



Information System as a Tool Guaranteeing Food Safety and Controlling Food Market

Katarzyna Szymanska

State Higher Vocational School in Ciechanow Faculty of Engineering and Economics

	<p>ABSTRACT</p>
<p>2016 Research Leap/Inovatus Services Ltd. All rights reserved.</p> <p>DOI: 10.18775/jibrm.1849-8558.2015.51.3004 URL: http://dx.doi.org/10.18775/jibrm.1849-8558.2015.51.3004</p>	<p>Changes occurring in the world (social, economic, technological) are a great challenge for market players. The development of transnational corporations, mass production, lower costs, greater amount of markets, cheaper suppliers influence that producers aren't able to secure semi-finished products or raw materials in the production cycle. Semi-finished products and raw materials are procured and delivered by providers, who are also intermediaries in this production cycle from different countries. Lack of control over raw materials affects the purchase by unscrupulous providers of the cheapest materials of unknown origin, resulting in scandals - also in food.</p> <p>The article shows the ways to verify the production of food at every stage of its creation, and indicates possibility of its control.</p>
<p>Keywords: Food market, Profit and scandals food safety food market, Control, Information system.</p>	

1. Introduction

The most important problem faced by the people all over the world is the problem of food. For years, it was thought that food is healthy, provides body with essential nutrients, minerals and vitamins for proper functioning of the body. This principle isn't true in food production, which has the highest change. Food has become much more accessible, more processed and less "natural", and thus its nutritional value for the consumer is becoming lower. Modern food contains all sorts of extras that lengthen its shelf life, improve the appearance and taste, increase the weight etc. (B. Waszkiewicz – Robak, 2002).

Modern food production sector is shaped by companies and corporations interested in profit. Despite safety systems, (including existing HACCP), and control, food contains a lot of different types of synthetic additives: dyes, or preservatives. Each of these food additives can be long on the shelves, look good and smell delicious. Chemistry isn't an enemy of society. The problem in the production of food is same who, wishing to achieve high returns looking for cheaper substitutes, sometimes untested, sometimes forbidden to improve the appearance of food, refresh it and re-enter it on the market.

Often manufacturers in search of profits, expand markets by buying and selling food and components for its production in different countries. Export and import of food, semi-finished or

preservatives from other countries is regulated by national governments. They choose their products, limit amounts of various chemical compounds, determine which products will be sold in the country. Countries defending themselves against unfair manufacturers prohibit importing food whose origin or composition can't be verified. Some bans are correct, some may be malignant in order to protect its own production. The problem arises when verifying accuracy of information about the food. How to stop throwing irregularities connected with the wrong proportions of fertilizers, pesticides or antibiotics? How to verify whether a food is healthy, free of excess pollutants?

It seems that the alternative is to increase the control, but the number of controllers doesn't solve the problem. An alternative to food producers is the development of clusters or associations of these producers, having ability to control food safety, and system verification information producers at every stage of food production.

2. Food Market

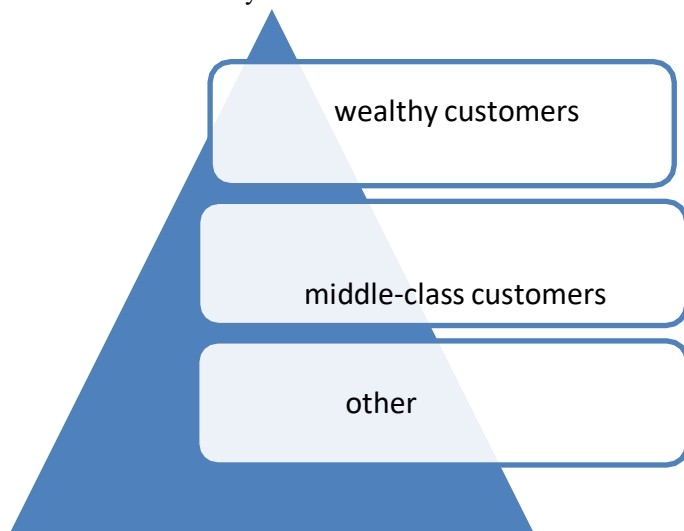
Food market is a very attractive one. Every man must eat to live, and it gives a variety of high - earning opportunities. The number of consumers leads to creation of new farms, factories producing food, chemical laboratories. Fast and rapid development of the food industry also affects development of market for food technologists who design recipes products suitable for human

consumption, their composition, determine permitted level of additives and preservatives, so as not to harm the public. Equally rapidly growing is the market of chemical additives, which look cheaper and higher food stabilizers, extending compounds expiry dates, enriching products with nutritional supplements (vitamins, calcium, iron, minerals etc.).

Attractiveness and profitability of the market affects both manufacturers who compete with each other in production of food, look for low-cost suppliers of cheap substitutes, produce cheap products to earn as much as possible, looking for suppliers of all kinds of food additives (preservatives, packaging, fixatives, food dyes, components for further production).

The development of the food market isn't dependent on the consumer's wallet. Food is produced for each consumer but it's composition is modified. In the more expensive products, you can find more natural substances. Cheaper products have their chemical counterparts, eg. water with strawberry flavor can be produced on basis of strawberry juice or a chemical additive which dictates taste and smell of strawberries. The difference between these products are reflected in the price - water is cheaper with chemical addition.

Customer allocation by wealth



Source: own.

This division presented in form of a pyramid. At the base of pyramid are customers who earn the least (minimum wage in the economy), living on unemployment benefits or benefiting from state aid (social assistance). In every economy, they constitute the largest group. Another part of pyramid is the middle class. The smallest group of customers are affluent, located at the top of pyramid.

In perspective of this division we can raise question: which food market is more attractive - natural food market (addressed to affluent and middle-income) or conventional food market (addressed to other customers)? Producers of many factories produce food in these two categories - sometimes hiding their

own brand – don't want to hurt themselves for example - Bakoma produces yogurt under name of the company and for discount Biedronka under name Tola, where there isn't any relation with the company's name. Conventional food market is a better market for some to make profit. The number of potential customers is greater, preservatives can add more (so it reduces operating costs).

The attractiveness of the food market favors formation of scandals. From time to time in the press, on television or the Internet, there are reports that the food contains road salt, antibiotics, rat poison.¹² In Polish butter Slovaks experts have detected some emulsifiers and preservatives allowed in the EU (emulsifiers E471, E322 and E472 and E202 preservative).¹³ Through these scams, every country has lost hundreds of millions of dollars. It is estimated that food scandal associated with road salt in food in Poland caused a loss of 300 million PLN.

Food scandal also touch the most expensive food - organic food. Name of food doesn't guarantee its safety. Press publicized the scandal in the Italian organic food company. Few thousand tons of counterfeit products have entered the market. One of the members of the criminal group said that he sold more than 700,000 tons of organic food counterfeit with a total value of around 220 million euros, in several European countries. The question was: how to look for proceder sales? He bought raw materials in Romania and Italy, then reported as "organic" on the basis of forged documents and resold at high prices.¹⁵ According to "Die Welt", on the German market were millions of eggs from caged hens sold, which were declared as "organic eggs".

Scandals in food industry in Poland and Europe arouse concerns of millions of consumers, damaged the image of food abroad and undermined confidence in inspection services, it hit in fair producers who have problems with signing long-term contracts with domestic and foreign customers. Countries under protection of their own consumers may impose an embargo on all producers of the country, eg. Russia, which believes that Polish food isn't healthy, contains antibiotics and harmful ingredients (K. Szymańska, 2013).

3. Food Inspection

Full control of food in each country is impossible. In Poland there are no controllers, who would be able to detect all fraud, so many scandals explode after a certain time, some are not disclosed at all. There is a lack of efficient operation and co-ordination between control service, sometimes it doesn't respect the law and don't enforcing it.

There can be many solutions to this situation. The most valuable solution for the proper functioning of the food market is to create a suitable computer program, the establishment of the entity collecting and making available information about food production at every stage, providing data producers and

consumers both in Poland and abroad, and the appointment of auditors for checking and verifying the information entered into the system at any level.

4. Electronic Information System as a Tool For Ensuring Food Security and Controlling The Food Market

Electronic information system about production of food is a tool to ensure food safety - from the farmer or producer to the customer.

The system should combine multiple units: seminal centrale, sales of fertilizers and pesticides, veterinary clinics, farmers, processors and stores. All information should be stored in an electronic database linking the different institutions.

Centrale seminal would inform, which products have been sold to customer, in which year, when they were made, what was their expiration date, residence time in the control of seed. In addition, they provide information about species of seeds or seedlings sold and way storage. Each purchase of these materials would be scanned and assigned to a specific manufacturer (farmer).

Veterinary database would provide information about disease in herds, genetic material for breeding, antibiotics and other means used in the farms. Here too, any purchase would be scanned and assigned to the producer (farmer).

Database farmers contain information about the use of fertilizers or plant protection products, size of the farm (there can be correlated and checked purchased fertilizers in terms of number of acres), the time of their application (in terms of preserving grace period - to reduce dosage of fertilizer just before sale, the frequency of use - if they were too often fertilized to improve crop yields); antibiotics used on the farm (or preserved waiting periods prior to sale of animals and products of animal origin).

Farmer at home would be forced to make a particular purchase and enter information about application. In addition, the farmer must have had provided information on number of sowing, after manufacture of product (seed, raw materials for further processing) would be forced to check in amount collected or produced fetal cattle or swine, date of harvest, accounting changes its location - the sale. Before the sale he would introduce information about the last time when he used additives and their dosage, method of storage, storage conditions and measures taken to storage. This would give a complete picture of a working farm.

Database would contain processors information about: farmer from whom a person bought material for further processing, food additives, the country from which they are derived with dates of purchase to prevent re-circulation of food that is past due. At this stage each purchase would be scanned. Downstream manufacturers can choose from whom they take raw or material for further processing, as far as content of chemistry they can afford.

The final link of system would be client. Using appropriate application, he could scan code, Internet connection would

have access to information about composition, place of manufacture, additives, company that manufactured product, a farmer who supplied raw materials (modified or not). He would know what he pays for, what he eats, how much chemistry does the product contain.

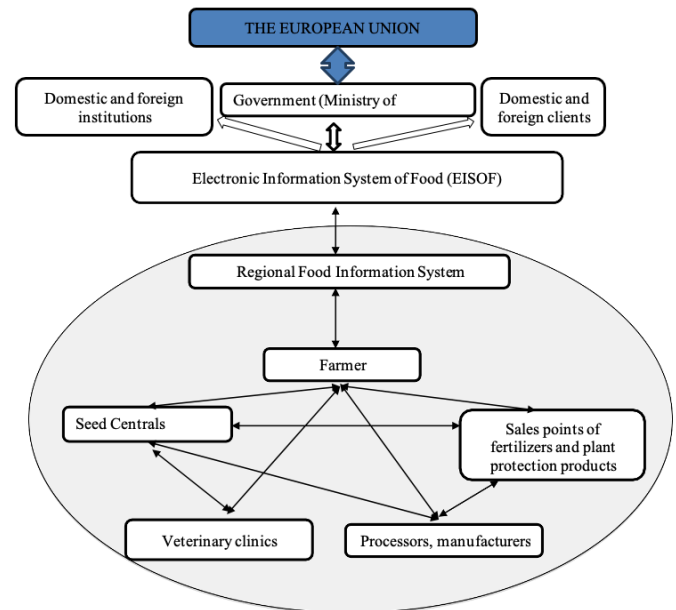


Figure 2: Electronic Information System of Food – model
Source: own.

All this information should be collected in one network per country - so that producers (processing plants, butchers etc.) can choose the farmer from whom they wish to buy (they were guided by information about animal diseases or plant fertilization, would have access to information about place with comes raw material, how he was made or that he contained GMOs).

The control unit would have information about farmer and producer - information about what was purchased, when, if it was possible to produce a registered quantity of raw material amount of product intended for sale. If material studied by the institution would include measures that weren't included by manufacturer of the system, or concentration would be too high (deliberate fraud), then it is possible to punish the manufacturer in different forms (a monetary penalty, suspend the sale or production), send a check to further testing of production (manufactured products) and stop further sales, if results would extend wrong.

Access to this information would also have the government suitable ministry. This information would be useful in food sales abroad - other governments would have access to it and would choose products suitable for further processing. Country purchaser or manufacturer from another country would define acceptable range of applied fertilizers, antibiotics, etc. The less chemical additives, products would be more expensive.

The Union has problems with the sale of food to other countries that call quality of products into question, talk about their

harmfulness, diseases, fertilizers etc. It's hard to defend against such accusations, or lead to criminal liability - a word against word. With such a system, there could be quick way to convince malice buyers who falsely reject purchase with their invented strange reasons (embargo - Russia). The Union and individual countries wouldn't have to unnecessarily pay extra subsidies to farmers for losses caused by embargo.

5. System Benefits

The proposed system will provide specific information for all interested groups and informed about what is happening with food at the various stages of its production. Thanks to interested, individuals are informed of farmer - how much production he sold, at what price; if he didn't sell - what happened to the production - at this stage can be ruled out defective seed, feeding of animals broken, outdated or too fertilized production (cereals, potatoes). Also, manufacturer would have to watch, given composition and origin of ingredients used to produce food, which would prevent occurrence of scandals habits.

Moreover, the system provides information on origin of product and its composition, prevents fraud involving sale of products sold as organic as "health food"; to exclude fraud selling multiple products, eg. green - you may find that farmer has to buy food from another farm (there is no production capacity, element destroyed sowing or crops) and sold as their own to earn on it (can be seen in system, he sold two times more yield than he can gather). The system is able to check at each production stage.

6. Disadvantages of the System

The problem with what will have to face at the beginning of introduction of the system will cover food that can't be sold at any of the stages because it doesn't meet the defined criteria. What to do with it?

The second problem is cost of building the system. The cost of building the system can be reduced by applying for funds from the EU funds. Another problem is the reluctance of farmers, manufacturers and inspection bodies. Farmer or producer explains that there is no time to enter information into the program, but State as an institution may require such involvement from farmer. State sells agricultural products abroad, looking for markets, subsidizes agricultural production, EU subsidies paid to farmer. It may be a condition forcing farmer to enter the digital age. The range of activities - the system is extensive and requires introduction. You should start by designation of units (institution) in respective regions and make changes locally, at a later stage to go to the national system, which spans farmers, growers, producers, controllers and clients. The units of introducing such systems should be food producers' association or associations clusters giving them opportunities and control powers. Such associations could affect confirmation of the quality of food, strengthening the image of manufacturers, helping farmers and creation and maintenance of a market.

7. Conclusion

Article discussed the problems associated with the food market - showed problems of producers who, if they get a positive financial result are looking for cheaper labor, cheaper raw materials, cheaper suppliers. Lack of control over raw materials, cheaper components, desire to make a profit affects with an appearance of unfair market suppliers, chemists, food technologists and manufacturers. Nowadays, it is difficult to verify quality of product, place of origin, method of production, which is why we often have to deal with food scandals.

A computer system becomes a way to verify production of food at every stage of formation and monitoring, individual collecting and releasing the information about food production in the country and abroad. The system allows to solve problems associated with production and sale of food and quality products.

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