Case Studies of Green Supply Chains and Enabling RFID Technology

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ABSTRACT

There is considerable evidence the next frontier for achieving a competitive advantage in market place is taking up the idea of a green supply chain (GSC) by introducing corporate responsibility (CSR) and sustainability into your day to day operations. This chapter of applications of supply chain management (SCM) emphases the role of radio frequency identification (RFID) technology. Since the beginning of RFID since the early 1980s, the technology has blossomed into many sectors and different purposes but there is no consensus on the actual popularity, familiarity, and overall likeability of RFID in any of this. Some of these business sectors include retail, finance, information technology (IT), healthcare, and aerospace industry. This chapter is proposing an empirical study to examine RFID sectors or businesses personal use of such technologies, especially with green of eco-friendly applications. For example, the Green Clean Institute (2016) defines this strategy as "an approach that results in the manufacturing of green products and services and using green business practices that causes no immediate, residual, or long-term harm to the biosphere." However, due to increased competitiveness and shorter product life cycles more and more attention is being paid to a reduction of resource usage and environmental protection. RFID-embedded has been a major technological advance that appears to be on the verge of universal acceptance as an industrial standard that will enable companies with improved data gathering, therefore helping managers make more informed decisions, saving capital while improving their environmental friendliness. This chapter is meant to discuss the current and future practices of GSC management and how RFID can be incorporated into the business as a green, environmentally conscious enabler.

Introduction

As consumers continue to educate themselves and become more environmentally conscious, they will begin looking at a company's green profile or their energy efficiency profile and begin making their purchasing decisions with that in mind. The speed at which companies peruse these indicatives will be directly related to the dollars spent on product by customers demanding green indicatives. Many firms are requiring their suppliers to be cognizant of these ideas and these customer demands, which will in turn drastically affect B2B commerce between the firm and its suppliers. With the wave

of environmental friendliness emerging, these supply chains still have to deal with the challenges of keeping their strategy cost-conscious and effective; this is where RFID comes into play.

In a world that is bent on eliminating waste from its operations, i.e. eliminating redundancies, streamlining manual data collections, etc., there is another form of west that occurs, physical waste. In other words, the waste that is created by transportation, outside warehousing, damaged inventory, wasted effort in managing these larger fleets, etc. RFID can increase the visibility for manufacturers, distributors, suppliers and retailers, and with real time information, firms can access much more accurate information regarding inventory movement and usage. This will not only reduce wasted costs but can have a large impact on the company's overall environmental standing by reducing the operational west in the supply chain.

Purpose

The purpose of this research study is to find out, using a wide birth questionnaire to real world, multi-sector participants, how people feel about the use of radio frequency identification (RFID) technology. RFID technology, which is not only a multi-billion-dollar industry but the grandchild of Radar technology, has only been recently becoming more popular across many business sectors, far more than run of the mill retail security tags. This diversification comes at the forefront of oftentimes, the problems of RFID still persisting or even getting worse across a supply chain.

The expressed purpose of the propositions is to find the answer to the usage of RFID technology in the real world and see if the results corroborate with that much of the current literature says about the popularity of the technology. Across the scholarly articles have different and often contrasting opinions on how well RFID works in the real world. As well, because the technology has changed so much, many of the articles about RFID scholarly articles and research models are simply obsolete. This study stands to make a more modern look at whom is using RFID technology, based on sector, business, size, longevity, and most of all, the feelings of the business/respondent on the matter.

DISCUSSION

Current Trends

According to Goldenhersh (2009), RFID technology assists firms with the three "R's" of sustainability.

1. Reducing the number of logistics assets needed to operate the supply chain
2. Reusing those assets as frequently as possible
3. Recycling whenever possible

RFID plays a key role as it can vastly improve the management and use and visibility of their inventory. A company can Track everything from returnable inventory to raw materials, therefore increasing their asset utilization and reducing the strain that maintaining and storing these additional asset has on the environment.

For example, an empirical study case study was performed on a number of industries, including food and dairy industries, to assess the effectiveness of RFID technology has had on the sustainability goals of each industry Violino (2004). It was found that RFID had many practical uses in the food industry and has a major impact on reducing food wastage and perishability. In one company alone, a producer of about 60% of U.S. pistachio crop and exports, uses RFID primarily to rationalize the processing of deliveries from its suppliers, which is a critical part of the firm's supply chain. Because Paramount's inventory, Pistachios, has a relatively short time horizon in which they can be harvested and processed, time spent picking, shipping and packaging are of great concern as perishability issues can arise. Paramount went on to say that their keeping of accurate Tracking of inventory delivered was key in maintaining a good working relationship with its suppliers.

RFID has enabled this relationship because Paramount can now weigh its trailers with the nuts to determine the exact amount of inventory that each truck contains. That truck is then RFID tagged as it enters the processing plant to help the manages at Paramount understand exactly how much inventory they have on hand and how much they still need to cover current demand forecast for its product. However, there are some issues Paramount has had with this new technology. First, the surface in which the tags are placed, the metal hulls of the trailers, poses a problem because the metal reflects back the signal, therefore causing some interference. To get around this they now place a "spacer" between the RFID tag and the truck, reducing the interference they were getting when applying it directly to the truck hull. Another issue they were having was the climate in which they were exposing the tags too. By exposing the trailers to extreme temperature swings, Paramount had to use extra durable tags to withstand to change in temperature they would be going through.

Even with this extra costs coming about by the challenges, Paramount reported a staggering success stemming from the utilization of RFID tagging. First, the relationship between them and their suppliers grew and improved considerably by eliminating bad information and disagreements over payment amount and delivery times. Second, the throughput of trucks significantly increased therefore saving the company from having to build a second scale house to handle the increased volume through the facility. Third, there have been better informed management decisions being made by the plant because delivery information is highly accurate, timely, and accessible. Fourth, the company has saved money and gained efficiencies in being able to Track expensive assets, like trailers, whose usage was reported to be increasing by 30% since the RFID tagging began.

Another study that was done in the food industry was
in Greengard (2007), where the author explored how RFID helps ensure the freshness of

processed foods that went through multiple factory operations like the dairy industry. He studied how Wells Dairy uses RFID in its production operations and examines how why tag each case and pallet while running through the production line. Once tagged they are sent to the freezer where Wells ran into problems with the extreme temperature changes the tags were experiencing. Because of this, Wells had to install a verification station in order to ensure that no damage was done to either the cases or tags prior to the pallets leaving the warehouse. However, even with these increased costs, Wells reported great success with the project in that management has a better grasp on their inventory and has been able to make better informed decisions and that because of RFID tagging during the manufacturing stage, they have seen great efficiencies by being able to Track inventory at any stage in the supply chain and understand what percentage is delivered to the final customer vs. being returned or destroyed for any reason.

With this long list of advantages that RFID brings with it, there must be just as long a list of disadvantages, right? Not exactly. While it is true that every system you use, there will inherently always be downsides to that system. It is not so simple with RFID tags. RFID is simply a tool, so explaining the disadvantages becomes more difficult. Like a hammer can be used to build a house, so can RFID by used to identify and Track objects in real time and improve upon ones supply chain. In other words, RFID is efficient in what it is designed to do, it will not guarantee increased sales or even fix a defunct supply chain, but it will however help in identifying what and where certain objects are and help you move towards a more efficient supply chain by having goods on the shelf when customers want them.

What is Radio Frequency Identification (RFID) Technology?

Supply chain management (SCM) has been one of the most difficult and absolutely necessary parts of a modern and functional economy. The global market demands that isolationism cannot exist and most all businesses and companies, large and small, foreign and domestic, new and old, have to have a functional and comprehensive supply chain. The advent of new technologies like seafaring freighters, ground transportation, third party suppliers, and outsourcing labor has really changed the face of the profession. Of the many new technologies and adverts, one of the most relevant changes to not only the SCM industry but to a dozen broad sectors is the RFID technology. RFID technology promises revolutions in areas such as supply chain management (Lee & Park, 2008). It is essentially a miniaturized electromagnetic radar that allows some real time Tracking of goods, services, persons, or really anything that can be given a transponder and is connected to a receiver.

How is RFID used?

RFID technology can come in many forms and the style, usage, and overall functionality has changed very drastically since the creation around 1980s and further development through 1990s and 2000s. In its modern incarnation, the RFID is a small node with a self-contained power source and transponder, similar to that of an aircraft, which is encoded specifically for the particular receiver. The information that is received at the supply chain manager's computer can Track where a tagged good or product is, as a location confirmation or in an assembly line, or in

a specific location within a smaller local. According to EEEI "A recent Aberdeen Group survey of 200 companies found that more than half of the companies with RFID systems were using the technology in asset Tracking" (Michael and Caine, 2005) shows that many of the companies use RFID for asset Tracking in real time. This is the most well-known usage but as this research study will show, the usage of RFID has expanded vastly. This chapter will be covering information about the RFID, including what it is, the history of the RFID, and some pros and cons currently of the technology. The chapter will include a discussion of some of the business sectors that are most familiar with RFID technology in one form or another, as well as what they use, how they use that technology, and how it may be changing the field. The chapter will end with the summary and conclusions including a recap, the results, and the researcher's conclusions, followed by the references and a sample of the questionnaire.

RFID Technology

How does RFID work?

Radio Frequency Identification (RFID) technology, as it is generally known, as evolved vastly since the creation in the early 1980s. The technology is based strongly on the Radar technology developed during World War II. However, around 1970, a man named Mario Cardullo, thought of and developed the idea for the original RFID, which was a simple versatile tag that consisted of a transponder and receiver system. Though the original was a simple 16-bit interfacing tag, the 1990s saw the technology really pick up. As it is now, the RFID is far more than a simple transponder that can broadcast and receive a signal. Much of the early RFID technology was limited by barcodes in order to confirm an assets location while in transportation, but today, a tag is much cheaper and far more versatile, not even needing an active scan or anything. A modern tag can be registered through a "gate" or a receiver even if the tag is embedded within a box, in metal, or not at all visible The gate, be it an actual tunnel or a within house monitoring system, then sends the information in real time to the supply chain manager. This kind of real time Tracking is a massive benefit for any supply chain manager and today, at some large companies, it is simply mandatory as no amount of humans could watch thousands of products move every second.

Historical Aspects of RFID

As briefly mentioned above, the RFID was the grandchild of radar technology developed during World War II. The radar originally used electromagnetic waves and time to measure an objects distance from the apex of the radar. The development of RFID was done concurrently between private technology firms and the US government. The original RFID had a very low frequency signal, around 125 khz, and was increased over time up to 13.56 Mhz and UHF level tags which had far more range and usability than the original which only worked within a small space. The true game changer, however, was the integration of the RFID tag from a private network system to the internet connectivity. This, combined with the rise of the WiFi networks and satellite GPS technology, toke the RFID global, allowing a supply chain manager to monitor any given good from step one, where the tag is attached, to the final destination with corroborated checkpoints for each partner who has a hand in the process.

Pros of RFID

The obvious benefit and primary usage of the RFID is the real time location Tracking of assets. This can come in the form of many, many different industries Tracking their products at different sizes and speeds in order to get an actual monitor of a supply. This could mean, for instance, a shop could watch how much of a certain product is in the store or warehouse, or an agency could watch the "hits" of a certain product, like a passport for instance, where people are showing up and write that information into a database to follow people.

As well, in the instance of a massive assembly line, the captain or manager could see where the product being built is in the "assembly line" and if the KPI are being hit or not. This kind of asset Tracking during construction means that companies which survive on massive contracts can know for a fact whether they are on schedule or not to meet their goals and deadlines. Finally, RFID can be connected in most everywhere today, allowing for a very widespread real time Tracking, much like an aircraft's transponder allows for an air traffic controller to see where they are in the sky from takeoff to landing, an individual could watch where the good or service was, being Tracked in real time, across the global. Obviously, this technology is becoming integral to supply chain managers for their work, even in small and large chains across many partners due to fact that the RFID has not only gotten more advanced but they are much cheaper, less than a dime per tag.

Cons of RFID

RFID can be a very handy tool to use but it is not without a few hang ups. As it stands now, depending on the size of the supply chain that the manager is trying to get tagged up, several things are needed. One is a complete and total commitment from all of the supply chains partners, meaning that everyone has to invest in one tag, one software, and one overall system completely. While the tags themselves are not particularly expensive, the setup of the system can be very expensive to get up and running. As one research study states: "By adopting RFID technology, companies will be confronted with a huge amount of data generated by RFID tags" (Lee & Park, 2008). RFID system requires that, as mentioned before, every supply partner and involved distributor, retailer, and raw material constructor, need to be in on the "plan." This means that, for example, if one step in the supply chain chooses not to get involved or rejects the idea of an RFID system, the entire system is effectively moot. This can hurt relationships between supplier and distributor or retailer, and could even demand that a supply chain manager must find new partners to work with which could really hurt or even stop production.

BUSINESS SECTORS

Who uses RFID?

In this chapter, we want to see how people in the real world choose to utilize and how much they like or dislike the actual technology. Though a known limitation of this project is that it is impossible for me to know literally every single use of RFID technology, in and out of supply chain management, so for the sake of having cohesive research project, we will focus not on

every use of RFID but of the more popular uses in sectors and determine at what size of a company, perhaps, uses an RFID technology in some form, and try to determine if they are really worth it or not. The above discussed several instances of the but this section of the chapter will be discussing some of the known uses. The order listed is in no particular order but will be the business sectors that this research study will be "shooting for" with regards to subject participation.

Retail

One of the most well-known sectors to adopt RFID technology across the board. Most people know the common use of tags, for instance, on clothing as security tags, to deter people from shop lifting the tagged clothing that will set off a gate if the tag goes through it. While most people thing that this is the most popular use of RFID, another less well known usage is actual pallet Tracking (Thrasher, 2013). When a big box supplier needs to flow what is coming any given week, how much or little of X product is on the way, a company can see that, using gate Tracking, assets are on the way and when they will be arriving, how far across the supply chain they actually are. According to one study "...through its capabilities to uniquely identify, Track and trace consumer products along the entire supply chain requiring neither direct human contact nor line of sight" (Bardaki, Pramatari, Doukidis, 2007) This kind of automation is a major strength to retails from small to large since not only does this save work hours but it helps remove some of the human element with regards to making a mistake.

Financial

Much the same way that other industries use RFID for asset Tracking, this fact is especially important in financial sectors. The way this is most often used is with banks, who use tags on large sums of money in order to manage asset Tracking. As well, despite how important it is for a bank to keep Track of their money, this saves dozens of man hours' worth of having to have a teller or accountant count the money between locations, as well as financial firms like large banks being able to Track their IT assets.

Information Technology (IT)

Speaking of IT asset Tracking, this has become one of the more behind the scenes and prevalent uses of RFID technology. Like in the instance of datacenters and server farms, RFID have changed how high tech firms manage their equipment. According to one expert on RFID, "A full inventory often took days to complete. With RFID, some financial institutions are accomplishing the task in hours." (Pleshek, 2011) Firms who live and die by their technology and database functionality are able to have much shorter maintenance times and more active time so long as a supply chain manager is able to watch their expensive IT parts in a collaborated database. Information technology uses RFID in other instances as well, for example with GPS connects and US passport tagging to Track where people have checked into when traveling. Finally, one of the more cutting edge technologies that are being implemented is real time dynamic

advertising, where objects like phones will receive an Ad or message based on a real time location with information received from a nearby store or kiosk.

Healthcare

One of the larger trends we have seen growing according to several studies is the use of RFID in the healthcare system. What we mean by the healthcare system are the involved hospitals, who are the consumers in this supply chain, and the associated retailers, distributors, and such, that have been benefitting from asset Tracking of such important, expensive and specific tools. According to one research article: "Potential benefits that are associated with intelligent healthcare information systems include improved patient safety through reduced medication errors and adverse events, improved medication/test ordering, improved quality of care, and improved efficiency in healthcare delivery"(Tua, Zhoub, & Piramuthub, 2009). Hospitals can keep an active Tracking of their limited and specific supplies in real time in the instance that a situation arises that requires some equipment within seconds. As well, hospitals are gaining the ability to Track their ambulances with RFID and GPS to read traffic and location and help expedite getting a critical patient to the hospital as soon as possible.

Aerospace

While most everyone assumes that RFID in aerospace is mostly used in baggage handling, the technology is evolving very quickly and finding it's footing in a new functionality. The normal baggage tag, used at the usual large, commercial airports, allows airliners to Track the flow on and off of baggage in an aircraft along with information related to that baggage such as size and weight in order to create the most balanced baggage situation on a flight. As well, one of the new techniques being used is from big time manufacturer's like Boeing or Airbus, can Track the construction of a new aircraft in real time. (Pleshek, 2011) A commercial aircraft is made of so many parts that all have to come together in a timely fashion and the construction of an aircraft is so complex that applying RFID tags to different parts can let a manager monitor the situation.

RFID Implementation Strategy for a Green Supply Chain

The following is a set of guidelines managers can use as they seek to implement RFID into their sustainable supply chain.

1. Top management needs to be involved with the pursuit of sustainability

According to Case, in his chapter "Socially Responsible Purchasing "executives of the company and supply chain managers need to cooperate in establishing rules of engagement for interaction with suppliers, roll out a sustainability statement to suppliers, making the decision if green criteria should be included in the certification of the supplier, and deciding the rollout of a "supplier code of conduct" for supporting sustainability practices.

2. Having a strong business case for going green

in Case's chapter, he points out that top management must provide a strong business case for implementing a sustainability strategy. Typically, green supply chains are implemented and justified by way of cost savings and gains in efficiency. When you pair that up with the reduction in waste and enabling just in time manufacturing.

3. Outline a plan for pursuing a sustainable supply chain.

In Hershauer's chapter, Process Guide for Supply Management Environmental Sustainability, the author states that there needs to be a top tier executive or cross functional team that oversees the iniatives will ensure continuity in pursuing these iniatives. There are several supply chain management tools available in assisting with this iniatives and will help the team in developing a supplier code of conduct, supplier scorecards, etc.

4. Outline Opportunities using RFID in the business processes

Hershauer point out that the focus of the implementation will be promoting the green supply chain, while cutting costs and increasing performance of production. Managers need to identify all business process problems that would benefit with RFID deployment.

5. Identify RFID issues in the IT department.

Case points out that a companywide roll out of RFID iniatives will undoubtedly involve the setup of new enterprise systems to handle the increased data flow. The IT department needs to ensure that users of the data can access it reliably and effortlessly. One such way of achieving this, would be to offer web services in the delivery of this information. Web services give suppliers access to the information without giving them access to the company's internal data base.

Rallying Suppliers to Support the Green Initiatives

Hershauer pointed out that there needs to be incentives and penalties tied to the suppliers' participation of this green initiatives. By utilizing the scorecard created in an earlier step, there needs to be continuity across the board and suppliers need to feel that they are treated fairly when rolling out this initiative.

Proposition 1: RFID technology may not be universally applied with the same benefits. While the subject matter that we are testing is inherently quantitative, the questionnaire gives the research study data a degree qualitative merit to see. We believe that in some sectors, the use of RFID technology may be done across the board, hands down but may not be as universally loved due to technical limitations with third party supply partners.

Proposition 2: This proposition suggest that only very large companies have access to the realist, broad margin use of RFID technology in whatever sector they are involved with. For

instance, in retail, only the kind of "mega stores" like Walmart, Kroger, Costco, etc. Using correlations between dollar values of the responding subject's business/company and their familiarity with RFID will provide insight into the limit of RFID, whether or not anyone smaller than a massive retail chain or heavy manufacturer like Boeing bother with RFID. The concept behind this proposition is that though much of the RFID system is and has become more affordable, the ceiling placed on supply chain managers and their partners stops most attempts.

Null Hypothesis

The null hypothesis is that RFID technology is, in fact, as popular and widely acknowledged as many research articles and studies indicate. This would be a reversal of the prior two hypothesize that did not completely acknowledge the value of RFID technology. The null hypothesis assumes that all sectors and all sizes have generally positive feelings regarding RFID technology and use them in some aspect.

GENERAL CONCLUSIONS AND IMPLICATIONS

Summary

This chapter deals with the usages and popularity of RFID-embedded technology. This study aims to discover what the situation is in the modern supply chain in a wide array of sectors. Using previous RFID articles which have referenced the use of radio frequency technology in other sectors, this research study seeks to, colloquially, find the "temperature" of how people are feeling and more importantly, using RFID in their business. While some RFID usages are obvious, this research study can find if there are new, more cutting edge uses of RFID that not even any of the previous literature has touched on. This chapter is reminiscent of a professional survey, seeks to add to the conversation about what is possibly working, what is not working, and what people are really thinking ideally.

Conclusions

Though the chapter has not yet been conducted, the conclusions that are expected to be reached will be reviewed by all associated peers in the immediate vicinity and academy structure to double check all of the data and reading. If the majority of the reviewers positively review both the study methodology and the study itself, the study will be distributed to other university professionals in the area in order to continue to receive reviewing. Testing these propositions should place a spotlight on the usefulness of RFID-embedded technologies with the SCM industry and help make the situation clearer to other supply chain professionals.

Directions for Future Research

Forward-looking companies and supply chains need to take a closer look at RFID tagging and the current/future sustainability initiatives that they enable. RFID tagging can help these firms improve their impact on the environment by utilizing the information flow RFID enables, improving logistic assets, and reducing reliance on disposable packaging. Couple

these initiatives with the impact that RFID tagging can have in improving business processes and production methods, and your company can cement a solid plan as to why RFID tagging may be instrumental in the implementation of your sustainable supply chain.

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RFID by Sectors and Real World Usage Questionnaires

Radio Frequency Identification (RFID) technology has been one of the most talked about and least understood pieces of supply chain management since the rise of the internet age. Every individual business and supply chain uses RFID differently for mostly Tracking and observing small transponders in real time. Please spend a few moments to answer the following questions regarding your RFID technology usage.

PLEASE CHECK THE SINGLE BEST ANSWER.

Business Experience and RFID Familiarity

For the following questions, please check the appropriate response concerning your business/companies experience with RFID. Please note that the questions should be answered on a 1-4 scale.

Strongly Disagree Agree Strongly Disagree Agree

My business/company uses RFID technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company is very familiar with RFID [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has only recently

(<5 years) started using RFID technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has experience [Symbol] [Symbol] [Symbol] [Symbol]

(>5 years) using RFID technology

My business/company is in the (Retail/IT/

Healthcare/Aerospace/Manufacturing) industry [Symbol] [Symbol] [Symbol] [Symbol]

RFID technology has proven to be effective at

my work place [Symbol] [Symbol] [Symbol] [Symbol]

RFID technology has had no problems with

implementation/maintenance [Symbol] [Symbol] [Symbol] [Symbol]

Current and/or Past RFID Usage / Primary Uses of RFID Technology

For the following questions, please check the appropriate response concerning the previous/current usage of RFID technology. Please note that the questions should be answered on a 1-4 scale.

Strongly Disagree Agree Strongly Disagree Agree

My business/company has previously/currently

implemented RFID
technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has plans to implement/

expand RFID technology in some
form [Symbol] [Symbol] [Symbol] [Symbol]

My business/company is, in my opinion, overall

happy with RFID technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company uses RFID primarily for

Tracking purposes [Symbol] [Symbol] [Symbol] [Symbol]

My business/company uses RFID primarily for

security purposes [Symbol] [Symbol] [Symbol] [Symbol]

My business/company uses RFID for logistics

purposes [Symbol] [Symbol] [Symbol] [Symbol]

My business/company uses RFID for Supply

Chain Management (SCM)
purposes [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has partner(s) that use

RFID technology [Symbol] [Symbol] [Symbol] [Symbol]

Ease of Use of RFID Technology

For the following questions, please check the appropriate response concerning the ease of use of RFID technology. Please note that the questions should be answered on a 1-4 scale.

Strongly Disagree Agree Strongly Disagree Agree

RFID technology was easy to

purchase/implement [Symbol] [Symbol] [Symbol] [Symbol]

2.RFID technology has, generally,

worked without error [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has continued to

commit to RFID usage [Symbol] [Symbol] [Symbol] [Symbol]

In general, RFID works as intended for your

business's specific need [Symbol] [Symbol] [Symbol] [Symbol]

RFID technology is easy to update and
expand [Symbol] [Symbol] [Symbol] [Symbol]

RFID technology is, generally, well received

among all involved supply
partners [Symbol] [Symbol] [Symbol] [Symbol]

My business/company hired/contracted a third

party for RFID
implementation [Symbol] [Symbol] [Symbol] [Symbol]

My business/company hired/contracted a third party

for RFID technology
maintenance/troubleshooting [Symbol] [Symbol] [Symbol] [Symbol]

Future Development/Implementation of RFID

For the following questions, please check the appropriate response concerning the future of RFID technology at your business/company. Please note that the questions should be answered on a 1-4 scale.

Strongly Disagree Agree Strongly isagree Agree

My business/company has plans to expand

their RFID technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has plans to implement

new RFID technologies [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has expressed interest in

keeping their current RFID
technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company has expressed interest in

stopping/removing any existing RFID
technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company's supply partners have

expressed interest in RFID
technology [Symbol] [Symbol] [Symbol] [Symbol]

My business/company's supply partners have

expressed disdain with RFID
technology [Symbol] [Symbol] [Symbol] [Symbol]

Final Questions*

For the following questions, please check the appropriate response concerning your personal opinions on RFID technology. Please note that the questions should be answered on a 1-4 scale.

*These answers represent only the individual filling out the survey and do not reflect the feelings of any other entities.

Strongly Disagree Agree Strongly Disagree Agree

I like Radio Frequency Identification

Technology (RFID) [Symbol] [Symbol] [Symbol] [Symbol]

RFID has made supply chain management

easier overall [Symbol] [Symbol] [Symbol] [Symbol]

RFID technology was implemented properly

and works well [Symbol] [Symbol] [Symbol] [Symbol]

Demographic Information

For the following questions, please check the appropriate response:

Please state your gender:

[Symbol] Male [Symbol] Female

Please state your age group:

[Symbol] 18-24

[Symbol] 25-34

[Symbol] 35-44

[Symbol] 45+

Please state your level of education:

[Symbol] No education

[Symbol] High School or equivalent

[Symbol] Associate Degree or some college

[Symbol] Bachelors' Degree

[Symbol] Masters' Degree

[Symbol] Doctorate Degree

Please state your professional industry:

[Symbol] Retail Services

[Symbol] Financial Services

[Symbol] Healthcare Services

[Symbol] Manufacturing/Production

[Symbol] Aerospace

[Symbol] Computer Information Systems (IT)

[Symbol] Other: _____

Please state your years of professional experience in your sector:

[Symbol] 0-3 years

[Symbol] 4-6 years

[Symbol] 7-10 years

[Symbol] 10-15 years

[Symbol] 15-25 years

[Symbol] 25+ years