An emerging technology: rfid essay samples

Business, Company

Introduction to RFID

In the world today, the RFID i. e. Radio Frequency Identification Technology has become a mainstream application and no longer an obscure one. The RFID application now enhances the quick handling of manufactured materials and goods. The Radio Frequency Identification Technology makes it possible to carry out identification from a distance without requiring a line of sight unlike the barcode technology. The RFID also supports many set of unique IDs compare to barcodes. The RFID also gives room for the application of additional data which may include environmental factors example of which is the temperature, it may also include data like the product type and the product manufacturer. Further than that, various tags situated in the same general area can be discerned using the RFID, without the assistance of human, unlike the barcode technology that requires that each items be oriented towards a reader before it can be scanned .

The RFID (Radio Frequency Identification Technology) is the defined as the use of radio waves to read and grab information stored on a tag that has been attached to an object. The Tags does not have to be within the direct line-of-sight of the reader for it to be read or tracked, it can be read several feet away. An RFID tag might be very small in size, in that, grain of rice might be bigger than an RFID tag, and it could be as large as a brick, or could be thin and flexible to the extent that it can be implanted within an adhesive label. The RFID are usually fixed to an antenna. The RFID tags that has batteries included with it are known as the “ active tags” while the ones that has no battery included are known as the “ passive tags”. The active RFID tags have the ability to broadcast information that can be deciphered

by someone that is at a distance which is above 100 yards away. These RFID active tags can therefore be used to track employees and track equipment. The passive RFID tags can be scanned at a distance of many feet. These tags can be fixed on ankle bands or wrists of patients, can be added to name badges, blood supplies, and medicine bottles. The passive RFID tag system can also be used to monitor the numbers of surgical sponges, ensuring that none gets forgotten inside the patients after surgery. These systems may also be used for the matching and identifying dentures to patients.

Image Showing the RFID System

Mostafa Higazi (2011). How the RFID Tag works. Retrieved from http://m-higazi-ie673. tripod. com/assignment-5. html

The primary reason this wonderful technology is still emerging as one of the fundamental technologies to ubiquitous computing, web of things, intelligent transport system, and Internet of things (even after 50 years of its creation) is simply as a result of its high cost, broad applicability, and automatic identification. The RFID cost more than every other traditional labeling technologies but now that companies are getting to realize the added value that comes with this technology its large scale adoption for managing consumer retail goods in now being given huge considerations . The RFID has recorded tremendous success in several domains ranging from surveillance systems, supply chain management, smart home appliances, highway toll collection, asset tracking, and identifications of animals . This paper presents the Radio Frequency Identification Technology as an emerging technology.

ANALYSIS

Views That Suggests That the RFID Is a Good Emerging Technology

The RFID has been suggested by several authors to be a good emerging technology owing to the huge benefits that the RFID can be used to achieve. The RFID is emerging as an essential technology enabler for the tracking and identification of assets and goods in every parts of the world. The RFID, according to some authors, would enable the hospitals to locate expensive devices and equipment more rapidly to enhance patient care. It would aid the pharmaceutical companies to greatly limit counterfeiting. It would aid the logistics providers to make advancements in the way moveable assets are managed. Also, it has been suggested that the RFID promises to enhance new efficiencies in the supply chain by making the tracking of goods from the manufacture point to the sales point.

The potential benefits of the Radio Frequency Identification technology has resulted in

- The use of closed loop Radio Frequency Identification systems, in the automotive industry, for controlling and tracking major assemblies in a production plant for more than thirty years.
- Most major retailers in the world today have made the use of RFID tagging compulsory on cases and pallets in order to provide better visibility of them as they get shipped into their distribution center.
- The moves by the aerospace and defense industry to make the use of RFID compulsory thereby ensuring the parts authenticity and improve the visibility of the supply chain.
- The moves by the regulatory bodies, in some countries like the United

States, to employ the use of ePedigrees, which is based on the radio Frequency Identification technology, to stop the counterfeiting of prescription drugs.

- The moves to track the movement of animals, using the RFID tags, to solve the problems with tracking of animals especially during the outbreak of major animal diseases.

The Implications of the RFID for Stakeholders

When adopting a new technology, it is very important that the implications of this new technology on the stakeholders be considered. Stakeholders may be individuals or groups who can influence or get influenced by the activities of the industry. For example, the healthcare industry has been said to benefit a lot from the potential of the RFID. However, there is a need for the hospital administration that are in charge of examining this technology to consider the concerns of the patients, who are the secondary stakeholder as far as this is concerned. The consideration of these stakeholder would aid in the improvement of the technology adoption decisions. In a consumer survey conducted, it was discovered that the support for the application of two Radio frequency identification applications in the hospital gave different results both across the applications and across applications. The variation in the RFID support was discovered to be as a result of privacy behaviors and attitudes of the stakeholders.

Problems may arise if the administrators fail to try to integrate some stakeholders into the decision process by feeling that these stakeholders do not have legitimate concerns. However, research has shown that the initial acceptance of a new technology does not necessarily mean that the principal

concerns have been addressed. After making a review of various applications of the possible applications of the RFID in several industries, it was concluded by Wu et al. (2012, p. 420) that the wide-spread use of the RFID is being impeded by the concerns of users about privacy.

In its strive to improve patient care and control cost, the Radio Frequency Identification has been successfully deployed by the health industry to track employees and equipment, to match patients with their respective prescribed drug dosages, to avoid the use of counterfeited drugs, and, also, to monitor and identify patients. To identify the implication of the RFID on the healthcare organizations the results from about three published surveys would be analyzed.

Block Diagram Showing a Typical Radio Identification Tag System

Comparing and Contrasting the Benefits of the RFID Technology with Past Telecommunications Technologies That Are in Place.

The implementation of the RFID technology has various principal differences with other kind of telecommunications technologies implementations that are presently in place. Firstly, the issue with security and privacy is more prominent with RFID technologies than other telecommunication technologies like the barcode technology. This issue with privacy and security is as a result of the fact that RFID signals can be easily intercepted and read without any need for authorizations. Also, with RFID, exchanges of information can occur without much human intervention, however, there is need for privacy and security concerns of all stakeholders to be explicitly taken into account before any RFID process is implemented.

Secondly, when used as a standalone technology, the RFID gives a smaller value than when it is combined with other organizational systems. However, the combination of the RFID with other organizational systems poses an enormous issue as a result of the fact that the RFID would require acceptance from both the external business partners in the supply chain and the internal business units such as warehousing and purchasing. This was the challenge that even companies like Wal-Mart had to face when implementing the RFID in its supply chain even after all the media hype . What this mean is that the implementation of the RFID needs to be seen as a typical multi-project and multi-firm effort, which makes the RFID implementation distinct from other telecommunication technologies implementation.

Thirdly, for RFID to be effectively implemented there is a need for a significant alteration to both the intra and inter-organizational business processes, in order to leverage the full potential of the RFID technology since the capturing, processing, and exchange of data from multiple sources can now be accurately and easily done. The distinctiveness of the RFID Technology from past Telecommunications technologies that are in place, such as the barcode technology, makes the implementation of the RFID very interesting and quite important.

The RFID Process

An RFID wirelessly enable communication between a reader/writer and a tagged object. An RFID system is typically made up of one or more tags with each of the tags having a semiconductor chip and an antenna fixed onto an insert. Then a finished label or tag is made from the insert by encapsulating

it into the right protective material. The second component in a typical RFID system is the read/write devices, also known as readers. These readers allows the transfer of radio waves from the RFID tag that has the same frequency with it. The other component in a typical RFID system are the antennas, they can be two or more. They are usually positioned on the tag and on the reader. The last component is the host computer system and the application software. The RFID are usually fixed to an antenna. The RFID tags that has batteries included with it are known as the “ active tags” while the ones that has no battery included are known as the “ passive tags”. The active RFID tags have the ability to broadcast information that can be deciphered by someone that is at a distance which is above 100 yards away. These RFID active tags can therefore be used to track employees and track equipment. The passive RFID tags can be scanned at a distance of many feet. These tags can be fixed on ankle bands or wrists of patients, can be added to name badges, blood supplies, and medicine bottles. The passive RFID tag system can also be used to monitor the numbers of surgical sponges, ensuring that none gets forgotten inside the patients after surgery. The third type of tag is the battery-assisted type of tags which have a battery that powers chip electronics but does not transmit RF energy. Different types of tags are required for use in various environmental conditions, depending on the application and environment. The paper thin labels for instance are usually used for disposable or other applications that requires one time use.

Block Diagram of Both the Mobile RFID Reader and the Fixed RFID Reader

Retrieved on 14 October 2014 from http://www. ti. com/solution/rfid_reader

Issues with RFID

Most of the implementation performance issues that comes from the RFID is as a result of the fact that it is a radio based technology. These issues include the

- Susceptibility of the RFID to interference from metals and other radio transmissions and lack of consistency of sensitivity as this is influenced by the variations in the frequency and usage environment.
- The ability of the RFID to automatically write to tags and read from them, every available seconds could lead easily to an overwhelm of the information system due to too much of data.
- The RFID is affected by the presence of liquids and metals as this not only affects the range but also the read/write performance because their presence could cause interference.
- No single frequency is ideal for all applications. All applications have varying frequencies even if they belong to the same industry. Therefore, an RFID tags of varying functionalities and frequencies are usually deployed together within the whole supply chain operations.

Why the RFID is the Best Choice for the Corporation.

It is no longer news that the RFID is the best choice for the corporation, this can be seen from the fact that many organizations have started employing the radio identification technology to effectively keep track of their assets. The RFID is helping corporations to significantly improve their business

processes. It would allow the corporation to effectively manage inventories and results in a reduction of the tracking cost by allowing timely, accurate, and up-to-date data. It is thereby essential for the corporation to get familiar with the advantages of deploying the RFID technology in the workplace and the legal and privacy aspect of the use of RFID with clients. The most significant instance of the deployment of RFID is the use of the E-ZPass and SunPass in New York and Florida respectively, and other use of prepaid toll passes in the US. A company like Wal-Mart has recorded a reduction in the out-of-stock merchandise by about twenty percent due to their deployment of the RFID tagged stock.

Elements of the Objective.

- Cost Reduction: This is a target area of many corporate companies especially the US Department of retailers and consumer packaged goods companies. These corporate enterprises are expected to reduce their inventory management expenses and inventory by billions of dollars over the next couple of years. Examples of this objectives include the reduction of waste, reduction of logistics costs, reduction of claims and deductions, and the improvement of asset utilization.
- Competitive Advantage: Many leading companies are of the opinion that the RFID is crucial to the increment in competitive advantage.
- Increase Revenue: The RFID is being deployed by small and large manufacturers and retailers to drive sales. This deployment of RFID empowers to create innovative solutions having significant benefits that include the reduction in shrinkage, improvement of the order fill rates, improved in-store customer support, and minimal out-of-stocks.

Application of the RFID

- Asset Management: All fixed assets and capital equipment can have RFID tags permanently attached to them. With this done, the movements and position of all the assets and equipment can be automatically tracked with a high level of accuracy. With this information, expensive assets, equipment, and tools can be quickly located whenever the need arises. Also, the RFID may be configured in such a way that the reader would alert the supervisors in case of an unauthorized attempt to move any of these equipment.

- Tracking of Production: The greater visibility which is provided by the RFID in the aspect of materials inventory and work-in-progress tracking has been found to have the tendency to bring down the working capital requirements by as much as 8 percent. The attachment of RFID tags to subassemblies during the process of production and not on the finished goods makes the product manufacturers able to gain an accurate and real-time visibility into the work-in-progress ambience.

- Control of Inventory: As a result of the ability of the RFID to read through packages without being located in a direct line of sight with either the reader or the object, and due to the fact that the RFID can withstand exposure to contaminants, moisture, heat, and dirt the RFID takes away blind spots from the supply chain operations and the inventory.

- Other applications of the RFID include shipping and receiving, authorizations of service and warranty, and regulatory compliance.

In conclusion, the RFID will continue to evolve just like every other emerging technologies. As Corporates and companies continues to get familiar with the RFID advantage, i. e. the high efficiency advantage and the bottom-line

benefits that it provides, the market adoption of this great technology will rise. The technology is mature enough to be deployed into many applications. The RFID is highly functional and has the support of all the current and emerging standards.

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