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INNOVATIVENESS OF FOOD PRODUCTION ENTERPRISES IN WIELKOPOLSKIE VOIVODSHIP FROM THE PERSPECTIVE OF PRODUCERS

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Abstract. The aim of the paper is to assess the impact of quality management systems on innovativeness at food manufacturing enterprises in Wielkopolskie Voivodship in 2009/2010 on the basis of 25 surveys carried out and 3 direct interviews conducted with managers. All analyzed enterprises have implemented at least one quality management system and carry out an innovative activity which positively influences their functioning. It contributes to greater diversification and quality of products, increase in sales and entering new markets, and increased flexibility of production processes. Quality management systems help to shorten the time necessary for development and implementation of innovations mainly by regulating processes, implementing improvement measures and drawing up responsibility. Half of the analyzed enterprises cooperate with the research and design sphere or other enterprises. Such cooperation is mainly triggered by the lack of their own technical knowledge and not sufficient research infrastructure, deficit of experience, incomplete knowledge of market needs and customers expectations. Another reason for taking up innovative activity was to keep or decrease the distance from competition and to increase profits. The above conclusions prove a positive link between quality management systems and innovative activities.

Key words: food production, innovation, innovative activity, Wielkopolskie Voivodship

INTRODUCTION

The manufacturing activity of Wielkopolskie Voivodship is characterized by a significant share of foodstuff brands. Production of food items constituting 26.25% of the sales value in 2009 is based on excellent raw material sources of agriculture in Wielkopolskie Voivodship[1]. Over half of all Polish food companies rated their economic situation as good or very good in June 2008 [Urban 2008]. One has to agree with the opinion of J. Drożdż that

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[1] Calculated from Rocznik Statystyczny Województwa Wielkopolskiego 2010, table 2(210).

"currently, for an enterprise to successfully compete with foreign companies it must offer not only competitive prices but also newer and more modern products. More and more companies understand this problem and are aware that a success is guaranteed not only by great inventions but also by constant improvement of quality and modernity of products offered" [Drożdż 2009]. For that reason both innovativeness and an efficient quality management system are so important.

Food manufacturing industry (Section D, group 15) belongs to low or medium-low technology according to OECD nomenclature. Food manufacturing plants in large extent belong to small and medium enterprises (SMEs). It does not, however, mean that this kind of industry is underdeveloped in terms of technology or innovativeness. It is natural that due to its significance this industry is dominated mainly by incremental innovations rather than radical ones. One may expect, however, that the number of processes, products and marketing innovations are high. For example, R. Herrmann noticed that such novelties as incremental innovations in food manufacturing may be grouped into different classes (comfortable, "light", ecological, ethnic, health, qualitative, nostalgic, etc.) [Herrmann 1997]. Enterprises which manufacture and support food production introduce many process, product, marketing and organizational innovations within the whole chain of values from the field to the table.

RESEARCH METHOD AND MATERIAL

The aim of the paper is to assess the relations between quality control systems and innovativeness at food manufacturing enterprises in 2009/2010 on the basis of the surveys carried out and direct interviews conducted with managers.

The questionnaires were presented to 140 enterprises from Wielkopolskie Voivodship and addressed directly to quality control managers in different companies. The questionnaire was correctly filled up by 25 food sector companies. All of them carry out the innovative activity on a daily basis and each of them possesses at least one system of quality management. They are differentiated in terms of size. There are three small companies among them (employing up to 49 people), 14 medium ones (employing from 50 to 249 people) and 4 big (250–499 employees) and very big (over 500 employees) companies respectively. All data was obtained via the Internet, telephone and also directly. Due to the unsatisfactory return of the questionnaire the direct interviews among managers in three companies were carried out in addition. Analyzed companies in almost equal terms act on the local market (21), national market (19) and among EU Member States and EFTA members (21) as well as other countries (14).

QUALITY MANAGEMENT SYSTEMS IN ANALYZED ENTERPRISES

All analyzed subjects have implemented at least one quality management system. Each of the 25 companies possesses the HACCP system (Hazard Analysis and Critical Control Points) which is obligatory or it was implemented on the basis of ISO 22000:2005 regulation (Food safety management systems. Requirements for any organization in a food chain). The second most commonly used system among the food manufacturing

enterprises is the quality management system based on the ISO 9001:2006 standard implemented by 16 companies. Eight companies implemented the systems based on wholesaler standards i.e. IFS (International Ford Standard) or BRC (British Retail Consortium. Global Standard-Food). Four larger enterprises concerned about their environment implemented an environmental management system based on the ISO 14001 standard and two of them possessed a safety management system according to the ISO 18001 standard. This data points to the existing discipline of all companies and respect for legal regulations and understanding of issues concerning safety of employees and environment. Most enterprises (16) implemented their quality management systems between 2003 and 2006 while four of them did this before 1999.

EFFECTS OF INNOVATIVENESS

Replies provided by respondents are shown in Table 1 and suggest that innovations positively affect company's activities in many ways. Everyone declares that it contributed to diversification of offered products. Innovations contributed to an increase in sales and share of current business activity or they enabled entry into new market segments or they contributed to an increased flexibility of production processes in nineteen companies. Thus, a better adjustment of the companies' offer to their customers' needs took place. As 18 managers noticed – innovations lead to an increase in product quality. Additionally,

Table 1. Importance of innovative activity for food producing enterprises
Tabela 1. Ważność działalności innowacyjnej dla przedsiębiorstw przetwarzających żywność

Effects of innovativeness	Number of replies
1. enabled entry into new market sectors, increased share in the market sector where a company remains active	19
2. replaced old products or processes with new ones	17
3. increased diversification of products	25
4. improvement of the production process' flexibility	19
5. increased effectiveness in utilizing a company's resources	14
6. increased quality of products	18
7. improved process of storage	10
8. increase in sales level	19
9. improvement in the occupational safety and health	10
10. decrease in negative impact on environment	15
11. superiority over competitors' actions/increase in a company's competitiveness	15
12. perceiving a company as competitive	10
13. decrease of product unit costs	11
14. decrease in the number of deficits and complaints	16
15. improved relations with customers and deliverers	16

Source: Own survey data.
Źródło: Badania własne.

17 respondents noticed that implementation of innovations resulted in rejuvenation of the product offer: new products replaced older ones which were subsequently removed from the market. As a result relations with recipients improved, the number of faults and faulty products decreased along with the number of complaints. Moreover, around 60% of respondents stated that introduction of innovations increased their competitiveness and effectiveness of utilizing resources and decreased their negative impact on natural environment.

In analyzed companies the innovative activity had quite a low impact upon them being perceived as competitive (10 companies) and also on cost reduction (only 10). The smallest number of enterprises (only 10) noticed an improvement in the storing up process.

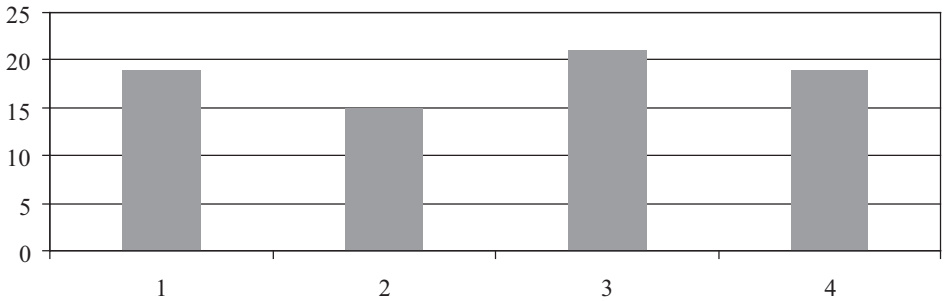
Obtained replies show that innovations bring many advantages and positively influence a company's business activity. What is most important, they increase the product diversification, the size of sale. They also improve product quality and enable exploration of new markets (higher scope for sale) as well as improve product flexibility. The effects of an innovative activity need to be kept balanced and in harmony. Similarly, keeping the balance between diversification of products, openness to new market segments and flexibility of production processes were all recommended by Sutcliffe, Sitkin and Browning [1999]. One can conclude that the leadership of the analyzed enterprises of food industry is fully aware how important innovations are. They bring profits and advantages in nearly every aspect of business activity – for products, processes and management. Thus, competitiveness increases. One of the most significant advantages is increase in product quality and subsequently more accurate fulfillment of customers' needs. This leads to an increased satisfaction and thus higher sales. However, only 11 companies noticed a positive impact of innovations on reducing costs of production. Such an opinion might stem from the fact that in the initial period of implementing innovations the costs are usually high and they influence this opinion.

QUALITY MANAGEMENT SYSTEMS AND INNOVATIONS IN FOOD SECTOR COMPANIES

Representatives of all analyzed companies replied that the implemented quality management systems facilitate the realization of an innovation strategy regarding products and technologies (19), distribution (12), sales of products (17) or organization (17). Majority believe that regulating many aspects of a company's organization required during implementation of management systems (i.e. process approach, process map, hazard analysis, descriptions of products, procedures, instructions, records, etc.) shortens the time needed for preparation and implementation of innovations.

Figure 1 shows spheres of companies' activity and the frequency with which quality management systems facilitated the initiation of innovations.

It is interesting that quality management systems activated activities aimed at reaching improvement in 21 out of 25 food sector companies. Such actions may lead to small incremental innovations which accumulate and thus improve product's quality. Nearly as important for companies, was to regulate communication and processes within the framework of organization and more efficient specification of responsibility (19 "yes"



1 – regulate communication and processes, 2 – improved their communication with other companies, 3 – reaching improvement 4 – more efficient specification of responsibility
1 – uporządkowanie komunikacji i procesów, 2 – poprawa komunikacji z innymi przedsiębiorstwami, 3 – określenie odpowiedzialności, 4 – działania doskonalące

Fig. 1. Spheres where quality management systems help to initiate innovations
Rys. 1. Sfery, w których system zarządzania jakością pomaga inicjować innowacje

Source: Own study.
Źródło: Badania własne.

answers). Regulating internal processes and structures carries a large potential for growth within the organizational activity. In turn around 60% of enterprises stated that a quality management system improved their communication with other companies. A more efficient communication with recipients and deliverers forms a potential source of innovations which aim at better fulfillment of contracting parties' expectations.

Systems of quality management quite efficiently prepare a company (in organizational terms) for implementing future innovations. Employees occupying production positions must possess knowledge regarding sources of faults and defects and must be able to differentiate between systematic and accidental mistakes. Such an approach required introduction of many organizational innovations regarding the control of production quality (statistical process control, Kazein, Six Sigma, QFD, good manufacturing and hygienic practice etc.) at production halls. Despite the fact that Deming's [1982] philosophy did not concentrate on product innovations or process innovations as such but rather on persistence and systematic pursuit of improving the quality management system it brought huge profits and altered awareness and strengthened the quality of social capital. It supports control of systems and processes in an enterprise by standardization of technologies and feedback [Douglas 2001]. According to other authors the "positive impact of a quality management system used upon innovativeness gets noticed by a company's key customers". In addition internal assessment revealed an improvement and better regulated actions and processes (including introduction of new ones), increase in quality of products, increase in work efficiency and reduction in the number of shortages and complaints. Within the above context one can come to conclusion that the introduction of quality management systems stimulates innovativeness mainly through the necessity to meet requirements of certain standards at the level of system implementation and later as a result of significant changes in company's functioning [Goszka, Bałdyga 2008]. Similar notions can be found in foreign literature on the subject [Martinez-Costa, Martinez-Lorente 2008, Mokhtar, Yusof 2010, Hung, Lien, Fang, McLean 2010].

COOPERATION OF ENTERPRISES

Cooperation of an enterprise regarding an innovative activity with its environment remains a weak point of most business entities. According to data obtained for the whole industrial food processing [Zalewski, Talaga 2011] most innovative companies do not declare any need for cooperation with other geographically close entities from the same sector or even those further away (horizontal cooperation). Such a behavior points to the fact that enterprises do not know and do not utilize the benefits stemming from business clusters [Skawińska, Zalewski 2009]. They assume (and this is proven in practice) that enterprises of similar production profile should cooperate locally in aid of development and innovativeness – and compete on the market at the same time. This increases the competitive advantage of a region. Similarly, most innovative companies from the industrial food processing sector (section D) regard cooperation with the scientific sector and R&D as of little importance [Zalewski, Talaga 2011]. The lack of cooperation between science and industry in today's era of knowledge based economy forms a serious developmental drawback.

Respondents from food sector enterprises who participated in the study manifest higher than average understanding of the above developmental determinants.

Almost half of the analyzed organizational units (12) declare cooperation with the science sector or with other companies from its environment for one of three reasons. Nine companies began cooperating with the science sector because they lacked their own knowledge or experience necessary to commercialize innovations. For eight companies the reason was to decrease the distance to competition or to reduce costs.

Seventeen companies do not cooperate with the closest business environment. Eight respondents stated that their enterprises undertook cooperation with other companies under pressure from deliverers and recipients in the value chain and six stated that they were looking for a business partner with special abilities or competences. Only at six companies the importance of those two reasons together was taken into consideration. In none of the companies they were looking for possibility for combining one's resources with those of another company or to reduce costs.

The above results prove that cooperation of companies with the science sector takes place only when a company does not possess its own knowledge or resources to reach a specific target. This also suggests that among the Greater Poland food sector enterprises in most cases the "closed" model of creating innovations takes place – meaning that they are designed and developed "secretly". Such a model of "closed" innovations in many economies or sectors in recent years has been replaced by an "open innovation" [Zalewski 2010] model, first described by Chesbrough [2003].

INNOVATIONS AND QUALITY MANAGEMENT SYSTEMS – CASE STUDY

A direct interview was conducted among the management representatives of food production companies of Greater Poland:

- dairy cooperative,
- bakery/confectionery cooperative,
- fruit-vegetable processing company.

The interview form was based on questions from the questionnaire. Among the aforementioned entities one company belongs to medium and two belong to large enterprises with long tradition. The fruit-vegetable company belongs to foreign capital while the remaining companies represent the national capital.

The dairy cooperative tops in the ranking of national dairy cooperatives every year. In January 2010 the company introduced a significant product innovation – the condensed milk with magnesium. Numerous prizes prove high quality of its products. "The plant is equipped with modern production lines to manufacture condensed milk both sweetened and non-sweetened in carton containers and cans, condensed non-sweetened light milk, flavored milk in tubes, UHT creams, UHT milk, butter, powdered granulated low-fat milk and a whole range o fresh products. Modern lines for aseptic confectioning of products allow for the use of carton containers of different size and carton containers in the form of multipacks"[2].

This enterprise remains active on local and national markets as well as in EU, EFTA, candidates to EU and also other countries. However, the national market remains the most significant for this company. Between 2008 and 2009 the state of employment in this company was around 500 employees.

The dairy cooperative has introduced the following quality management systems: HACCP (2000), ISO 9001 (1994) and BRC (2005). Among the most important positive changes resulting from the innovative activity was an improvement of product quality, improvement in product diversification, replacement of old products or processes with new ones, improvement of a production process' flexibility and also entry into new markets. Other positive changes which took place to a lesser extent than the above include the outstripping of competition's actions, improved relations with customers, decrease in the number of shortages and complaints, improvement in the storage process and decrease in negative environmental impact.

The company positively replied to a question regarding existence of a positive correlation between quality management systems and the innovative activity. Simultaneously the time of the innovations' commercialization has been shortened. Chairman of the creamery underlined that the quality management systems facilitated implementation of innovations in the field of products, distribution, sales and organization – a positive reply to all questions asked. He also noticed that proper functioning of the quality management system facilitates initiation of innovations because it enforces constant improvement of internal communication and communication with customers and deliverers, improvement in processes, organization, marketing and current definition of responsibility. Moreover, the response to complaints has been improved along with recording and analyzing data regarding quality of recertifying audits etc.

The company eagerly cooperates with the science sector (universities, external laboratories) due to the lack of its own R&D infrastructure.

Bakery/confectionery cooperative is a company specializing in bakery products, cakes and ice-creams. This enterprise takes lead among bread producers in Greater Poland and its tradition goes back over 100 years.

[2] Quotation from company's folder.

The analyzed entity mainly operates locally but also nationally and in different EU Member States. In 2008 and 2009 this company had over 320 employees. The company possesses the HACCP system implemented between 2003 and 2006.

Many positive changes stemming from the innovative activity were noticed. The most important include: improvement in product quality, entering new markets, replacement of old products or processes with the new ones and diversification of product offer. The innovative activity has also moderately influenced an improvement of the production process' flexibility, more effective utilization of own resources, decrease in shortages, complaints, improved relations with customers and deliverers. The company has decreased its negative impact on the natural environment by using more modern baking technologies and improving its waste management. Customers began to perceive this enterprise as innovative.

A positive correlation between the quality management systems and innovations has been noticed. It has been stated that the process of implementing innovations runs more smoothly regarding products, technologies and organization. It has also been noticed that at present it is easier to communicate with other enterprises from the same sector. It was very important for the company to set the extents of responsibility. The time needed for an innovation to get implemented was significantly shortened due to a greater role of improvement activities.

The analyzed subject cooperates with companies from its own sector and with the science sector thus manifesting its desire to keep or decrease its distance from competition and the need to cooperate with customers, recipients and deliverers.

Fruit-vegetable processing company specializes in manufacturing of tomatoes. Its activity fits in the sector of remaining food products (according to the Central Statistical Office – group and section D 15.8.). Apart from the aforementioned product groups this enterprise prepares dishes ready for consumption and this kind of production has been growing systematically. This company has been active for many years and is one of the leaders in its sector. Currently, the majority of this company's shares belong to a foreign investor. The analyzed company remains active on local and national markets as well as in EU Member States and EFTA countries. In 2008–2009 the company employed around 440 people.

This enterprise possesses the following management systems: HACCP, ISO 9001, ISO 14001, ISO 18001, and also the BRC. The first quality system was implemented between 1999 and 2002, which points to understanding the role of quality and safety in the production and distribution process.

A representative from the board of directors believes that an innovative activity carries an enormously positive impact for the whole company. Once again the role of innovation has been underlined regarding product quality, consumers' satisfaction, manufacturing new products for the sake of diversification and replacement of the old ones. As one of a few this company managed to lower its production unit costs. This may result from its technological advancement, innovativeness, large scale of manufacturing, good cooperation with growers – deliverers of raw materials and proximity of raw material source.

The company's management has noticed a positive correlation between quality management systems and innovations. It has been stated that thanks to such systems the time needed to implement innovations becomes shorter. Moreover, they have realized that such systems have positively influenced the strategy of innovations (facilitating and ac-

celerating implementation of innovations regarding products, technologies, sale, distribution and alike). They have understood that regulating processes, improvement activities, better communication with external organizational units (reached due to quality systems) intensify invention which is the beginning of any innovation.

The company does not cooperate with national scientific units or any other companies from its sector. It only utilizes internal resources of its group of companies in the process of implementing innovations.

CONCLUSIONS

All analyzed enterprises carry out an innovative activity and have implemented at least one quality control system. An innovative activity positively influences their functioning. It contributes to greater diversification and quality of products, increase in sales and entering new markets, and increased flexibility of production processes.

Quality management systems help to shorten the time necessary for development and implementation of innovations mainly by regulating processes, implementing improvement measures and drawing up responsibility.

Half of the analyzed enterprises cooperate with the science sector or other enterprises. Such cooperation is mainly triggered by the lack of their own technical knowledge and no research infrastructure, deficit of experience, incomplete knowledge of market needs and customers.

Another reason for taking up innovative activity was to keep or decrease the distance from competition and to increase profits.

The above conclusions prove the positive correlations between the innovative activity and the quality management systems.

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Streszczenie. Celem niniejszego artykułu jest ocena wpływu systemów zarządzania jakością na innowacyjność przedsiębiorstw przetwórstwa żywności w Wielkopolsce w latach 2009/2010 na podstawie przeprowadzonych badań ankietowych w 25 firmach i 3 bezpośrednich wywiadów wśród menedżerów. Wszystkie analizowane przedsiębiorstwa wdrożyły co najmniej jeden system zarządzania jakością i prowadzą działalność innowacyjną, która ma pozytywny wpływ na ich funkcjonowanie. Przejawia się on w zwiększeniu różnorodności i polepszeniu jakości wyrobów, we wzroście poziomu sprzedaży, w ułatwieniu wejścia na nowe rynki oraz zwiększeniu elastyczności procesów produkcji. Systemy zarządzania jakością pomagają skrócić czas opracowania i wdrażania innowacji, głównie przez uporządkowanie i doskonalenie procesów oraz określenie odpowiedzialności. Połowa ankietowanych przedsiębiorstw współpracuje z sektorem nauki lub przedsiębiorstwami o podobnym profilu działalności. Ta kooperacja wynika przede wszystkim z braku wystarczającej wiedzy technicznej i infrastruktury badawczej, niedostatku doświadczenia, niepełnej znajomości potrzeb rynku i klientów. Powodem podejmowania działalności innowacyjnej była również chęć utrzymania lub zmniejszenia dystansu do konkurencji i zwiększenia zysku. Przedstawione wnioski potwierdzają dodatni wpływ systemów zarządzania jakością i aktywnością innowacyjną.

Słowa kluczowe: produkcja żywności, innowacje, aktywność innowacyjna, Wielkopolska

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