

## DIFFICULTIES DURING THE IMPLEMENTATION OF THE HACCP SYSTEM PRIOR TO AND AFTER POLAND'S ACCESSION TO THE EUROPEAN UNION

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Difficulties during HACCP implementation in small and medium enterprises, on the basis of Poland accession to European Union were analysed in the paper.

Only 26% of enterprises before the accession and 40% after the accession had implemented HACCP, whereas 55% of enterprises before the accession and 44% after the accession were still in the process of implementation.

Difficulties which may affect HACCP implementation like financial outlays, modernization, incomprehension of idea and quantity/quality barrier were identified.

### INTRODUCTION

At the beginning of the 1990-ties, Polish food manufacturing plants faced the task of changing their food quality control. In mid-nineties in view of Poland's preparations for the accession to the European Union it became clear that food manufacturing establishments would have to implement obligatory food quality assuring systems, *i.e.* GMP/GHP (Good Manufacturing Practice and Good Hygienic Practice) as well as the HACCP (Hazard Analysis and Critical Control Point) system. Regrettably, in the years preceding the accession the legislation process in this respect was very slow. The Act of 11<sup>th</sup> May 2001 on food and nutrition health conditions imposed the obligation of implementing the HACCP system solely on large food manufacturing plants. It was not until the amendments in the Act were introduced that the obligation was expanded and embraced medium-size and small size plants; the requirement, though, was not formulated explicitly enough as it could be construed as „being in the process of implementation” instead of „being implemented”.

For this reason on the date of Poland's accession to the EU, many a Polish food manufacturer was at the initial stage of the HACCP system implementation process or even at its planning stage.

This paper has been aimed at evaluating the impact of Poland's accession to the European Union on Polish food manufacturers' approach towards the assurance of food safety through the implementation of adequate methods and systems. The following partial targets were formulated: (1) evaluation of the state and degree of the HACCP system and of GMP/GHP principles implementation in small and medium size manufacturing enterprises prior to and after Po-

land's accession to the European Union; (2) the impact of various factors on the state and degree of the HACCP system implementation; and (3) an analysis of problems accompanying the implementation of the HACCP system in the manufacturing plants under examination.

### MATERIAL AND METHODS

The object of the research were food industry manufacturing plants of all branches localized all over Poland, of small (0 – 49 workers) and medium (50 – 249 workers) sizes.

The research was conducted in the period directly preceding Poland's accession to the EU (January – April 2004) and one year after Poland's integration with the EU (January – April 2005). Two research methods were used: telephone interview and postal questionnaire. The research embraced 500 food manufacturing plants (250 small ones, and 250 medium size ones) prior to accession, and the same amount following the accession.

Statistical calculations were performed making use of the Statistica 6.0 PL software package. For a verification of hypotheses on variables independence, a non-parametric  $\chi^2$  test was applied. Additionally, by way of determining the strength of the relationship between the variables, the  $\phi$ -Yule coefficient was calculated, thus defining the strength of interdependences between qualitative features.

For the manufacturing plants agglomeration based on the criterion connected with specific benefits reached by the establishments after the HACCP system implementation, multidimensional agglomeration analysis was applied. Establishments which were qualified to the same agglomeration represented a similar attitude towards difficulties accompanying the implementation of

the HACCP system being at the same time entirely different from establishments qualified to the other agglomerations.

Due to a large quantity of branches embraced by the study, prior to the initiation of agglomeration analysis, the manufacturing plants under research were divided into groups with uniform characteristics appropriate for the adopted division criteria. The division criteria were enterprise size and production profile – of animal, plant and other origin. Six groups subjected to agglomeration were formed: (1) Small size enterprises manufacturing products of plant origin; (2) Small size enterprises manufacturing products of animal origin; (3) Other small size enterprises; (4) Medium size enterprises manufacturing products of plant origin; (5) Medium size enterprises manufacturing products of animal origin; and (6) Other medium size enterprises.

Table 1 shows the branches and the number of establishments representing individual branch groups. Other small size establishments constituted the least numerous group, since small plants operating in oil, potato and sugar branches were not identified. On this account, the group was represented exclusively by frozen food processing plants.

## RESULTS AND DISCUSSION

From data found on the subject in the literature it results that prior to Poland's accession the HACCP system in small and medium size food manufacturing plants was implemented to a small degree and amounted to less than 20% [Konecka-Matyjek *et al.*, 2005]. The results of our own research confirmed these findings and proved that prior to the accession the HACCP system was applied only in *ca.* 18% of small and medium size food manufacturing plants (in accordance with data obtained from telephone interviews and about 26% – on those obtained from postal questionnaires). The divergences in the results obtained can be accounted for by a few months' time lapse between the application of both research methods, *i.e.* the telephone interview and written questionnaire.

TABLE 1. Sizes of enterprises groups under study, for which calculations were made with the use of agglomeration analysis method.

Branches	Small Size Companies		Medium Size Companies	
	N	%	N	%
Enterprises manufacturing products of plant origin (small and medium size) Establishments operating in the following manufacturing/processing branches: fruits and vegetables, baked goods, grain-milling, food components, beverages and stimulants	125	25.0	100	20.0
Enterprises manufacturing products of animal origin (small and medium size) Establishments operating in the following manufacturing/processing branches: poultry, dairy, fish, meat	100	20.0	78	15.6
Other enterprises (small size and medium size) Establishments operating in the following manufacturing/processing branches: oils, sugar, potatoes, food refrigeration/freezing	25	5.0	72	14.4

After the accession a significant increase was recorded in the percentage of establishments which had implemented the HACCP system. Almost 33% of establishments pursuant to the telephone interview method results and *ca.* 40% of establishments according to the postal questionnaire method assured food safety based on the HACCP system. In spite of this, however, the HACCP system implementation level in European Union countries differed substantially from that attained in Poland.

Panisello *et al.* [1999], on the basis of a survey of the food industry conducted in 1998 in the Yorkshire and Humberside counties in Great Britain found that 72.6% out of food manufacturing establishments had the HACCP system implemented, 15% were in the process of implementation and 12.6% did not have the system implemented.

Other data concerning the HACCP system implementation level in Great Britain for 2001 were presented by the Food Standard Agency. In accordance to those compilations, the system was implemented and documented in *ca.* 20% of food companies, including 59% of food manufacturing plants, 16% of food trading establishments, 19% of restaurants and catering companies [Przegalińska, 2003].

The results obtained in the course of the authors' own research were comparable with data of the Food Standard Agency concerning the implementation level in Great Britain, whereas they considerably differed from those presented by Panisello *et al.* [1999]. Such a great difference could be accounted for by the territorial range of the research. Panisello *et al.* [1999] conducted their research in solely two counties which may represent a high level of development and industrialization, while the authors' own research and that of the Food Standard Agency concerned a whole country (Poland and Great Britain, respectively).

On the basis of research conducted among 300 food industry establishments in Germany in April 2003 it was found that *ca.* 83% of the establishments under study [Beyer & Krieger, 2004] had the HACCP system implemented. However, the German results should be looked at with criticism, since the studied sample in majority represented large size establishments (*ca.* 60%) and did not comprise a uniform share of establishments of different sizes.

According to Rothkaehl [2004], the fact that the HACCP system implementation level in food establishments in Poland is substantially lower than that in the EU-15 countries is connected with a different economic situation in our country. In the Author's opinion, this results from the fact that after World War II eight of the ten new member countries (including Poland) passed along difficult economic development paths, different from those of the EU-15 countries, and had to radically transform their economies. This accounts for the fact why there are certain shortcomings in technical and sanitary standards in those countries.

During their research, the Authors studied the influence of different determinants on the HACCP system implementation level in Poland.

On the basis of the calculated  $\chi^2$  value, it was found out that the factors affecting the HACCP system implementation both prior to and after Poland's accession, were, *i.a.* the enterprise size, the fact whether GMP/GHP principles were implemented or not, employees' training, the knowledge on

the amended Act of 30.10.2003 on food and nutrition health conditions and the knowledge of possibilities of being granted additional funding for the system implementation work.

Subject publications often claim that the success of the HACCP system depends on the adequate training of the manufacturing floor staff and management personnel [Vela & Fernández, 2003; Taylor, 2001], and without a high level of training courses it is impossible to attain the required from workers' awareness and commitment levels [Ziajka *et al.*, 2001]. This found confirmation in the Authors' research which proved a considerable impact of employees' training level on the HACCP system implementation level both prior to and after Poland's accession.

Once the data were analysed, it was found that there were many more enterprises which trained their staff and had the HACCP system implemented (*ca.* 53% before the accession and *ca.* 60% after it) than those which failed to train their employees but had the HACCP system implemented (only *ca.* 5% before the accession and *ca.* 21% after it). Besides it was shown that prior to and after the accession, among the establishments under study, there were more medium size than small size enterprises which had the HACCP system implemented.

Owing to a low level of the HACCP system implementation in Polish small and medium size food manufacturing plants, it appeared legitimate to analyse difficulties that blocked the system implementation in those establishments. The difficulties to be analyzed were divided into two categories, economic difficulties and those connected with personnel composition and with essential facts concerning the problem.

Both before and after the accession the most important economic problem was the necessity of modernizing the establishments aimed at their adjustment to sanitary and hygiene requirements (*ca.* 71%) and the need to incur financial outlays connected with the HACCP system implementation (*ca.* 74%). The remaining difficulties in this category include amendments in food-related legislation (*ca.* 45% before and after the accession), lack of access to information (*ca.* 30% before and *ca.* 20% after the accession), or pressure on the part of recipients (*ca.* 25% before and after the accession), (Figure 1).

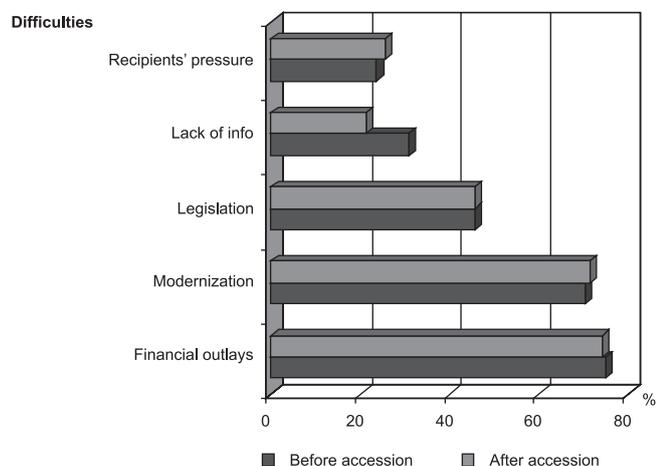


FIGURE 1. Economic difficulties during the implementation of the HACCP system before and after Poland's accession to the EU. Source: own studies

Among difficulties connected with personnel composition and with essential facts concerning the problem, respondents indicated, as those encountered the most frequently, both before and after the accession, the lack of comprehension by employees of the system's idea (*ca.* 67% before and *ca.* 61% after the accession), and a quantity/quality barrier noted among manufacturing floor workers (*ca.* 51% before and after the accession), insufficient number of competent people in the establishment (*ca.* 36% before and *ca.* 41% after the accession), and difficulties in establishing CCP and CP (*ca.* 30% before and after the accession), (Figure 2).

On the basis of an analysis of the results obtained it was shown that Poland's accession to the European Union did not substantially influence the elimination of difficulties accompanying the implementation of the HACCP system despite a substantial improvement in the HACCP system implementation level in Polish food manufacturing plants after the accession as compared with the pre-accession period.

After being divided into 6 groups according to their sizes and production profiles, the establishments under study were characterized by means of multidimensional agglomeration analysis in terms of difficulties accompanying the implementation of the HACCP system. Agglomeration of the establishments enabled singling out of those establishments which were the most similar to one another in terms of difficulties encountered during the implementation of the HACCP system and at the same time differing from establishments ranked in the other agglomerations.

With respect to opinions concerning economic difficulties, 4 agglomerations before and 5 agglomerations after the accession, differing in opinions on these difficulties, were singled out. The number and characteristic of groups formed were compiled in Tables 2 and 3.

The majority of enterprises under study indicated financial outlays before and after Poland's accession to the European Union (Figure 1) as a substantial difficulty in the implementation of the HACCP system. In this respect particular attention should be given to the group of other small size enterprises constituting a separate agglomeration both before and after the accession. After the Accession these enterprises

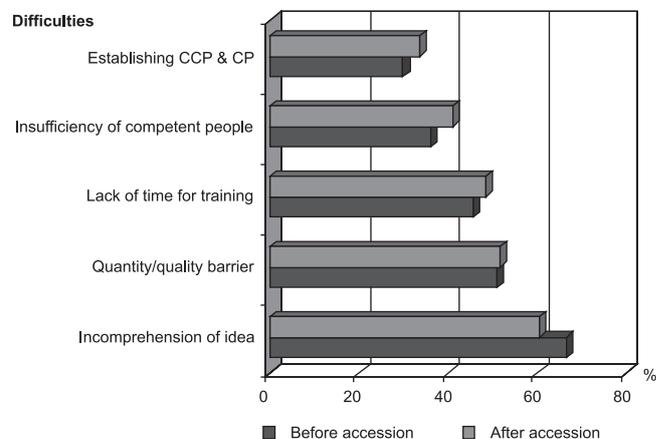


FIGURE 2. Difficulties with personnel composition and with essential facts concerning the problem during the implementation of the HACCP system before and after Poland's accession to the EU. Source: own studies

TABLE 2. Agglomerations characteristics – a group of enterprises under study with respect to their opinions of economic difficulties prior to the accession.

Agglomeration No.	Group of Enterprises	Group Characteristic	
		The highest percentage of indications of difficulties	The lowest percentage of indications of difficulties
1	Small size enterprises of products of plant and animal origin	No information available Medium size enterprises	-*
2	Other small size enterprises	Recipients' pressure Financial outlays	-*
3	Medium size enterprises of products of plant and animal origin	-*	Recipients' pressure
4	Other medium size enterprises	-*	Legislation Lack of information Modernization

\* a difficulty characterized by the highest/lowest percentage of indications was not identified

TABLE 3. Agglomerations characteristics – a group of enterprises under study with respect to their opinions of economic difficulties after the accession.

Agglomeration No.	Group of Enterprises	Group Characteristic	
		The highest percentage of indications of difficulties	The lowest percentage of indications of difficulties
1	Small size enterprises of products of plant origin	Medium size establishments	-*
2	Other small size enterprises	Legislation	Financial outlays
3	Small size enterprises of products of animal origin and medium size establishments of products of plant origin	Financial outlays	-*
4	Medium size enterprises of products of animal origin	Modernization	No information available Recipients' pressure
5	Other medium size enterprises	Recipients' pressure	Legislation No information available Modernization

\* a difficulty characterized by the highest/lowest percentage of indications was not identified

were characterized by the lowest percentage of indication of financial outlays as an obstacle in the implementation of the HACCP system, as opposed to the period from before the accession when the percentage of this indication was the

highest. That was probably accounted for by earlier actions taken by these enterprises towards the implementation of the HACCP system due to the specificity of this branch of industry. An increasing interest in frozen products as well as large supermarket chains forcing the application of the system caused the engagement of financial outlays at an earlier period than the accession date [Imbs, 1998; Górska-Warsewicz, 2006; Morkis, 2005].

Difficulties related to the modernization of enterprises were frequently indicated by all the enterprises groups under analysis (Figure 1), especially after the accession, by medium size establishments manufacturing products of animal origin. These results find confirmation in compilations of SAPARD or SPO programme subventions which were primarily taken advantage of by animal branch enterprises (meat, dairy, poultry, fish), and to a lesser degree, by plant branch enterprises (fruits and vegetables) [Wigier, 2006; Nitecka, 2006]. Pursuant to data of Urban *et al.* (2002) the meat, poultry and dairy sectors as early as in 2000-2002 showed the highest investment activity.

An important problem in the economic category was the variability of food-related legislation as indicated by almost half of the respondent enterprises both before and after the accession (Figure 1). That resulted from imperfection and variability of Polish food-related law. Regulations in force in other countries, particularly Western European, the USA and the former European Economic Community regulated food production conditions in a precise way in uniform acts and collections of legal provisions, whereas domestic regulations were largely scattered [Tyszkiewicz, 1992].

It arises from a study by the National Chamber of Commerce that even in 2006, the majority of small and medium size companies from all the business sectors in Poland declared difficulties connected with a low quality of the law and unstable legal system [KIG, 2006].

Before and after the accession, other medium size enterprises, among which dominated sugar factories, oil mills, and potato plants (Table 1) had the least amount of problems with the variability of Polish food-related legislation. It may have a relation with a high level of expertise of technological specialists working *e.g.* in the sugar industry [Szajner, 2006]. After the accession, small size enterprises reported the largest number of problems.

According to Sikora [2003], a source of frequent mistakes and misunderstandings connected with food-related legislation was an erroneous translation of the text of the Food Codex Alimentarius. Kitzmann [2005] acknowledged that too emphasizing that part of the documents was erroneously translated into the Polish language by the European Integration Committee, and the errors were serious enough as to change their meaning from time to time.

The other category of problems accompanying the HACCP system implementation were those connected with personnel composition and with essential facts concerning the problem. With respect to these problems before the accession 3 and after the accession 2 enterprises agglomerations were singled out which indicated problems of this category differently than the others. The number and characteristics of these formed groups of establishments were compiled in Tables 4 and 5.

TABLE 4. A characteristic of agglomerations – groups of enterprises studied in their aspect of difficulties connected with personnel composition and with essential facts concerning the problem prior to the accession.

Agglomeration No.	Group of Enterprises	Group Characteristic	
		The highest percentage of indications of difficulties	The lowest percentage of indications of difficulties
1	Small size enterprises of products of plant and animal origin	-*	-*
2	Other small size enterprises	Incomprehension by employees of the HACCP system idea Insufficient number of competent people Lack of time for training Establishing CCP and CP A quantity/quality barrier	-*
3	Medium size enterprises of products of plant and animal origin and others	-*	Insufficient number of competent people Establishing CCP and CP

\* a difficulty characterized by the highest/lowest percentage of indications was not identified

TABLE 5. A characteristic of agglomerations – groups of enterprises studied in their aspect of difficulties connected with personnel composition and with essential facts concerning the problem after the accession.

Agglomeration No.	Group of Enterprises	Group Characteristic	
		The highest percentage of indications of difficulties	The lowest percentage of indications of difficulties
1	Small size enterprises of products of plant and animal origin and others	Insufficient number of competent people	-*
2	Medium size enterprises of products of plant and animal origin and others	-*	Insufficient number of competent people

\* a difficulty characterized by the highest/lowest percentage of indications was not identified

Based on the criterion concerning an opinion on difficulties connected with personnel composition and with essential facts concerning the problem, both before and after the accession a considerably lower number of agglomerations – establishment groups was singled out than it was the case with economic difficulties which can prove that there are greater similarities with regard to these difficulties among the enterprises under study.

An important group among the difficulties connected with personnel composition and with essential facts concerning the problem was lack of comprehension of the HACCP system idea by employees (Figure 2). Although, following the accession, more employees were trained in the scope of the HACCP system it can be stated that a year after Poland's integration with the European Union questions regarding the HACCP system were still incomprehensible for employees in Polish small and medium size enterprises.

Similar problems concerning the absence of training and competent people in enterprises were pointed out by Kafel & Sikora [2004] in domestic research concerning barriers in the implementation of quality assurance systems. Percentage coefficients regarding barriers under discussion were lower, though, which may arise from the fact that enterprises implementing quality assurance systems conduct training courses with a higher frequency as it arises from principles of the quality standards to be implemented.

Besides, the problems may be caused by employees' fear of changes in their enterprises, which was indicated by Kafel & Sikora [2004].

## CONCLUSIONS AND STATEMENTS

1. Prior to Poland's accession to and one year after its integration with the European Union the level of the HACCP system implementation in Polish food industry enterprises was considerably lower than in other European Union countries.

2. Polish enterprises implementing the HACCP system indicated a number of difficulties of economic nature and difficulties connected with personnel composition and with essential facts concerning the problem, both in the period preceding and following the accession. Among the most important difficulties were: the necessity of incurring financial outlays, lack of access to information and the necessity of modernizing their establishments indicated mainly by small size food companies.

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## **TRUDNOŚCI PODCZAS WDRAŻANIA SYSTEMU HACCP PRZED I PO AKCESJI POLSKI DO UNII EUROPEJSKIEJ**

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W pracy dokonano analizy trudności towarzyszących implementacji systemu HACCP w polskich małych i średnich zakładach produkcyjnych przed i po akcesji Polski do Unii Europejskiej.

Tylko 26% zakładów przed akcesją i 40% po akcesji wdrożyło system HACCP, natomiast 55% zakładów przed akcesją i 44% po akcesji było w trakcie wdrażania systemu HACCP.

Zidentyfikowano bariery wdrażania systemu HACCP jak konieczność ponoszenia nakładów finansowych, modernizacja zakładu, niezrozumienie idei systemu HACCP oraz bariera ilość jakość.