

The existing and future role of RFID technology in Dairy Supply Chain from Farm to Fork

Project Proposal

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Aston Business School
Candidate ID: 389552

PROJECT TITLE

“The existing and future role of RFID technology in Dairy Supply Chain from Farm to Fork.”

BACKGROUND

Food safety concerns are on a rise and so is the management cost of food traceability systems. According to *Hong et al, 2011*, participants in a food supply chain are currently using two methodologies: One is to manage the food supply chain which is done with the help of standards or certifications and the second to trace the products in the supply chain for efficient operations.

RFID, Radio Frequency Identification is currently the best method that the industry can use to automatically record the logistics operations in a food supply chain. RFID is a technology that uses communication through the use of radio waves to transfer data between a reader and an electronic tag attached to an object, for the purpose of identification and tracking (*McMeekin et al, 2006*). The concept is similar to traditional barcodes. A barcode represents information in a condensed format (usually lines) that takes little space and can be read by a machine. The RFID device serves the same purpose as a bar code or a magnetic strip on the back of a credit card or ATM card; it provides a unique identifier for that object. And, just as a bar code or magnetic strip must be scanned to get the information, the RFID device must be scanned to retrieve the identifying information (*Schwagele, 2005*). RFID has been around for some 50 years, but lack of relevant technological knowledge prevented its development. Now, due to recent achievements in Information and Communication Technologies, RFID can be used in many more situations, particularly in business processes (*Tajima, 2007*).

Some research has been done in this area, and *Abad et al., 2009* and *Wang et al., 2010* suggest quite a few solutions to make the best use of RFID technology in food traceability systems but most of them are limited to a single division or process. Thus, a very few integrated frameworks have been worked upon to implement the RFID enabled traceability systems in the entire food supply chain (*Hong et al, 2011*). However, research into how the future-internet and tagging technologies will transform the journey of food products, right from the farm to the consumer's plate, has just begun at Aston Business School (*Aston University, 2011*).

PROJECT AIM

The aim of the project is to focus on the existing and future role of radio frequency identification (RFID) technology in the food supply chain from farm to fork, i.e. tracing the journey of food products right from the farm to the consumer's plate.

Since the topic is so broad, for the purpose of clarity and in-depth discussion, this project will narrow it down to “**Dairy Supply Chain**”, wherein the entire supply chain for dairy products will be studied and analyzed. Interestingly, not much research has been done in this area, and thus, it provides a good scope for research and analysis.

More specifically, there are two aims that the project will try to achieve. One, report on how RFID can be employed in dairy supply chain, and two, analyze long term investment in RFID traceability systems.

PROJECT DELIVERABLES

Besides the two specific aims that the project will try to achieve, the project also aims to produce a detailed and extensive report highlighting all issues related to usage of RFID technology in the dairy supply chain and long term investment decisions in this area. For the purpose of this report, following deliverables will be aimed to achieve:

- Looking at the current research literature on the subject, an end-to-end traceability across the supply chain is still a challenge (*Kelepouris, 2007*). Therefore, the project aims to deliver an outline of integrated large-scale traceability system across the dairy supply chain.
- Study of entire dairy supply chain along with all the participants involved in it, and a contrast with any other food supply chain. This will help highlight the particular requirements and the nature of this industry, and how the gaps in traceability technology can be filled with RFID.
- An assessment of the future role of RFID technology in the food-supply chain in the European countries, barriers involved in the usage of high-technology RFID in BRIC and particularly in the developing countries (*Kim and Garrison, 2010*) and where do we see this technology in future 5 to 10 years.
- Explore potential innovations in an attempt to achieve more effective use of the RFID technology in the traceability systems. Innovative usage of the RFID technology will also be discussed in the context of profitable dairy supply chain.
- An analysis of the potential business opportunity by using RFID technologies instead of existing traceability systems. Estimate of the improvement and efficiency in the business because of RFID's replacement of current technology.

METHODOLOGY

In the context of the Future Internet initiative, the project intends to consider how tagging technologies are being currently used and how they will be used in future in the agri-food sector.

The project aims to identify how the use of RFID helps increase transparency within agri-business.

The methodology would majorly involve desktop research, looking into the past works and the existing work being done in this context. What role has been played by earlier bar-coding techniques and what role does radio-frequency identification (RFID) have in the food supply chain. For the purpose of desktop research, relevant sources will be identified. Information related to this project can be found with the help of following resources:

1. Library: University's library and other electronic resources like AURA, MARs and the e-library will be accessed. Relevant journals and research papers will be studied and analyzed in-depth for the purpose of this project.
2. Videos and other materials: Books, videos and other media on the subject will be studied. Most of relevant material is available on the internet and in the library. These media can provide current information about the topic of the project.
3. Trade Magazines: To get a better idea of what technologies are being used in the dairy industry for the traceability purpose, it is important to go through the trade magazines and their electronic versions. Websites related to the industry and the sector can also be a good source of information about the subject.
4. Case Studies: Whether or not RFID and other technologies have proven useful for the dairy companies can be analyzed through the case studies. These case studies will not only give the real-life view of the topic but also can be used for backing a point or suggestion discussed in the project.

Once all the resources are tapped into and enough information has been gathered, it will be analyzed so as to fulfill the aim of the project.

An alternative or complimentary method could be some primary research in the form of interviews with the participants involved in the supply chain. This method can be explored later in the course of the research, as and when required.

In the discussion, all the information will be analyzed and some conclusions will be drawn so as to meet the project aim and achieve the deliverables.

PROJECT PLAN

The timeline for this project is from April-September 2011.

Keeping in mind all the risk and other factors, this project is planned according to the following stages:

Stage 1: Overview of the project process (April-May)

- Workshops about the project process
- Researching the topic

Stage 2: Topic Selection (May)

- Discussions with the supervisor
- Identifying the topic
- Topic approval by the supervisor
- Detailed discussion about the topic

Stage 3: Project Proposal (May)

- Submission of the Research Strategy and Bibliography
- Submission of Ethical Approval
- Submission of the project proposal

Stage 4: Literature Review (June)

- Collection of the relevant literature
- Categorization of the literature on the basis of their scope and nature

Stage 5: Research and Analysis (June-July)

- In-depth understanding of RFID
- Mapping of the entire dairy supply chain
- Identification and study of existing traceability systems
- Potential benefits of RFID
- Future role of RFID in dairy supply chain
- Outline of implementation of RFID-enabled traceability system in the dairy supply chain

Stage 6: First draft of the dissertation (August)

- Writing of the complete structured draft
- Discussion with the supervisor
- Feedback from the supervisor
- Corrections and completion of the second draft
- Approval of the second draft from the supervisor

Stage 7: Submission (September)

- Final editing of the draft

- Final discussion with the supervisor
- Revision of the dissertation
- Submission of the project

The Gantt-Chart below gives a summarized version of the project plan showing all the major milestones with colored status bars presenting the percentage completion of milestones.

Task Name	Duration(m)	Start Date	End Date	Apr	May	Jun	Jul	Aug	Sept
1 Overview of the project process (Workshops on projects)	2	4/1/2011	5/31/2011	100	100				
2 Topic Selection, Approval & Discussions with supervisor	1	5/1/2011	5/31/2011		100				
3 Ethical Approval & Submission of first draft of proposal	1	5/1/2011	5/31/2011		100				
4 Literature Review & Submission of Final Proposal	1	6/1/2011	6/30/2011			90			
5 Research & Analysis - Start of dissertation writing & mapping of project deliverables	2	6/1/2011	7/31/2011			10	0		
6 Submission of first draft of dissertation & Feedback from supervisor	1	8/1/2011	8/31/2011					0	
7 Editing, Discussion with supervisor, Revision and Final Submission of the dissertation	1	9/1/2011	9/10/2011						0

Fig: Gantt Chart

RISKS

Looking at the nature of the project and the lack of extensive research in the area, the risk or limitation can be a superficial discussion of some aspects of the project. To mitigate the risks, very few assumptions will be made since practical validation of the suggestions and solutions will not be possible.

Risks	Likelihood	Impact	Mitigation Strategy
Requirements partly known at project start	Low	Medium	The project aim should be flexible enough to incorporate such risk.
Unable to hold meetings with the supervisor.	Medium	Low	Contact through e-mail.
Change to project scope	Low	Medium	Refer to supervisor
Health Issues	Low	Low	Plan in a way that gives a buffer time to allocated tasks.
Loss of data	Medium	High	Backup, Save a copy on the internet/server.
Data damage/corruption	Medium	High	Antivirus software, Constant backup.
Loss of electricity/Natural Calamity	Low	Low	The project plan should allow enough margins for such events.

SUCCESS CRITERIA

On basis of the nature of this subject, the project can be considered successful if a logical outline of the RFID enabled traceability system is provided. A few new applications of RFID in tracing

the supply chain can make the project successful. All other deliverables and aims are required to be met for a successful and complete project.

Since there is no client involved, if the aims of this report are met, the project can be considered successful.

ETHICAL ISSUES

After careful considerations of all ethical issues, it is found that there are not many ethical implications to be considered in the execution of this particular project.

1. Human subject: A few interviews with concerned personnel might be needed but they will be done with proper consent and issues of privacy and identity disclosure will be considered. No information will be accessed or obtained without proper consent of the people involved.
2. Plagiarism and Fabrication of data: All facts and figures will be properly referenced throughout the project. No piece of information will be provided without proper verification of the source.

KEYWORDS

Radio frequency identification, rfid, rfid food supply chain, food supply chain traceability, ethical traceability food supply chain, research in rfid supply chain, agribusiness, dairy supply chain, supply chain traceability europe, rfid supply chain benefits, agricultural supply chain.

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