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Approaching food quality and safety

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Abstract

The management of resources is presented in this study for food quality, food safety and public health protection. In this chapter is presented the importance of ISO quality standards in food quality and safety. An environmental management framework is presented for businesses in food industry to protect the quality of their food or services. Sustainable solutions are presented for the food industry and the agricultural sector so as to reduce their operational costs and to improve their environmental footprints. Efficient designs that promote sustainability are necessary not only to protect food quality but also public health from associated hazards and risks.

Keywords: food safety; food quality; ISO; monitoring schemes; efficient designs for sustainability; public health

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1. INTRODUCTION

Sustainable designs are necessary due to world's population increase not only for environmental protection but also for food safety, food quality in agricultural resources, land uses of live stocks and other associated anthropogenic activities avoiding associated risks and hazards for public health [14,15,16,17,18,19,20,21,22].

Consumer and environmental organizations have proclaimed that in the era of the crisis "Quality as a size can be graded, security cannot be graded. A foodstuff will either be safe or not. Quality includes the term security. Quality can be targeted at different consumer groups and accept different consumer prices, but it should certainly be as safe for all consumer groups.

However, it sounds utopian to look for 100% safe products at a time when scientific knowledge is being shaken internationally.

It is customary to use the term "Socially Accepted Levels of Security" The question arises who will decide, in a state of uncertainty of scientific reason, on what acceptable levels of risk we can be exposed as a society to food threats that threaten us (Genetically Modified Foods, Dioxins, BSA (Crazy cows).

Clearly, one cannot decide on such a complex issue, but all together consultants, namely the Scientific Community - Business and Civil Society. Everyone has reason to decide at what socially acceptable levels of risk we are prepared to be exposed as a society and as consumers-users.

Quality assurance, quality assurance, ISO quality overall are reported to indicate the efforts made by businesses to protect the quality of their food or services. These terms are not identical but refer to the stages of the evolutionary course of quality.

2. FOOD SAFETY MANAGEMENT

The concept of quality in the agricultural sector is not new. Quality has emerged from the appearance of the human species and has been associated with both impressive structures in ancient Egypt of Pharaohs, ancient Greece of the Golden Age of Pericles, as well as the spread of philosophical thought from Antiquity to the present day.

Nowadays the concept of quality has evolved and transformed into a new philosophy that covers the whole business has strategic content and perspective and has as its ultimate goal the satisfaction of the client's needs. It is argued that the foundations of quality and its basic principles were laid by the philosophers of Ancient Athens Aristotle and Socrates and China Sun-Tsu.

Companies that closely follow the impressive changes in their environment are genuinely determined to offer products that meet their customer's requirements. However, quality is not only determined by the customer. At least this perception has not always prevailed. HACCP systems could help in minimizing of probable risks for food safety and quality.

Four different theoretical approaches to the meaning and importance of quality have been developed and show the orientations that prevailed from time to time in corporate governance and action.

The philosophical approach considers quality as a concept that is synonymous with the ancient Greek virtues "virtue and perfection". Thus, the attempt of many enterprises to approach quality with its philosophical dimension led to actions aimed at perfection, in finding the essence of quality, but which had practically weaknesses in assessing their effectiveness.

The economic approach assumes that market laws determine the quality of products for sale, thus linking the quality of a product with its value and price. According to the traditional economic models for consumer preferences, the decisive factor is the price of the product, which, as it decreases, is so far removed from the quality standards. Excessive acceptance by US businesses of this economic approach to quality has led them to obtain a bad reputation for their products in relation to the Japanese, especially after the Second World War.

The technocratic approach considers quality not as "beauty" and "glamoriness" but as a strict and systematic observance of specifications in the production process.

The ever-increasing competitive tendencies, the globalization of markets, the emergence of services, the efforts of companies to maintain more dedicated customers have contributed to the emergence of a new approach to quality that differs significantly from the previous ones.

However, the marketing is important for the promotion of food products. It is the market-oriented and marketing-oriented approach. Therefore, according to the marketing visa, the quality is determined by the customer and can be measured only on the basis of production specifications.

Today, the most important criterion for the quality of a product or service is full and customer satisfaction. It fully satisfies the customer within certain time limits of production costs is of a qualitative management nature. Quality theoreticians who have shaped roads and influenced thinking in Quality Management are Grosby, Juran, Ishikawa, Feigenbaum, Deming [23].

Juran and Deming are considered to be the proponents of the Japanese miracle and the architects of the "revival-revival" of quality in this country.

Philip Crosby is more widely known than his philosophy of "zero errors." In his view, the only standard performance for any business that pursues quality is that there is no defective product.

Ishikawa is considered the father of Quality Circles and is one of the first to use the term Quality Control throughout the business. He views Quality Control as a revolution in administrative thinking and proposes a specific process for quality assurance.

Deming is the man who linked his name to Japan's industrial and qualitative renaissance. It

defines quality as the expected degree of uniformity and reliability with the lowest cost, tailored to market needs.

However, ISO standards are coming to verify the quality in food industry. ISO 3591 determines the size of wine tasting glasses. ‘Cheers ‘ ISO 7304 provides cooking times for spaghetti. ‘Bon appetit ‘ ISO 3103 explains how to make the perfect cup of tea. With or without milk ? [9]

Today more than ever, food products regularly cross national boundaries at every stage of the supply chain, from farm to fork. ISO International Standards create confidence in the products we eat or drink by ensuring the world uses the same recipe when it comes to food quality, safety and efficiency.

ISO has developed a series of standards [2,3,4,5,6,7] for food safety management systems that can be used by any organization in the food supply chain. It features:

• ISO 22000:2005 – Overall requirements
• ISO/TS 22002-1:2009 – Specific prerequisites for food manufacturing
• ISO/TS 22002-3:2011 – Specific prerequisites for farming
• ISO/TS 22003:2007 – Guidelines for audit and certifi cation bodies
• ISO 22004:2005 – Guidelines for applying ISO 22000
• ISO 22005:2007 – Traceability in the feed and food chain. ISO 45001is for the occupational health and safety.

Moreover, ISO food standards create confidence in the products we eat and drink. ISO brings all stakeholders on board to share best practice, promote state-of-the-art technology, and ensure safety and quality.

ISO food standards provide benefits for all participants in the supply chain, from farm to transportation and logistics, from manufacturing to retailing and services, from consumers to regulators and analytical laboratories.

In the first stage of business efforts to improve quality, they have used inspection and quality control to measure, examine one or more product characteristics to identify or prevent defective production.

In particular, Quality Control has been linked to the growth of American Industrial Development since the end of the second world war. Quality control refers to all functional technical procedures that confirm the quality of a product or service based on specific specifications. In the mid-1950s, the term "TOTAL QUALITY CONTROL" by Feigenbaum was made, according to which quality is the responsibility of everyone, not just the quality control department. At the same time, Deming and Juran begin to teach the principles of quality control in Japan.

The second step in the evolutionary course of quality improvement is Quality Assurance. That is, all planned or systematic actions and processes necessary to ensure that a product or service meets certain specifications.

Quality assurance is primarily a prevention system that emphasizes product design and production processes.

The philosophy of quality assurance is that "quality intervention" should be done in the early stages of designing the product and requires effective adherence to specific technical specifications.

In order to help businesses that decide to ensure the quality of their production process, and to have a common international language on this issue, the International Standards Organization (ISO) has set up specific series of standards according to the requirements of which companies are audited and certified by National Agencies or other Bodies.

The International Organization for Standardization (ISO) is a specialized standard-setting organization, consists of the National Standardization Bodies of 91 countries and has 180 technical committees, each of which is responsible for the many areas of expertise.

The results of the work of this International Standardization Organization ISO are published as International Standards. One of the most recognized standards used as a guide to a quality assurance business is ISO 22000: 2005 and ISO 9001 series, whose main purpose is to assure buyers that the product meets the specifications and therefore meets the needs the customer's [2,8]. ISO 14001 series should be apllied properly in food industry so as to improve their operational management minimizing chemical pollutants and improving their environmental footprints.

The final stage in the evolutionary process of quality improvement is Total Quality Management. Total Quality Management is an administrative philosophy to improve the quality and efficiency of the business as a whole.

It is a new way of managing all the business, all departments, all employees and all activities at all levels.

Various theoretical models have been developed to effectively implement a philosophy and practice of Total Quality Management.

The most popular models are the American Quality Award Malcolm Baldrige National Quality Award, the European Quality Award of the European Foundation for Quality Management, the Oakland model, the Crosby Deming Quality Model and other

Furthermore, the following seven fundamental principles of Total Quality Management are the backbone of this new management philosophy.

1 Emphasis on customer satisfaction. Total Quality Management causes a change of business philosophy and policy towards the customer. It is first necessary to understand what product the customer wants and then to produce the product. That is, to pre-produce the production or to research the needs of the customer's wishes and suggestions.

2 Continuous improvement of the Total Quality Management System. The aim is not to ensure and maintain a certain level of quality of the specific specifications but to continually improve all processes, operations, methods and practices for continuous customer satisfaction (continuous improvement is the Kaizen system)

3 Join everyone in improving quality. An understanding of the philosophy of D.O.P all employees and their involvement in the design, development and implementation of improvement is a cornerstone of TQM. The participation of all requires effective -epimorfosi education on the issue of IIG and regular communication between of all levels of workers.

4 Commitment of Higher Management. The importance of quality and continuous improvement.

5 Education and training of workers. To accept the new philosophy of quality.

6 Continuous measurements and assessments of quality improvement efforts. Using statistical methods and practices for monitoring the results, continuous feedback and use of questionnaires for continuous updating.

7 Developing long-lasting healthy relationships with suppliers. Keeping a few and faithful suppliers became an act by Japanese companies and quickly proved to be a major asset for the companies that apply it. Because suppliers have a serious impact on the operation of the business because raw material quality, delivery time and service are directly related to product design, production methods, reduction of defective products, and the satisfaction of the citizen.

There are two points of view in assessing the situation of a food company in terms of quality improvement in Greece.

The Greek food industry is characterized by a dangerous stability in the issues of quality improvement. However, another view expressed by business consultants and executives fosters the idea that Greek Industrial Enterprises are slowly beginning to understand the importance of quality in achieving competitive advantage, improving productivity and entering new markets by applying proper practices and methods.

However, it is a fact that the Greek Industry was slow to wake up from lethargy. This is explained by the fact that it has been slow to incorporate in the concept of profit and other values such as environmental values, values of social responsibility, business ethics and consumer protection.

The philosophy prevailing in Greek businesses today is "excessive" and in many cases one-eyed focused on adopting a "hard" approach to quality improvement based on the ISO 9001 series of standards.

Undoubtedly, the ISO 9001 series is the spearhead of the quality assurance policy in Greece. But the vast majority of businesses will have to re-examine some of their basic perceptions about quality. That is to forget the traditional notion that quality is simply defined as the durability or purity of the product, but rather to adopt a broader understanding that is related to the general way of introducing Total Quality into business management. This choice is the only reliable and effective prospect for the survival and development of the Greek enterprise [13].

However, the progress and the evolution of our civilization increased the waste volume in urban eco-systems, as well the wastewater volume in wastewater treatments. The environmental pollution became hazardous the last years for public health. The food industry should invest in green clean technologies. The innovative technology has been focused on the environmental protection developing methods and systems of effective waste management and energy recovery. The increasing of the SWM recovery rates influences the waste management systems, the waste composition streams, costs and emissions from treatment and disposal activities [19,20]. Food industry in order to improve its operational management minimising operational costs and environmental emissions should be focused on an integrated environmental management framework not only to improve its environmental footpring but also for food safety and public health protection (figure 2.1). Monitoring schemes and proper designs should exist to minimise risks and hazards within the food industry and associated anthropogenic activities [9,10,11,12,19,20,21].

In this way, operational management activities within food industry at warehouses, logistics, buildings and surrounding landscapes will be improved in terms of their environmental footprints. After the above analysis of quantified risk assessment elements, an additional risk assessment planning base should be presented properly for the food safety by bioterrorism or other actions [12]. It should be followed during any examination of landfill study. A risk assessment planning base should take place when landfill emissions risks are quantified by numerical models [12]. Figure 2.1 presents an integrated environmental management framework for food safety, food quality, public health protection and improvement of environmental footprint within the food industry.

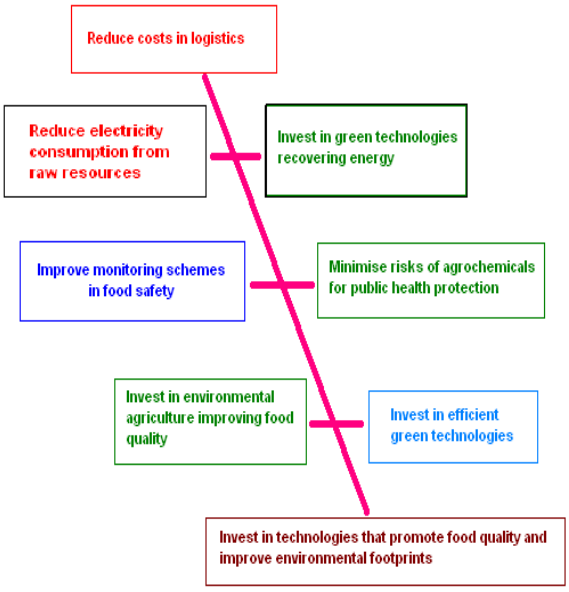

Fig. 2.1. Environmental management framework for food safety, food quality and improvement of environmental footprint within the food industry.

Food industry in countries that are in economic crisis like Greece should invest in emerging green clean technologies, minimizing their operational costs, improving their environmental management systems - environmental footprints, recovering their waste emissions and creating new jobs fighting the unemployment [1].

3. CONCLUSIONS

The development of monitoring schemes, auditing, risk assessment tools, and efficient environmental technology not only will control and manage better the environmental impacts due to the increase of the waste generation rate but also will promote environmental protection and sustainable development within the food industry.

For an effective food quality and safety should be taken into account the next: integrated geo-information simulation tools are necessary for stakeholders within the building capacity of optimum operational management and operational design of manufactures; right equipment selection in clean technologies; use proper environmental technologies for recovery of waste emissions; efficient designs in sanitary engineering; recovery of energy; effective designs of construction materials in reclamation works and clean technologies; risk assessment of environmental resources – public health protection and project management of equipment, machines of landfill gas exploitation to

electricity and greenhouse heating.

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