Chapter 7

A Web Application for Supply Chain Traceability

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ABSTRACT

The efficiency of a traceability system depends on the ability to identify uniquely each unit that is produced and distributed in a way that enables the continuous tracking from the primary production to the retail point of sale. An efficient traceability system must follow some rules that define which data must be gathered and stored in each stage of the supply chain. This is achieved by standardization of the gathered data and typification of the messages that enable storing and communication of the data. This chapter presents a Web-platform that will be able to support efficiently food traceability by monitoring and administering the data gathered and recorded in a central database. This application will be user friendly and provide the ability to keep, display, and communicate information through widely implemented technologies, such as the Internet and electronic mail services.

INTRODUCTION

During the past decade, the credibility of Food Industry safety schemes was heavily challenged after a number of food crises, such as Bovine Spongiform Encephalopathy (BSE) and foot-and-mouth disease. The necessity of sufficient traceability systems to tackle such crises brought into light the need for reassessing and updating traceability systems currently implemented in the food sector. Thus, the successful control of the physical flow of the products along the supply chain and product safety assurance depends on the existence of an efficient traceability system (Giraud and Halawany, 2006). This system must be able to identify each and every single unit produced and distributed from farm to fork. Apart from tackling food borne crises, a traceability system shall be able to meet the differentiated and dynamic demands for transparency information by consumers and government as well as by the supply chain actors (Triekenens, 2012).

According to the definitions at Article 3 of the E.C. General Food Law Regulation 178/2002, traceability in the food sector is defined as the ability to trace and follow a food, feed, food pro-
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Producing animal or substance through all stages of production and distribution (European Union, 2002). Stages of production and distribution refer to any stage including import, from and including the primary production of food, up to and including its sale or supply to the final consumer and, where relevant to food safety, the production, manufacture and distribution of feed (Hordon et al, 2006). This is the newest general regulation on the hygiene of foodstuffs, where hygiene rules will apply from farm to fork. Primary responsibility is taken by the food business: Hazard Analysis and Critical Control Point (HACCP) and more recently ISO 22000 (Arvanitoyannis et al., 2005). The E.U. directive 178/2002 regarding the establishment of the European Food Safety Agency (EFSA) set the foundations towards more strict traceability requirements in food sector and paved the way for further legal requirements at a national level assuring information flow transparency and efficient traceability in the Food Industry of each country-member of the E.U. According to the E.U. directive 178/2002, which took effect on January 1st 2005, “…food business shall have in-place systems and procedures to identify the other businesses to which their products have been supplied. This information shall be made available to the competent authorities on demand.”

This Regulation does not lay a specific methodology to be followed by all food business operators. Instead, food companies are free to choose those mechanisms that fit their needs and ensure efficient traceability for their products. According to ISO Quality Standards, traceability is defined as: “the ability to trace the history, application or location of an entity by means of recorded information” (ISO 8402:1994). Moreover, the same institution introduced at the beginning of 2006, two new standards that define the requirements for a traceability system within a food safety management system and the data that needs to be retained (ISO 22000:2005 - Food Safety Management Systems - Requirements, and ISO 22519 - Traceability System in the Agriculture Food Chain - General Principles for Design and Development). ISO 22000:2005, gives the basic requirements for a food safety management system to ensure safe food supply chains. ISO 22000 incorporates the principles of the CAC's Hazard Analysis and Critical Control Point (HACCP) system for food hygiene.

The effectiveness of a traceability system lies on the ability to collect information related to product quality and consumer safety (Resende-Filho and Buhr, 2008; Sasazaki et al., 2004). There is a wide range of traceability systems currently used in food chains; from paper-based to IT enabled (Food Standards Agency, 2002). IT enabled systems have been developed and introduced over the last years in the food sector, based on technologies implemented in more sophisticated industries, such as pharmaceuticals (Wilson and Clarke, 1998). Bar code and Radio Frequency Identification (RFID) technologies have been implemented in food chains, reducing errors associated with manual data handling, and make the tracking more feasible (Karkkainen, 2003; Salin, 1998). The development of software systems and databases (data pools) increases the effectiveness in collecting, transmitting and analyzing larger volumes of safety and quality related data (Food Standards Agency, 2002; Wilson and Clarke., 1998).

REVIEW OF LITERATURE ON TRACEABILITY SUPPORT SYSTEMS

Traceability Support in Agrifood SMEs

In the agrifood sector most software that support traceability have been own developed by the companies and often are supported by record and data that are maintained in printed form. Most SMEs do not have the possibility of adopting complicated technologies as that of ERP systems. Van der Vorst et al (2004) propose the solution of
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