting returned products is uncertain that provokes some research on stochastic lead times (Lieckens & Vandaele, 2007). According to Krumwiedea and Sheu (2002), supply chain involves the movement of goods. Conveyance transportation physical goods from one location to another reverse supply chain, also called Reverse logistics which earliest documentation of it uses can trace to the military. Simpson and Weiner referenced an article written in 1898 describing logistics as a strategy for handling troops during war, including the moving and quartering of troops. The military has since defined logistics as encompassing all activities and methods connected with supplying the military, including storage requirements, transport and distribution (Krumwiedea & Sheu, 2002). Although the reverse logistics has an ancient history, it was being treated as a seriously topic only a few decades. But in the last decade, a lot of researches were focus on the reverse logistics because it has great economic effects in the future market. Based on the findings of Rogers and Tibben-Lembke (1998), the total logistics cost amounted to $862 billion in 1997 and the total cost spent in reverse logistics is enormous that amounted to approximately $35 billion which is around 4% of the total logistics cost in the same year (Lee & Chan, 2009). Kaihara (2003) and Liu et al. (2005) hold that a supply chain is a valuable information sharing channel among the suppliers, manufacturing and storage facilities, distributors and customers for facilitating the key business activities of the sale, production and delivery of a particular product(Poon et al., 2009). Krumwiedea and Sheu (2002) developed a reverse logistics decision-making mode to guide the process of examining the feasibility of implementing reverse logistics in third-party providers. Lee and Chan (2009) propose that the five principal processes in the flow of reverse logistics are collection, storage, transportation, inspection and reduction. Reverse logistics rapid development in recent years, the recycling techniques are immaturity, and there are less successful examples be used in practice. Construction reverse logistics information system is still in its infancy, most of the articles' studies are limited to static single product, and less of cases are involving for the dynamics of multiple attempts and multiple product types.

With advent of new technology like Radio Frequency Identification (RFID), which is an automatic identification method, keeps track and trace of the moving objects within the logistics network. Both bar-code and RFID have its distinct strength in data collection and application areas. InLogic (2008) has done the comprehensive comparison between RFID and barcode. Want (2006) had detailed and systematic introduction of the RFDI technology. Although he concludes the RFID has a very broad market prospects, he also pointed that RFID remains a lot of challenges. RFID is advocated by Wal-Mart for promoting the use of electronic code to streamline the supply chain and Wal-Mart requests suppliers to attach tag to each pallet of goods in distribution center and warehouse (Lee, Ho, Ho, & Lau, 2011). Poon et al. (2009) used RFID technology to collect and share the data in a warehouse. The tests are performed for evaluating the reading performance of both the active and passive RFID apparatus. With the help of the testing results, the efficient radio frequency cover ranges of the readers are examined for formulating a radio frequency identification case-based logistics resource management system (R-LRMS). Langer et al. (2007) have a research in the impact of RFID on return center logistics. They conducted a field study with a third-party logistics company that deployed RFID in the outbound logistics operations at one of its return centers. In the research, they found the number of customer claims fell substantially following the RFID deployment. Ko (2009) have researched the RFID technology used to enhance building maintenance and the results show that integrating RFID can improve facility and equipment maintenance efficiency. Lee, Ho and Lau (2011) discussed how artificial intelligence techniques and RFID technology can enhance the responsiveness of the logistics workflow. Based on the work of Visich, Li and Khumawala (2007), they discussed how RFID can be effectively used to enable decision making during the return process and to enhance value recovery. Tuzkaya and Gülsün (2008) researched the centralized return centers location evaluation problem. The return centers location is an important factor affecting the cost of reverse logistics. Transportation of used products is the most challenging issue in RL (Fleischmann, 2001; Krumwiedea & Sheu, 2002) as smaller return quantities and variability in product types increase the transportation costs (Ferrer & Whybark, 2000; Tibben-Lembke & Rogers, 2002). As we know, the transportation costs are directly related to distance and that means choosing a suitable location for the return center has significant affects to the cost of reverse logistics. Tuzkaya and Gülsün (2008) solved this problem via an integrated analytic network process- fuzzy technique for order preference by similarity to ideal solution approach. Lee and Chan (2009) propose a genetic algorithm to determine such locations in order to maximize the coverage of customers. Also, the use of RFID is suggested to count the quantities of collected items in collection points and send the signal to the central return center. This can facilitate the vehicle scheduling for transferring the items from collection points to the return center (Lee & Chan, 2009). Barros, Dekker and Scholten (1998) tackled the location allocation problem of regional depots and treatment facilities for the sand recycling network by using heuristic procedures. Trappey and Wu (2010) develop a hybrid qualitative and quantitative approach, using fuzzy cognitive maps and genetic algorithms, to model and evaluate the performance of RFID-enabled reverse logistic operations. Guide et al. (2006) present a network flow with delay models that includes the marginal value of time to identify the drivers of reverse logistics design. They illustrate their approach with specific examples from two companies in different industries and then examine how industry clock speed generally affects the choice between an efficient and a responsive returns network. Schultmann, Zumkeller, and Rentz (2006) have developed a recycling network for the German automotive industry by minimizing the travel routes between dismantling centers and reprocessing facilities. With RFID technology used in more and more area in our life, some researchers were questioned it privacy protection. Weiss (2003) was concerned when the product reaches the consumer; the tags could still be read when they encounter an RFID transceiver. Peslak (2005) explored the ethical of privacy on RFID. He has attempted to study the fundamental issue of privacy the privacy implications of frequency identification tags. He reviewed the privacy rights, talked the position of enterprises, discussed RFID privacy issues and proposed RFID privacy category framework.

The above reviews are most focus on one part of the reverse logistics. RFID technology was mostly used in warehouse for management the products and collect the information for determine the location of the return center.

With the knowledge of current researches, this article established a prototype that would serve as a framework for implementing RFID technology in whole reverse logistics. The prototype is discussed in detail in the following section.

III. RFID TECHNOLOGY AND VIRTUAL CURRENCY

RFID (radio frequency identification) is a non-contact automatic identification technology, it automatically identifies the target RF signal and to obtain relevant data, without touching mechanical or established optical recognition system. As a wireless version of the barcode, RFID technology has waterproof, anti-magnetic, anti-high temperature, long life, long read distance, tag data can be encrypted and greater data storage capacity, storage of information freely change those advantages that a bar-code do not owned. Its application will brought revolutionary changes to the retail, supply chain and other industries. RFID can be divided into the low-frequency (under 135KHz); high frequency (13.56MHz); ultra high frequency (860M~960MHz); microwave (2.4G, 5.8G) by frequency. RFID divided by the way of energy of supplied into passive RFID, active RFID, and semi-active RFID. Passive RFID with short distance reader, low prices; active RFID reader can provide further distance, but requires battery power, the cost is higher, suitable for long distance applications of read and write. A complete set of RFID systems contains the reader, electronic tags (TAG) also called as transponder and application software systems three parts. The working principle is the energy Reader emits specific frequency radio waves to Transponder, driving Transponder circuit sent the internal data, at the same time, and the Reader will follow the order to interpret the received data and sent to the application to make the appropriate treatment. The Reader can be divided into mobile and stationary two types. The RFID technology has come a long way since Marconi first transmitted Morse code-based signals in 1896; however, at a rudimentary level, it is essentially composed of three components. The tags and readers are the hardware components; the third component, the middleware, is the software that acts as a bridge between the data that the readers read from tags and a database (Langer, Forman, Kekre, & Scheller-Wolf, 2007). Electronic tags generally preserved agreement format of electronic data, in practical applications the electronic tag attached to the surface of the object to be identified. Reader can read the electronic tag and identify the stored electronic data without touching and achieve the purpose of automatic identification. Generally, Reader will connect to the computer and transmit the tag information to the computer for further processing. Electronic Product Code (EPC) is more specific terms for the company's plan to more effectively track and manage the assets of the entire system. This new identification system is characterized by the EPC Global, a partner of the Uniform Code Council and European Article Numbering International (EAN). The system is support interoperability and open standards. The EPC structure can use other industry standard coding scheme into its structure. A meta-code data structure developed by the Auto-ID Center to uniquely identify virtually any kind of physical asset, such as a pallet or a consumer product. The number is contained in a radio frequency tag as a license plate, indexed to a store of related information. To this end, EPC Global has created global RFID standards; the reader can find the details of these standards at http://www.epcglobalinc.org. Virtual currency means the non-real money. If not contains the electronic money of the banking system, network virtual currency can be roughly divided into three categories. The first category is the game currency that familiar by the game players. The second type is portal or instant messaging service provides currency that dedicated issued for the purchase of services within this website. The third type of virtual currency is on the Internet, such as Bitcoin (BTC), Litecoin (LTC), etc. Bitcoin is an electronic currency generated by the open-source P2P software, someone also paraphrase the bitcoin as "a bit of gold," is a network of virtual currency. Mainly for the internet financial investment, but also can be used directly as a new currency in real life. Application and development of the Internet as a new media computer communication technology is the basis produced of network marketing techniques. Internet was born in the 1960s, with the development of network protocols and related hardware and software products, the Internet began transition from military to commercial and civilian. From the beginning of the 1990s, the internet is gradually entering into the daily life of the community. Internet lead to an emergence of a new market, this market is based on the cyberspace of virtual market. Internet provides consumers a great exchange and communication sites, while also giving the enterprise with business market. Business changed their core from product and service to the customer. With the development of RFID and database technology, companies can conveniently gather customer information; timely understanding of customer needs and change their business strategy with real-time control of economic artery.

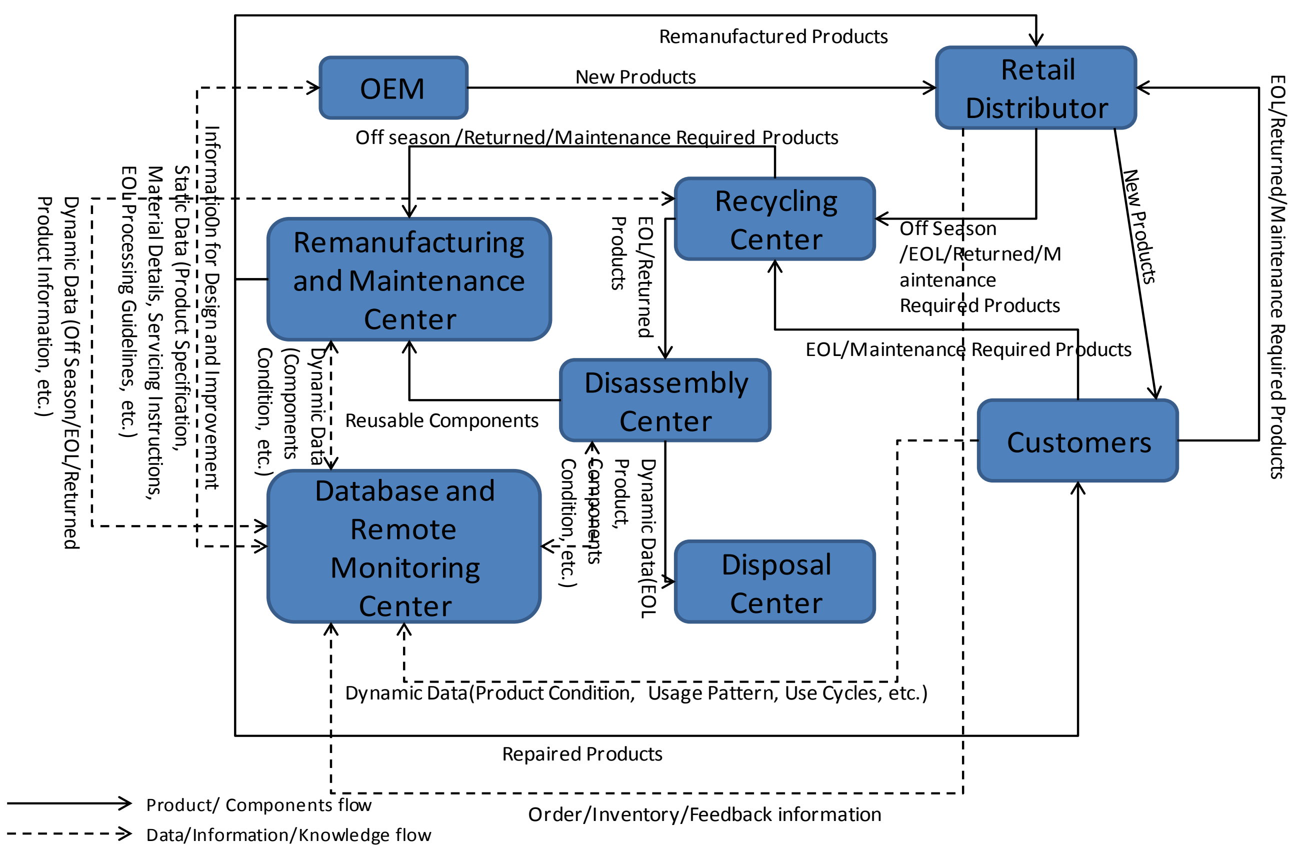
IV. ESTABLISHING OF PROTOTYPE

This section is mainly study of the model. There has many models already exist in the forward logistics field, and there are many companies have already applied RFID technology in supply chain to improve the logistics efficiency. In the reverse logistics field, RFID technology begin to be widespread concern in recent years, and to be used, but is mainly focused on determine the recycling location and management of the recycling process. In this paper, on the original model we add other variables to build a new model. It takes a holistic look at RFID technology and its possibilities for various users, rather than focusing on cost-effectiveness. RFID technology is a time-consuming project which requires a long-term vision. By review some literatures of RFID applications in Reverse Logistics, we use Gupta & Wang's Application of Sensor-Embedded Products in product lifecycle management model as a basic model and established a model embedded RFID technology into the supply chain.

Model building

Building some infrastructure is essential to the fullest benefits of using RFID technology. In the forward logistics process, manufacturers sold products to retailers, and then sold to customers through retailers. Manufacturers in order to provide its customer with better service, so they build the maintenance center, and for recycling these products they need to build a recycling center. Reverse logistics was produced on this progress. Manufacturers set up a disposal center for the purpose of environmental protection, and through established disassembly center, manufacturers can recycle products from customer and by recovering and reuse of products, not only can save costs, but also can analyze products and improving existing products, develop new products and thus ensure the competitiveness of manufacturers. To be able to together and use of information in different sectors, a database and remote monitoring center came into being. The establishment of this department is the product of network development. Monitoring center not only is able to collect the data from various departments, but also can integration, analysis and processing of these data. Figure 1:

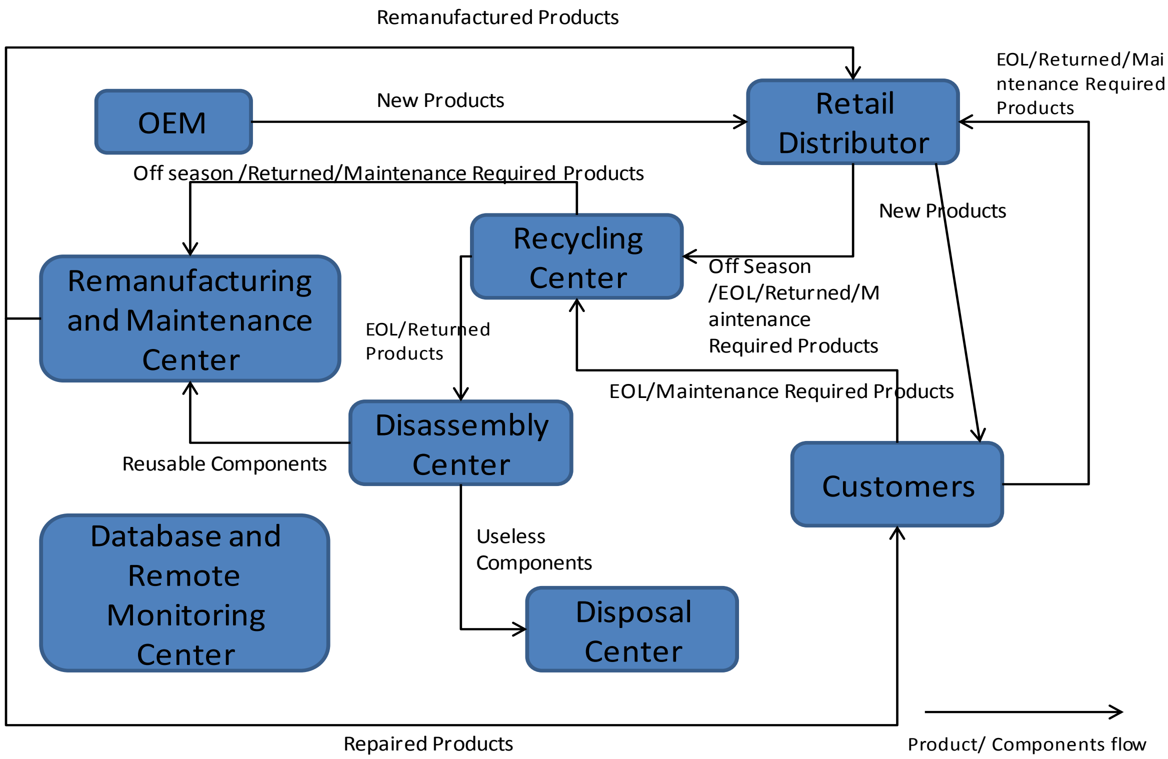
Figure 1. Use RFID technology collection products information in supply chain model



In order to better explain the model, this paper will separate the model into two parts, the flow of goods and the flow of data.

First, we talk about the flow of product. Figure 2:

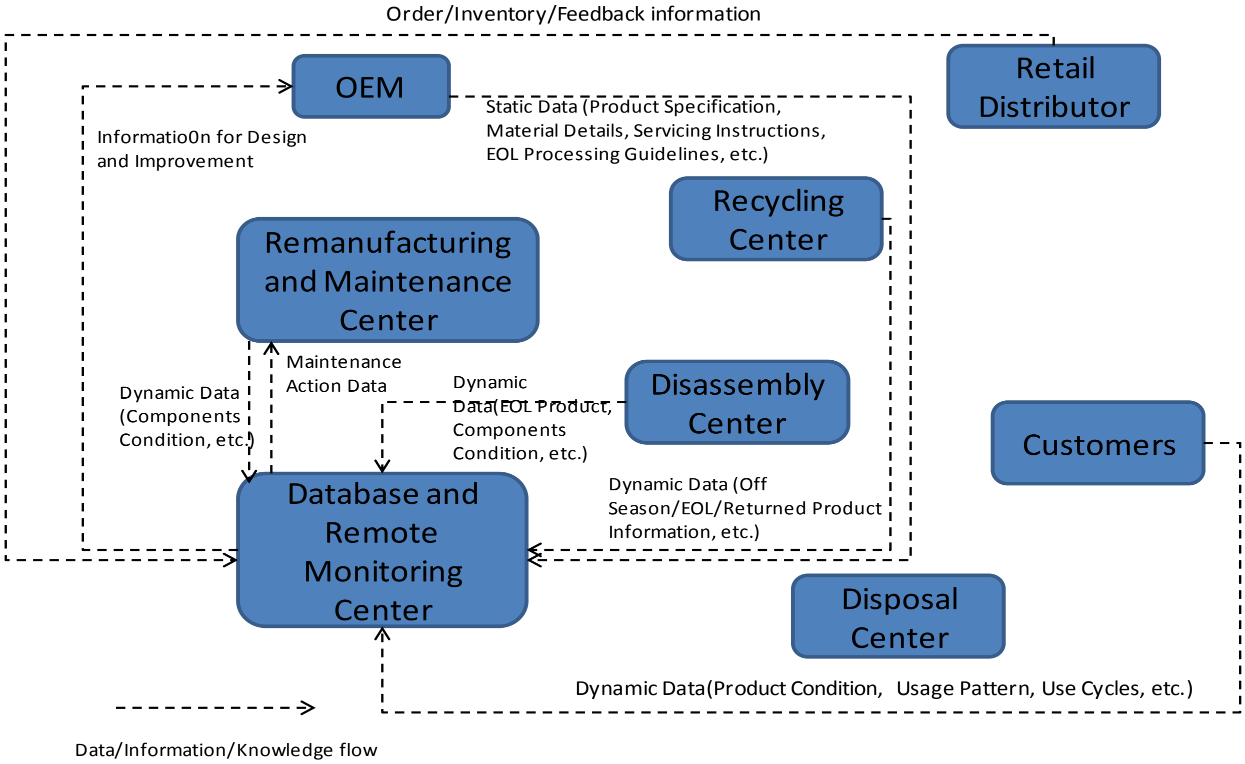
Figure 2. Forward and reserve supply chain



In this model, a new product from OEM to the retailer, then to the customer is a forward logistics. Customers using the product will generally appear about several situations: (1) normally use until the product end of life. (2). Error occurred after use, go to the retailer get returned back or change a new one use until product EOL. (3). Error occurred after use, returns to the factory for repair, and then continues to use until the end of life. For those products did not establish a recycling center or no recycling value, after the end of life it will be treated as spam directly addressed, as for the goods have recovery value will be sent to a recycling center through different channels. Customers can send it by themselves, also can through retailers. Recycling centers will collect the products and simply classify it; some are in need of repair, while others need disassemble. In need of repair items will be sent to the maintenance center set up by the manufacturer, while the other will be sent to the Disassembly center. Disassembly center will dismantle the product that cannot repair or end of life into many parts, some of them can be recycled and re-use to the repair center for re-use, the other part will sent to the disposal center. There are many manufacturers started to consider dismantling recovered when they designed of their products. Modular design favored by more and more manufacturers, not only easy of production and assembly, but also convenient recycling. Through a brief description of this model, we can found that product recycling is a progress as complex as manufacturing process of new products, the cost is very high, but recycling rates may not be significant to the manufacturer's goals. For the manufacturers, they are unwilling to do things that against natural, that is the case and finding ways to reduce recovery costs, increase recycling rates to achieve the rate of return on the manufacturer's requirements.

Next is the flow of information analysis. Figure 3:

Figure 3. Data/Information flow in supply chain



In the flow of data information, the database and remote monitoring center is the nerve center of the logistics chain information management. Information gathered from various departments to be brought together here, then back after the analysis process. Undoubtedly, the importance of database and remote monitoring center will become increasingly prominent in today's fast development of social network. When new products achieved the customer's hands and began to use, the built-in RFID tag began collecting information during the use of the product. Such as, run-time, ambient temperature, humidity and other indicators data, and then sent to the database and remote monitoring center in the manner according to the preset mode. Database and remote monitoring center will monitor the use of the product through the analysis of the data. If a fault occurs in the use of the product, database and remote monitoring center will receive a warning sent from the goods, and the database and remote monitoring center's staff will be able to instantly notify customers and provide solutions, which they can sent maintenance workers to the customer's home to repair or replace the item, or allow customer sent to a nearby retailer or recycling center to replace or repair. The effect of commodity problems will be better before the customer receives notification than the customer returned after the product is broken or need repair, the latter one tend to lose customer loyalty. Retailers can share their inventory and other information through this network with the manufacturer, the manufacturer sends the goods to the retailer under optimal order information that from the database and remote monitoring centers. Retailers can send very accurate information of sales time record, the number and location of goods, these data will be useful information to predict the market. The recycling centers will send back the number of recovery goods, location, time, and other data to the database and remote monitoring center, through the comparison and analysis of these data with retailer's data can be more reasonable to set the recycle bin location.

In the recycling process, the number of commodities recycling is closely related to the recovery site set. Site set incorrectly will cause a great waste, thereby increasing the cost of recovery. After disassembly center disintegrate the goods, they can determine which module to be recycling, which sent to disposal centers by receiving information carried in RFID tag. At the same time, this information will be sent to the database and remote monitoring center, by analyzing the data, to provide data to support the manufacturer's recommendations on how to improve some of the modules. Maintenance center also can through receives RFID tag information to determine how to maintenance products, so there is no need to conduct a comprehensive dismantling of the product, only maintenance or repair the module needed, thus can greatly saves labor costs. This process will be capture and convert to data and will be collected, database and remote monitoring center using these data to send information to the manufacturer for redesign and improve the production process. Manufacturer sends the goods material information, handling instructions, maintenance mode, etc. to each department through the database and remote monitoring center. In this model, RFID technology has played a major role in gathering information. By collection and analysis of information, so that many of the original process is invisible to become visible in the way of data. The entire logistics system in all aspects is displayed in the screen in the database and remote monitoring center. This makes improving the overall logistics system becomes more targeted than before, able to find just the right by inefficient data link.

Model Development

After the above analysis of the model, in this part we will add a virtual currency into the model. Since this model has established a database and shared the information, database can together all departments from manufacturer to the customer through the RFID technology. The method that can reduce the cost of this model in the future will be naturally applied. The concept of virtual currency has been introduced in the previous section, in this section will introduce its application in the logistic model. Now, the financial industry is largely done through electronic financial transactions. Cash have become a digital on a pile of bank's account, transactions between manufacturers were changed. However, this way are controlled by each banks, every transaction will be charged a large number of bank's fee. If transactions between manufacturers are frequency, these costs will be greater. Currently, the rise of virtual currency on the network is started on private company's website. That company sells virtual currency on their web portals and only can be use in their web portals. But some virtual currency began to be accepted by other websites, they can be use cross-site, such more and more websites accepting those virtual currency, those virtual currency will have a certain function of electronic money that can be used on different websites for consumption. The distinction between virtual currency and general currency is not in its form, but its intrinsic value, in other words, what kind of contact and distinction between the value of virtual currency represented and the value of general currency represented. The value basis of general currency and virtual currency are different, the former representatives the utility, while the latter representatives the value. Deduced from behavioral economics view, currency as a general equivalent, it "equal" to "price", although the language is called value, but actually refers to the utility, rather than the general currency, virtual currency's "price" not representatives to "utility", but the value itself. Virtual currency is not generally equivalent, but the relative value of the manifestation, or a symbolic expression; may also say that the virtual currency is the currency of personalization. In another word, the virtual currency can also be called information currency. They have in common is that both are the symbolic represent of the uncertainty value and the relative value. Currency can either as a general equivalent symbols also be used as the symbol of the relative value set. The sovereign of virtual currency is individual in distributed nodes. From the perspective of information economics, general currency is a special case of the virtual currency. Therefore, adding the virtual currency into the logistic model, establish a currency trading system based on the real world currency value on the model, then transactions between manufacturers can be through internal currency trading system made the direct currency trading, as for the bank's account makes a few large transactions on a regular basis needed can reduce the frequency of small transactions. Since this model is largely internal information sharing, the establishment of foundation of this model is on the assumption of mutual trust between the various departments, on this basis, naturally, will be able to agree that the use of such a virtual currency to replace the real-currency in general use. Therefore, fraud does not exist in this model.

Application of the model

The most important part of this model is the embedded RFID technology, and the establishment of a database with a remote monitoring center. Therefore, the applicability of the model relies heavily on the development of RFID technology. Recent advancements in RFID technology coupled with lowering costs have allowed RFID to gain higher prominence and therefore a higher level of adoption. Different tag types have a broad range of options for data content and read-write capabilities. The feature of RFID technology to capture information makes this model has a fast response capacity. The communication of this data could be harnessed for near real-time event management and decision making. For many companies, the "killer app" of this solution will be harnessing real-time data to drive business value. Being able to answer questions such as "where are the assets right now?" or "how many assets are there right now?" will allow firms to automate business processes and decision making. This capability also can play a role in asset security and monitoring, therefore, the model has a significant effect in warehouse management. RFID can be coupled with sensors to record and store changes in temperature, movement or other environmental conditions. Although the original intention to build this model was to serve the reverse logistics, the benefits that RFID features perceived lead to more companies are implementing RFID and experiencing tangible results. The outlook for manufacturers is quite different from that of retailers. For the manufacture, this model has following effects: 1. Reduced retail stock-outs, providing more volume and revenue to manufacturers. 2. Improved asset visibility, leading to improved asset utilization and working capital efficiency. 3. Real-time decision making capabilities - routing, sorting, recalls, etc. A product, through the management of this model can improve the returns of goods. This is the goal of this model, while it does not only can prevent counterfeit, but also can prevent obsolescence. Time is of the essence for many of these firms to both meet compliance objectives and change internal processes for mutual benefit. In the field of short shelf-life grocery goods owing to a high number of product variants, strict traceability requirements, short shelf-life of the products, and the need for temperature control in the supply chain. Many companies are facing a similar predicament when considering Radio Frequency Identification (RFID) technology as a new tool for supply chain efficiency. Retailers can see more immediate benefits when a critical mass of RFID tags are in place. According to the literature review, RFID technology decreased inventory of as much as 5% of total inventory in recent years, and reduced labor costs in stores and warehouses, as much as 7.5% has been estimated. It also played an important role in reduce shrinkage by theft, this is a multi-billion dollar issue, as for the reduced of stock-outs, the gain as high as 7% of revenues.

Pitfalls of model

Since the model is highly dependent on the application of RFID technology, in turned, the pitfalls of RFID technology will cause defects of the model. Currently, the cost of RFID is the main barrier. Although in recent years the development of RFID makes the cost dropped a lot, but compared to the barcode, it is still very expensive, for some small businesses it's still costs a lot. In particular, to establish such a large system, how to balance cost and revenue is very important. We believe that in the initial period of the infrastructure establishment, allowing barcodes and RFID co-exist is a wised choice. At this stage, the database and remote monitoring center may not yet completed, the use of RFID does not very common in various departments, and cannot share the data, then continue to use barcodes during this time will not have great impact on the entire logistics system, as long as the created of model process, slowly replace the barcodes with RFID. Companies no need to invest a large asset on RFID tag in one time, but replaced by small amount of continuous investment. For most businesses, this can be a very effective solution for the problem of high cost. There is also a customer privacy issues involved, but in this model is not very significant. Although the model also mentioned gathered information from the client, but the client may choose not to feedback. Of course, companies can provide guarantees to customers to ensure that their privacy will not leak, and for those customers who willing to send feedback information may give certain concessions. The model will result in a significant change in the original logistics. Process automation through RFID will require new work methods and performance measurements for the supply chain. The degree of difficulty will be comparable to that of other systems implementations, where significant impacts to process, organization and technology are commonplace. In order for the effective functioning of the model, great effort must be done by organizations to successfully implement this option and the results may not be immediate. Besides the outside constraints, there has pitfall of RFID technology itself will affect the use of model. In the passive UHF RFID technical, there still has the poor stability problem for system integration; UHF tag performance itself has many technical imperfections and some physical defects issues. In system integration, the passive UHF RFID application solutions are still immature. This situation will result a low stability in the application system, thereby affecting the confidence of the user apply of using UHF RFID solutions. Meanwhile UHF standards are not uniform, restricting industrial development. The technology can determine the total solution of these problems.

V. Conclusion

Although the use of RFID is still having many aspects of the problems and limitations, however, there have broad application prospects of this technology. Right now, RFID tag has been widely applied to many aspects, such as: health care, libraries, shopping malls and so on. Like any new technology, RFID has received its share of bouquets and brickbats. Despite the large amount of investment from enterprises like Wal-Mart, target, RFID technology to change the existing model still has a long way to go. This article reviews a numerous of literatures that RFID applications in the logistics field, proposed this model based on the previous work and improvements it, however, it is regrettable that this is just ideas. Although many of these departments have been used RFID, the establishment of database and remote monitoring center still needs each department coordination. As for the virtual currency used in this model which based on the database, there are a lot of policy content needs to be established. Do not underestimate the need to change business processes to achieve the automation and asset visibility that RFID can provide.

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