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CASE STUDY: LATTERIE VIRGILIO, ITALY

Abstract

Latterie Virgilio is an Italian consortium that groups 108 dairy cooperatives with more than 2500 farmers. Its role is to collect, to age and to pack cheese products from its cooperatives, selecting only the ones which grant the safe origin of milk and the quality of manufacturing procedures. Latterie Virgilio supplies to the market wheels of Parmigiano-Reggiano and Grana Padano, and other dairy products such as milk, butter, mascarpone (fresh cream-based cheese) and milk cream. Other activities concern pork slaughtering and prosciutto (ham) production.

This case study focuses on a project that aimed at tracking the flow of cheese wheels (of Parmigiano-Reggiano) along the supply chain, by using RFID tags that are embedded into the crust of the cheese.

Case study fact sheet

■ Full name of the company:	Consorzio Latterie Virgilio
■ Location (HQ / main branches):	Mantova Italy
■ Sector (main business activity):	Manufacturing of cheese
■ Year of foundation:	1966
■ Number of employees:	300
■ Turnover in last financial year:	300 million euros (2004)
■ Primary customers:	Distribution
■ Most significant market area:	Italy (80%)
■ Main e-business applications studied:	RFID
■ Key words:	RFID, supply chain management

Background and objectives

Parmigiano-Reggiano is an Protected Designation of Origin (P.D.O., DOP in Italian) product and its production and aging are strictly controlled. The name is trademarked, and in Italy there is a legal exclusive control exercised over its production and sales by the Parmigiano-Reggiano Cheese Consorzio (created by a governmental decree). There are strict criteria each wheel must meet early in the aging process, when the cheese is still soft and creamy, to merit the official seal and be placed in storage for aging. A 1955 law defines the standard of this cheese, stating that the whole production should come

from a restricted area: the provinces of Modena, Parma and Reggio Emilia and partially Bologna and Mantua.

The Parmigiano-Reggiano production system is a unique dairy system. The processing of 1.35 million tons of milk into a high quality product in 600 small cheese dairies using predominantly artisan production techniques is not found anywhere else in Europe. The production is based on a family farm structure, with a strong integration of milk production and milk processing. Many cheese dairies have market relations with just one or two cheese maturing firms and these commitments do not change much over time. Although many improvements may take place in this market relationship to the benefit of the cheese dairies, the stability of sales to a few purchasers guarantees a high reliability and this in turn reduces transaction costs.

Latterie Virgilio is an Italian consortium that groups 108 dairy cooperatives, employing more than 2500 farmers.

The consortium began its activity in 1966 with only 27 dairies: today its cooperatives transform each year more than one million tons of milk originating exclusively from cows nurtured in Northern Italy (Pianura Padana) and fed only local forage (with a ban on fermented forage, such as maize silages).

The role of the consortium is to collect, to age (at least 12 months) and to pack the cheese products from its dairies, selecting only the ones which grant the safe origin of milk and the quality of making procedures.

From their headquarter in the medieval town of Mantua in Northern Italy, Latterie Virgilio supplies to the Italian (80%) and foreign (20%) markets wheels of Parmigiano-Reggiano and Grana Padano and other products like milk, butter, mascarpone, yoghurt and milk cream. Other activities concern pork slaughtering and the production of prosciutto.

All products have safe origin, freshness and quality granted by their traceability and food certification. Since 2001 the consortium obtained the certification CSQA¹ which guarantees that milk and cream are produced exclusively from Italian cows.

In particular the rigid and standardized manufacturing, aging and preservation method of the Parmigiano-Reggiano provides for excellent hygiene and safety characteristics that render it safe to consumers.

In 2004 the consortium had a turnover of 300 million euros (+11,5% with respect to 2003). The export quota represents about 20%. The company employs about 300 people. Latterie Virgilio is the main Italian producer of butter, with a market share of 17%.

As reseller of Parmigiano-Reggiano and Grana Padano, the consortium detains the seventh place in Italy for market share and the fifth place for export.

e-Business activities

One of the main activities of Latterie Virgilio is to collect the wheels of Parmigiano-Reggiano from the selected dairies, and to age the cheese into its warehouses according to the procedures established by the "Consorzio del Formaggio Parmigiano-Reggiano"

This Consortium is a non-profit organisation and its main task is to defend and protect the "Designation of Origin" of the cheese and facilitate its trade and consumption, by promoting every initiative aimed at safeguarding the unique features of the product. One

¹ CSQA is an Italian Certification Authority

of the most important measures adopted by the Consortium with the aim of protecting the product sales is the introduction, since 1964, of the mark of origin, with the dotted inscription "Parmigiano-Reggiano" encircling the wheels.

The control of traceability of the wheels of Parmigiano-Reggiano from the producer to Latterie Virgilio is done through a casein plate attached on the crust. The casein plate shows the production year, the acronym "C.F.P.R." and an alphanumeric code identifying each single wheel.

The selected dairy receives from Latterie Virgilio these casein plates, bearing a unique code which represents the origin of the wheel (the dairy, the production zone, the lot).

In the warehouse the wheels are aged, brushed (many times) to avoid mould formation on the crust, and finally sliced for retail distribution. In this case the code-number is automatically printed also on the single package label. With this system any distributor or consumer can trace the origin of his wheel or slice of Parmigiano-Reggiano.

The risks of this procedure could be the following:

- the numbers marked over the casein plate could be illegible after the repeated brushing of the wheels;
- human errors of transcription from the casein plate to the register that books the wheels.

Until now the control of the traceability has been done manually, but since 2003 the company started a project to automate this control.

This project consists in the introduction of a RFID tag under the casein plate that allows to automatically identify the number and the codes of the wheels and transfer this data to a central database.

The main advantage of this system is the enhanced possibility to keep track of all sorts of information. This includes not just production lots and codes (as required by EU regulation on traceability), but also, for instance, information about the quality of the wheel (based on the results of the quality checks made when the cheese wheel arrives at the warehouse or is shipped from it). This kind of information may include an assessment of the colour of the crust, the sound that the cheese makes when it is stroked by a rubber hammer, and other food-specific parameters.

The investment requested for the pilot program was not very expensive, because Latterie Virgilio automatised its pre-existent traceability system. The cost has been around 20,000/30,000 euros (software, RFID readers and writers, sensors, antennas) plus the cost of about 200 tags at 0,50 cent each.

Technical issues

In 2003, Latterie Virgilio started the first testing, which involved few dairies. The aim was to verify technological and organisational problems.

The main risk was to verify whether the "hostile" aging environment (with controlled levels of humidity and temperature) could cause a proliferation of bacteria and mildews under the casein plate, or whether the brushing procedures could cause damage to the tag or remove the control system. Many tests were conducted, and they didn't show problems.

In 2004 the second testing started. The main goal was to establish an internal standard to divide the memory space of the chip, in order to insert different sort of codes (dairy of production code, wheel code, lot code, dates and other characteristics of the wheel).

In 2005 the last successful testing (involving more dairies) was achieved, showing the possibility to adopt by 2007 this system for all cooperatives of the “Consorzio del Formaggio Parmigiano-Reggiano”.

The tested technology used different types of RFID tags, working at 13,56 MHz frequency. The first version tag had a copper antenna and a diameter of 2 cm. The second version of tag has an aluminium antenna, and a diameter of just 1 cm. The smaller dimension reduces the possibility of bacteria and mildews proliferation under the casein plate. The third version used features an even smaller tag, inserted directly into the casein plate.

All these RFID devices are readable and writable. The objective is to allow people that work with the cheese to update directly into the tag the information about the cheese wheel, whenever necessary along the supply chain.

The RFID system has been tested only at wheel level but not at unit (cheese slice) level. The single cuts of Parmigiano-Reggiano have the relevant traceability code stamped on their package.

Latterie Virgilio is now planning to extend this system to its production of Prosciutto: in this case the RFID tag will be sewed on a side of the ham.

Lessons learned so far

So far direct impacts haven't been evaluated, because the RFID system at Latterie Virgilio is not fully implemented but still in a test phase. However the expected impact after the adoption of the system is:

- reduction of handling times and warehouse costs;
- reduction of times and human errors during the data transcription from the casein identifying plates to the registers for inventory;
- limitation of counterfeiting of Parmigiano-Reggiano cheese, thanks to the adoption of a more strictly controlled and certificated system;
- adoption of a system that allows to link internal procedures to the future request of distribution.

The lessons learned so far from this case are:

- The system can provide in real time information regarding the product, the safety of the production process, the traceability and the location of goods;
- The system grants an accurate control of inventory and allows to link internal processes to the requests of distribution (traceability, safety and other);
- Small dimension of the tag reduces the possibility to generate bacteria and mildews under the casein plate. Moreover it doesn't suffer hostile environment;
- The implementation of RFID is not expensive for companies that already use a traceability system.

References

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