

Boczkowska, Katarzyna; Niziołek, Konrad

## Article

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# The determinants of management systems implementation – study results

**Katarzyna BOCZKOWSKA**

**Konrad NIZIOŁEK**

**Faculty of Production Management and Logistics, Lodz University of Technology,  
Poland**

**Abstract:** In recent years the slowdown in the field of management system certification has been observed. There is a need to try and identify the causes of this phenomenon and the use of exploratory factor analysis may prove a very useful tool. The aim of the article is to identify the factors determining the decision to implement management system(s) in accordance with the requirements of the ISO 9001, ISO 14001 and OHSAS/PN-N 18001 standards, related barriers and the effects of the system(s) implementation. Based on the survey carried out on 36 companies with the use of CAWI technique, a construct with distinguished scales for the reasons, barriers and benefits of implemented management systems was developed. The selected groups of factors allow identifying the problems more precisely. For example, 3 latent variables determined for the barriers highlighted the problems of implementing the systems connected with the documentation development, the attitudes of management and employees and system documentation implementation or combining it with the one currently existing in the organization. The presented study is an introduction to further extended research.

**Keywords:** *ISO 9001, ISO 14001, OHSAS 18001, integrated management systems*

**JEL codes:** *L15 L23, M11*

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## 1. Introduction

Gaining competitive advantage in the market operating in a turbulent environment and increasing globalisation has become a challenge to both strong players and the sector of small and medium-

sized enterprises. In addition to the implementation of technological and product innovations, we also observe the development in management concepts and methods. Standardisation, covering widely understood products and services quality management, natural environment and work environment, has become one widely used management tool. The application of standardised management systems has inspired numerous researchers, especially in the areas of their costs, benefits and improvements (Lunarski 2008; Urbaniak 2006; Skrzypek 2007; Kjellén 1997) also in knowledge-based organizations (Ejdys 2011). The key issue of standardised management systems is to establish the necessary minimum set of requirements, the compliance with which should ensure the achievement of planned results (Łańcucki 2010). The most commonly used management systems include quality management system, environment management system, occupational health and safety management system.

The aim of a quality management system is to streamline all organization's resources to meet the client's (internal and external) requirements. The use of the system, as described in international standard ISO 9001, with its Polish equivalent PN-EN ISO 9001, may be a good way to accomplish that.

The environment management system aims to implement and achieve the company's environmental goals with the use of certain instruments and management principles. General elements of the environment management system are described in the international standard ISO 14001, with its Polish equivalent PN-EN ISO 14001.

Occupational health and safety management system puts the employee in the centre of interest and aims to ensure an acceptable level of the health and life protection against work environment hazards. For many years International Organization for Standardization did not make an effort to develop an ISO standard in the area of OHS. The standard OHSAS 18001 introduced by British Standard Institution has set the guidelines to implement and improve occupational health and safety management systems. The Polish equivalent of this standard is PN-N 18001 standard. As late as in 2018 an ISO 45001 standard was developed, and it has become a breakthrough in the attitude to the issues of occupational health and safety. The Polish equivalent to the standard has not been introduced yet.

The integration of the three above-mentioned systems is at the micro-level incorporated in the concept of sustainable development which indicates three factors: economic, ecological and social as those which define the future organization's development (Borella 2017; Nunhes 2016)

and the complexity of the systems' integration process often poses the biggest challenge (Nunhes 2017, 2018).

## **2. Certified management systems in numbers**

The data about the volume of management systems certification have been obtained from the International Organization for Standardization (ISO Survey 2017). The survey provides the information about the number of certificates issued by control bodies accredited by the members of International Accreditation Forum (IAF).

There is no data available on the number of OHS certificates issued around the world since there was no ISO standard published until 2018. In 2005, the number of certificates confirming compliance with the requirements of the OHSAS 18001 standard was estimated at 15,000, and these systems were implemented in entities operating in 82 countries. It is assumed that the annual increase in the number of issued certificates is 30-40%, and in 2009 the number of certificates amounted to 50,000 (Podgórski 2010).

The ISO data show that over the period of 25 years (1993-2017) the number of certified systems increased several dozen times. However, the dynamics of these changes varied over the time. In the case of quality management systems (ISO 9001) the limit of one million entities which implemented the system was first exceeded in 2009 (see Fig. 1). The best result was recorded in 2016 when, according to ISO data, 105 937 certified quality management systems were implemented. The number of implemented systems based on environmental standard ISO 14001 over the period from 1999 to 2017 rose 26-fold from 13 994 to 362 610.

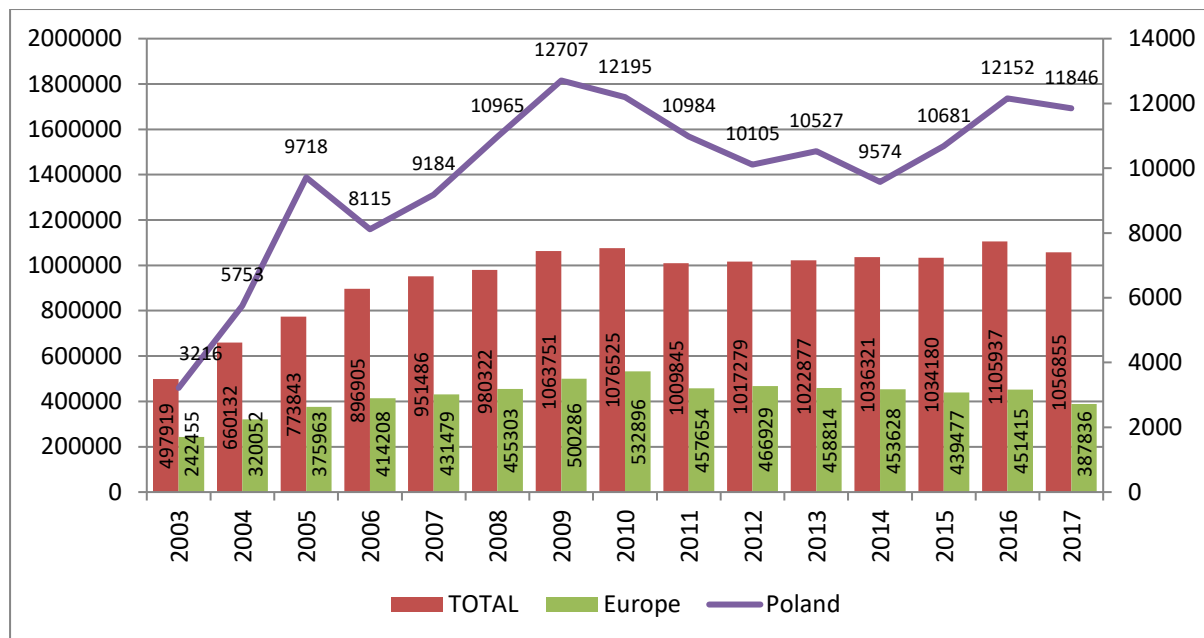
In Poland, the increase in certification was also spectacular, starting from the first ISO 9001 certificate issued in 1993 to 12 707 certificates in 2009. In the case of systems based on ISO 14001, in 1999 only 72 Polish companies were certified, whereas in 2016, there were 3 184 with the certificate (see Fig. 2).

When analysing the pace of changes in ISO 9001 systems certification (Fig. 1) it should be noted that after a period of its gradual growth in the world, in Europe and in Poland, since 2010 there has been a downward trend in the certified systems in Europe and Poland. The persistent global interest in the certified systems is mainly maintained thanks to the rising number of certifications in Asian countries. Poland and Europe after the growth in 2016 caused by the issuance

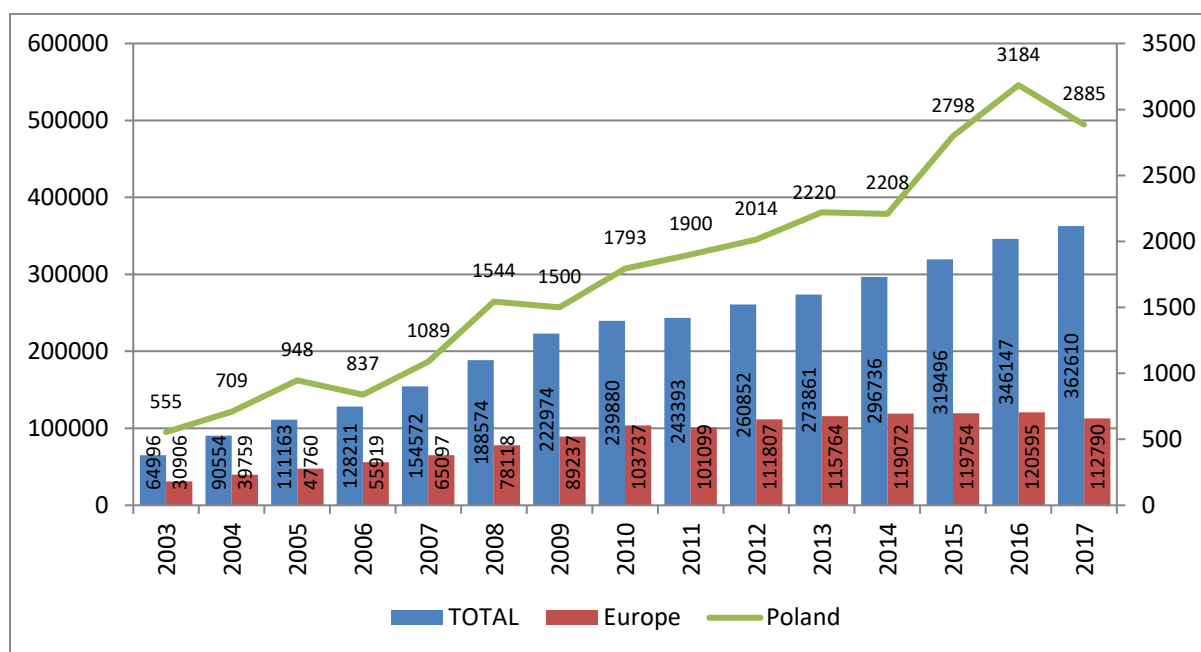
by the International Organization for Standardization of the new ISO 9001: 2015 standard (PN-EN ISO 9001), recorded a decrease in 2017.

In the case of environmental management systems, the dynamics of changes (Fig. 2) seems to be more optimistic for the world, whereas Europe and Poland have seen a significant slowdown or even a slight drop in the number of certified systems in the last three years.

**Figure 1. The number of certified ISO 9001 systems in the years 2003-2017**



Source: Author's own elaboration based on <https://isotc.iso.org>

**Figure 2. The number of certified ISO 14001 systems in the years 2003-2017**

Source: Author's own elaboration based on <https://isotc.iso.org>

The main reasons for the decline in the number of companies which implemented quality management systems in Poland include (Sadkowski 2017; Kalso 2012):

- the lack of immediate effects which should guarantee the company's success, the conviction of the implementation futility,
- caution in expenditures and investments as a result of global economic crisis and uncertainty in the Euro zone,
- the termination of EU-funded programmes for implementation and certification of the quality management systems (the possibility to acquire a certificate at 50% of its actual value),
- the possibility to use quality tools and meet ISO 9001 requirements by the organization without the need to acquire the certificate,
- cost reduction in companies is achieved by withdrawing from non-compulsory activities,
- a growing awareness of entrepreneurs that simply owning a certificate does not guarantee market success,
- the interest in other ISO standards (ISO 14001, OHSAS 18001, ISO 27001, ISO 22000, ISO 13485) or implementing other specialist standards (e.g. standard EN 15224:2012 for

the hospitals and medical practices) which are better adjusted to fulfil the company's needs and providing tangible benefits, e.g. following legal requirements or launching products in compliance with law,

- emerging eastern markets – industrial development in Eastern countries has contributed to closure or dividing European factories into smaller ones which cannot afford to pay for the implementation,
- increased in the number of consultants and auditors – subsidized and co-financed workshops, new study programmes at universities, numerous ISO 9001 implementations and rising unemployment “produced” a number of consultants and auditors whose theoretical knowledge and short occupational record do not go hand in hand with quality.

Substantial fluctuation of the implemented management systems observed in Poland in relation to Europe and the world is confirmed by statistical distribution analysis. The hypothesis about the distribution conformity of certified ISO 9001 systems in Poland with the distributions in Europe and the world in the years 2003-2017 was verified with the use of non-parametric test  $\chi^2$ . The obtained high values of  $\chi^2$  statistics at 14 degrees of freedom set in the area of rejecting the hypothesis about the distribution conformity, prove that the distribution of implemented ISO 9001 systems in Poland is statistically significantly different from the distributions in Europe and in the world. In the case of ISO 14001, the result of the  $\chi^2$  test did not allow accepting the hypothesis about the distributions conformity, therefore, also in the case of implementation of certified environmental management systems, Polish enterprises behave differently from those in Europe and in the world.

**It seems reasonable to examine the determinants that decide on the implementation of the system, as well as the barriers faced by Polish entrepreneurs.** These problems became the basis for the research hypotheses formulation

*H1: There is a set of factors determining the decision to implement management systems based on ISO standards in organizations.*

*H2: There is a set of barriers accompanying the implementation of ISO-based management systems.*

*H3: The implementation of ISO-based management system(s) generates tangible benefits for the organization.*

### 3. Methodology

Verification of the hypotheses was preceded by an analysis of the research results using descriptive statistics tools – classical and positional measures.

In order to verify the hypotheses exploratory factor analysis (EFA) was used.

Due to the specificity of the aspects examined, thus the limited number of entities that could participate in the study (at least one management system implemented), the selection of sample size and number of variables was an important aspect of the factor analysis carried out.

Representatives of a very cautious approach generally indicate the sample size should be 4-5 times bigger in relation to the number of variables covered by the analysis. Others indicate a minimum of 50 observations, or that the number of observations should be greater by 51 than the number of variables. However, there is a group of researchers that find the 2:1 ratio satisfactory (Górniak 1998).

At the beginning of the research process, companies were selected from generally available company databases, websites and based on own contacts - convenience sampling. The study included solely production companies. The questionnaire was sent to 80 entities, 36 of which returned a fully completed questionnaire (return factor 45%).

Due to the subject scope of research on the implementation of standards, the CAWI (Computer-Assisted Web Interview) method was used in the research. The survey was prepared based on sector literature and expert consultations with long-term auditors and people implementing systems in organizations.

The substantive part of the questionnaire consisted of 3 blocks of questions:

Block 1 – 14 variables defining factors determining the decision to implement the system(s),

Block 2 – 11 barriers/difficulties that the organization sees when implementing the system(s),

Block 3 – 17 variables describing the benefits identified by the entity as a result of the system(s) implementation.

Respondents were requested to answer every question by attributing the rank on the five-point scale 1 – insignificant/very small, 2 - small, 3 - average, 4 - high, 5 - very high.

The persons completing the questionnaires were company representatives responsible for implementing management systems, people dealing with the systems in the company, managers of OHS and/or environment and/or quality departments.



In the last question of the questionnaire, the respondents assessed the level of the expectations' fulfilment related to the system(s) implementation using the 5-point Likert scale where, 1 - definitely negative, 2- rather negative, 3 - hard to say, 4 - rather positive, 5 - definitely positive.

Factor analysis was performed with the use of Statistica-StatSoft.

#### 4. Results

General information about the surveyed entities, included in the introductory section of the questionnaire, is synthetically presented in Table 1. The largest group of respondents were medium-sized companies (38.9%), the smallest group was micro-entrepreneurs (8.3%).

**Table 1. The research group characteristics**

	<b>N=36</b>	<b>% in group</b>
<b>Company size</b>		
<10 people	3	8.3%
10-50 people	10	27.8%
50-250 people	14	38.9%
>250 people	9	25.0%
<b>Implemented management systems</b>		
PN-N/OHSAS 18001	2	5.6%
ISO 14001	1	2.8%
ISO 9001	11	30.6%
PN-N/OHSAS 18001 and ISO 9001	5	13.9%
PN-N/OHSAS 18001 and ISO 14001	2	5.6%
PN-N/OHSAS 18001 and ISO 9001 and ISO 14001	14	38.9%
ISO 9001 and ISO 14001	1	2.8%
<b>System(s) operation time</b>		
up to 1 year	6	16.7%
1-2 years	3	8.3%
3-4 years	11	30.6%
5-6 years	6	16.7%
>6 years	10	27.8%

Source: Author's own elaboration based on (Gorzałek 2018)

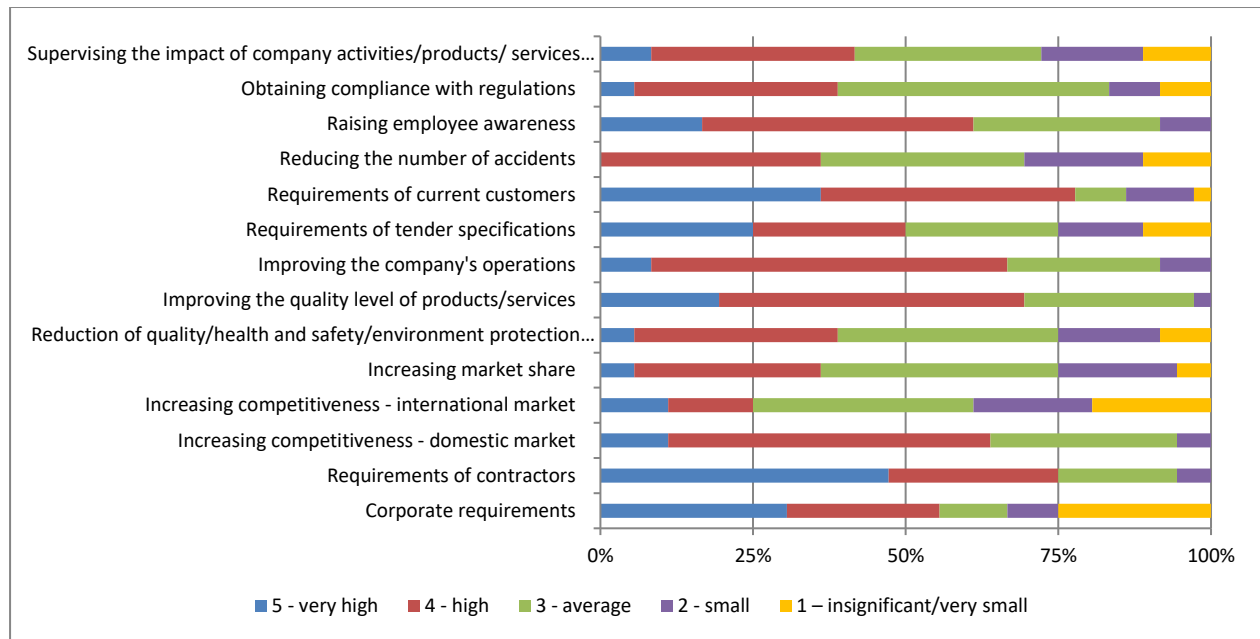
Out of the surveyed companies, nearly 40% were companies that implemented only one management system (n = 14), 8 entities declared having two systems (22.3%), the remaining group (n = 4, 38.9%) had an integrated system covering both quality and environment as well as health and safety.

The most popular system among the respondents was the ISO 9001, which was implemented in 31 enterprises (86.1%), next followed the health and safety system (n = 23, 63.9%), and the system compliant with ISO 14001 was the least popular (n = 18; 50 %).

In the surveyed group,  $\frac{3}{4}$  respondents (n = 27) represented companies in which the system has operated for at least 3 years.

The factors determining the decision to implement the system along with the ranks/weights assigned to them are illustrated in Figure 3.

**Figure 3. Weights assigned by respondents to the factors determining the decision to implement the system(s)**



Source: Author's own elaboration

The most important factors determining the implementation (high and very high weight) according to the respondents turned out to be the requirements of current clients - 77.8%, requirements of contractors - 75.0%, improving the quality of products/services - 69.4%,

improving the company's operations - 66.7%, willingness to increase competitiveness on the domestic market - 63.9%, raising employee awareness - 61.1%, and requirements of tender specifications - 50.0%. Confirmation of the above facts is found in the values of the calculated measures, where the dominant as well as the median takes the value of 4 or 5 (see Table 2).

**Table 2. Values of measures for P1-P14 factors determining the decision to implement the system(s) among the surveyed enterprises**

	<b>Decision-making factor</b>	<b>Me</b>	<b>Do</b>	<b>Average</b>	<b>S</b>	<b>Vs</b>
P1	Corporate requirements	4	5	3.3	1.6	0.5
P2	Requirements of contractors	4	5	4.2	0.9	0.2
P3	Increasing competitiveness - domestic market	4	4	3.7	0.7	0.2
P4	Increasing competitiveness - international market	3	3	2.8	1.2	0.4
P5	Increasing market share	3	3	3.1	1	0.3
P6	Reduction of quality/health and safety/environment protection costs	3	3	3.1	1	0.3
P7	Improving the quality level of products/services	4	4	3.9	0.8	0.2
P8	Improving the company's operations	4	4	3.7	0.8	0.2
P9	Requirements of tender specifications	3.5	3	3.4	1.3	0.4
P10	Requirements of current customers	4	4	4	1.1	0.3
P11	Reducing the number of accidents	3	4	2.9	1	0.3
P12	Raising employee awareness	4	4	3.7	0.9	0.2
P13	Obtaining compliance with regulations	3	3	3.2	1	0.3
P14	Supervising the impact of company activities/products/ services on natural environment	3	4	3.1	1.1	0.4

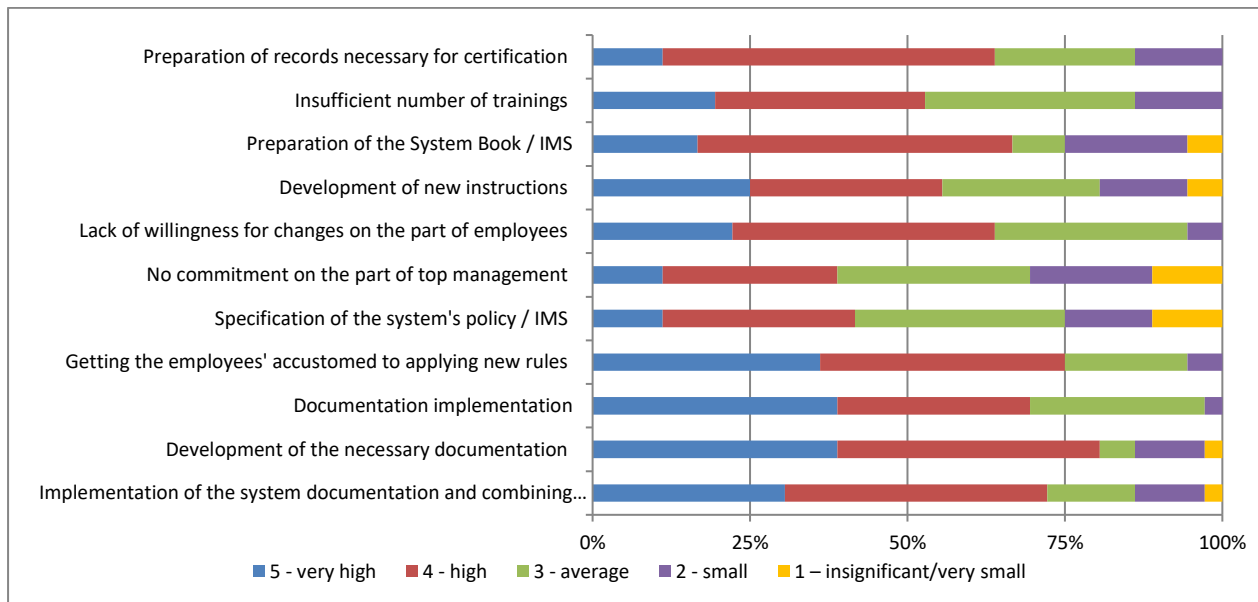
Source: Author's own elaboration

The greatest variation in the response ( $V_s = 0.5$ ) is observed when assessing the validity of corporate requirements. This is mainly due to the diversity of the research group itself, in which apart from small companies operating on the local market, there were representatives of large international corporations obviously "forced" to implement ISO international standards.

The premise that was essentially irrelevant or not important for entrepreneurs in making decisions about implementation was to increase competitiveness in the international market and to reduce the number of accidents at work. The average value for both variables is lower than 3 (see Table 2). The results are surprising as nearly 2/3 of companies ( $n = 23$ , 63.9%) have a certified occupational safety and health management system PN-N / OHSAS 18001.

When implementing changes or implementing new ideas, difficulties arise in every company. This is also the case when implementing the systems based on previously described standards. Respondents, while answering the questions in the questionnaire, indicated which of the described problems turned out to be large and which were unnoticeable. Figure 4 presents respondents' answers according to the rankings given to the existing barriers.

**Figure 4. Weights assigned by respondents to problems/barriers that accompanied the system(s) implementation**



Source: Author's own elaboration

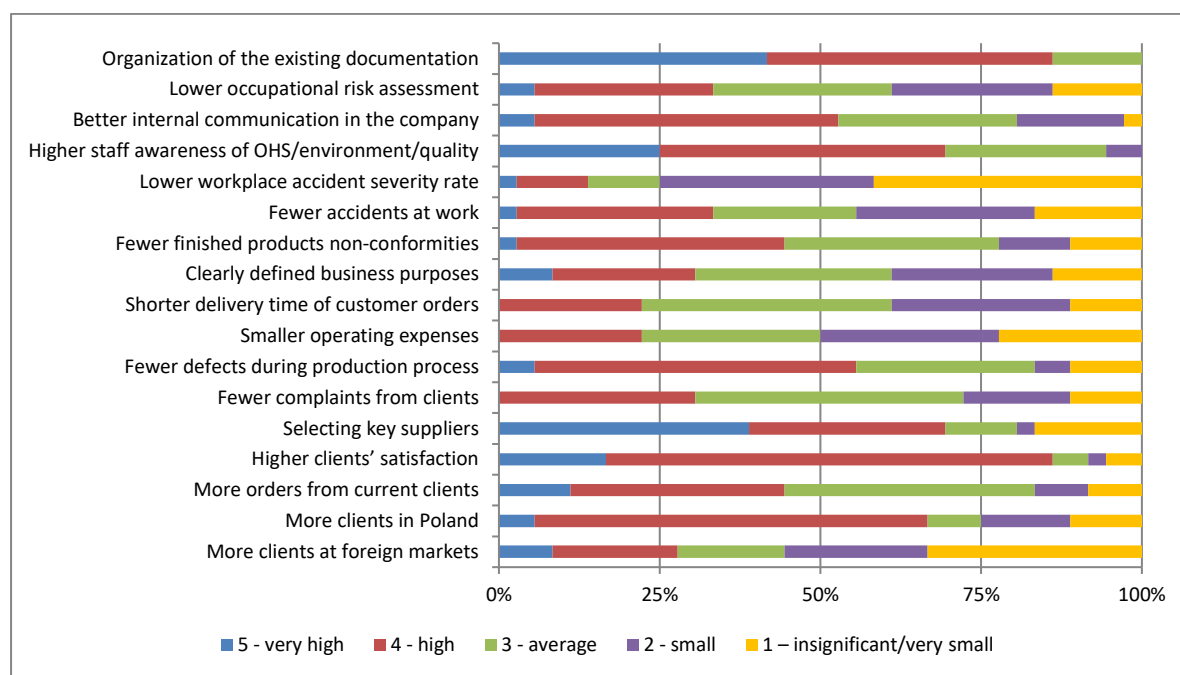
Respondents fairly consistently rated the weight of most problems as high or very high. Few have decided to assess the problem as negligible / very small and this concerned the system's policy development and no commitment on the part of the top management. These conclusions are confirmed by the calculated descriptive statistics in Table 3. The variables were characterized by a moderate level of variation, therefore the group is quite homogeneous.

**Table 3. The values of measures for barriers/difficulties B1-B11 that the organization sees when implementing the system(s)**

	<b>Barrier/difficulty</b>	<b>Me</b>	<b>Do</b>	<b>Average</b>	<b>S</b>	<b>Vs</b>
B1	Implementation of the system documentation and combining with the existing one	4	4	3.9	1.1	0.3
B2	Development of the necessary documentation	4	4	4	1.1	0.3
B3	Documentation implementation	4	5	4.1	0.9	0.2
B4	Getting the employees' accustomed to applying new rules	4	4	4.1	0.9	0.2
B5	Specification of the system's policy / IMS	3	3	3.2	1.2	0.4
B6	No commitment on the part of top management	3	3	3.1	1.2	0.4
B7	Lack of willingness for changes on the part of employees	4	4	3.8	0.9	0.2
B8	Development of new instructions	4	4	3.6	1.2	0.3
B9	Preparation of the System Book / IMS	4	4	3.5	1.2	0.3
B10	Insufficient number of trainings	4	4	3.6	1	0.3
B11	Preparation of records necessary for certification	4	4	3.6	0.9	0.2

Source: Author's own elaboration

One of the most important aspects of the management systems implementation are the benefits, what effects has the implementation had and whether the effects will be an incentive for further organization's systems improvement and the decision to apply for a certificate again. The following figure (Figure 5) presents the results of the respondents' answers, while Table 4 presents descriptive statistics.

**Figure 5. Weights assigned to the benefits that are evident after the system(s) implementation**

Source: Author's own elaboration

**Table 4. The values of measures for the benefits of K1-K17 identified by the entity as a result of the system(s) implementation**

	Benefits	Me	Do	Average	S	Vs
K1	More clients at foreign markets	2	1	2.47	1.36	0.55
K2	More clients in Poland	4	4	3.36	1.15	0.34
K3	More orders from current clients	3	3	3.31	1.06	0.32
K4	Higher clients' satisfaction	4	4	3.89	0.92	0.24
K5	Selecting key suppliers	4	5	3.72	1.45	0.39
K6	Fewer complaints from clients	3	3	2.92	0.97	0.33
K7	Fewer defects during production process	4	4	3.33	1.07	0.32
K8	Smaller operating expenses	2.5	2	2.5	1.08	0.43
K9	Shorter delivery time of customer orders	3	3	2.72	0.94	0.35
K10	Clearly defined business purposes	3	3	2.86	1.17	0.41
K11	Fewer finished products non-conformities	3	4	3.14	1.05	0.33
K12	Fewer accidents at work	3	4	2.75	1.16	0.42
K13	Lower workplace accident severity rate	2	1	2	1.12	0.56
K14	Higher staff awareness of OHS/environment/quality	4	4	3.89	0.85	0.22
K15	Better internal communication in the company	4	4	3.36	0.93	0.28
K16	Lower occupational risk assessment	3	4	2.86	1.15	0.4
K17	Organization of the existing documentation	4	4	4.28	0.7	0.16

Source: Author's own elaboration

The research showed there was a wide variety of the implementation benefits in the respondents' assessments. The high values of the variation coefficient are confirmed (see Table 3). Dominant values 1 - insignificant / very small value of benefits for variables: More clients at foreign markets and Lower workplace accident severity rate, correlates with low rankings assigned to these issues by respondents (variables P4, P11) before the decision about implementation.

The biggest positive effect of the system(s) implementation was the organization of the existing company documentation. The group of highly rated benefits also included: higher customer satisfaction, higher staff awareness in the field of OSH/environment protection/quality, selection of key suppliers, internal communication improvement in the company, increase in the number of customers in Poland, fewer product defects during the production process and fewer finished products non-conformities.

Determinants of implementing management systems are associated with expectations regarding the functioning of these systems, as well as their impact on the organization's achieved results. Respondents, globally assessing satisfaction with the effects of implemented systems, having at their disposal the Likert scale from 1- definitely negative to 5 - definitely positive, in the majority gave – positive - 4 (n = 16, 44%) or definitely positive -5 (n = 7, 19%). Every third respondent (n = 11, 31%) was not able to assess whether the changes had positive or rather negative effects. This final assessment whether the system implementation fulfilled the expectations is significantly different from the previously asked detailed questions. It should be emphasized that in the case of many analysed effects, the benefits will be evident after some time, even several years. Therefore, the implementation success and optimism articulated by the respondents may be overestimated. The more so because the respondents were often the people very involved in the process of the system implementation and maintenance. Thus, to some extent, the assessment was a self-esteem of respondents who displayed complacency in the effects of their work.

## **5. Results of exploratory factor analysis**

Due to the multi-aspect and diversity of factors related to the reasons, barriers and entrepreneurs' expectations about the system(s) implementation, it is difficult to formulate definitive conclusions. Empirical sciences are based on experience, investigating the influence of various factors relevant

to the problem under study – a phenomenon or a process. Frequently, the factors relevant to a given problem need to be first identified. They are referred to as common factors or latent factors.

The sets of variables presented to the respondents (along with the evaluation criteria) that could be taken into account when considering the decision on the possibility of implementing the system(s), problems noticed, and effects assessed became the basis for the exploratory factor analysis in three areas using the Statistica StatSoft package.

As a result of the analysis, sets of factors were obtained along with items for the three scales analysed. The number of three variables per factor (i.e., loading only this factor) is a sufficient condition to identify the factor (Bacher 1990: 120). A fairly common agreement prevails that there should be at least twice as many variables as factors (see Kim & Mueller 1994b: 144-145).

As a result of the performed analysis, the following results were obtained:

- 5 factors, 12 items in the scale - *Factors determining the management system(s) implementation*
- 3 factors, 7 items in the scale – *Barriers in the management system(s) implementation*
- 5 factors, 10 items in the scale – *Benefits resulting from the implemented system*

The values of factor loads for particular items included in the factors are presented in Tables 5, 6, 7 below.



**Table 5. Factor load values for items in the scale - factors determining the management system(s) implementation**

Reasons		Factor				
		1	2	3	4	5
P7	Improving the quality level of products / services	<b>0.877645</b>	0.007452	0.154919	0.031566	0.199804
P14	Monitoring the impact of the activities / products / services on natural environment	<b>0.763035</b>	0.348413	0.264122	0.131953	0.090712
P12	Raising employee awareness	<b>0.758583</b>	0.076491	0.245216	0.109221	0.168574
P8	Improving the company's operating	<b>0.714043</b>	0.153493	0.157865	0.220170	0.007798
P2	Requirements of contractors	0.099436	<b>0.838426</b>	0.223305	0.064567	0.013290
P10	Requirements of current customers	0.177912	<b>0.822357</b>	0.221079	0.020862	0.031467
P1	Corporate requirements	0.096133	0.379153	<b>0.816809</b>	0.051848	0.036691
P11	Reducing the number of accidents at work	0.189016	0.106458	<b>0.738535</b>	0.237526	0.004948
P4	Increasing competitiveness - international market	0.128855	0.102732	<b>0.725588</b>	0.300197	0.345417
P3	Increasing competitiveness - domestic market	0.100198	0.040064	0.117816	<b>0.831783</b>	0.125601
P13	Obtaining compliance with regulations	0.124155	0.088849	0.091049	0.120067	<b>0.836186</b>
P5	Increasing market share	0.179123	0.006045	0.409609	0.004488	<b>0.742075</b>
	% of the total variance explained by the factor	27.53%	15.62%	12.77%	11.31%	7.53%
	<b>Accumulated% of the total variance explained by the factor</b>	27.53%	43.15%	55.92%	67.23%	<b>74.76%</b>

Source: Author's own elaboration

Factor load values in all 5 factors are high and explain a total of 74.76% variance. The performed factor analysis gives grounds to develop five synthetic measures of information contained in groups of 4, 2, 3, 1 and 2 items, respectively.

The weights assigned to particular variables within each of the 5 factors are similar, therefore it is possible to aggregate variables (items), e.g. by calculating the average value.

**Table 6. Factor load values for items in the scale - Barriers in the management system(s) implementation**

Barriers		Factor		
		1	2	3
B9	Development of the System Book / IMS	<b>0.893113</b>	0.014330	0.175475
B8	Development of new instructions	<b>0.886679</b>	0.057575	0.001696
B5	Specification of the system's policy / IMS	<b>0.847889</b>	0.174200	0.031643
B7	Lack of willingness for changes on the part of employees	0.107334	<b>0.836410</b>	0.223858
B6	No commitment on the part of top management	0.102791	<b>0.788302</b>	0.244820
B1	Implementation of the system documentation as combined with the existing one	0.158943	0.176031	<b>0.766300</b>
B3	Implementation of documentation	0.291289	0.174994	<b>0.760584</b>
	% of the total variance explained by the factor	36.98%	17.22%	12.93%
	<b>Accumulated% of the variance explained by the factor</b>	36.98%	54.20%	<b>67.14%</b>

Source: Author's own elaboration

Factor load values in all three factors are high and explain a total of 67.14% variance. The factor analysis carried out gives the basis to construct three synthetic measures of information included in groups 3, 2 and 2 items, respectively. The weights assigned to particular variables within each of the three factors are similar, therefore the items can be aggregated, e.g. by calculating the average value.

**Table 7. The values of measures for the benefits identified by the entity as a result of the system(s) implementation**

Results		Factor				
		1	2	3	4	5
E9	Shortening the delivery time of customer orders	<b>0.868776</b>	0.019355	0.132464	0.119186	0.202427
E2	Customer growth in Poland	<b>0.848588</b>	0.050075	0.007027	0.009315	0.212868
E7	A decrease in the number of defects during the production process	<b>0.793080</b>	0.038895	0.064445	0.206130	0.066863
E12	Reducing the number of accidents at work	0.323341	<b>0.805427</b>	0.164381	0.289521	0.185172
E13	Reducing the severity of accidents	0.152476	<b>0.791576</b>	0.039766	0.142296	0.128381
E1	Customer growth in the international markets	0.201512	<b>0.780967</b>	0.206512	0.205777	0.238568
E16	Reduction of occupational risk assessment	0.263269	<b>0.727631</b>	0.160201	0.215528	0.249286
E10	Clearly defined business goals	0.023500	0.012864	<b>0.920565</b>	0.071554	0.025361
E17	Organization of the existing documentation	0.127476	0.281233	0.000878	<b>0.849655</b>	0.102342
E4	Increased customer satisfaction	0.476332	0.104832	0.150238	0.116021	<b>0.719672</b>
	% of the total variance explained by the factor	36.99%	15.39%	9.65%	6.58%	6.40%
	<b>Accumulated% of the total variance explained by the factor</b>	36.99%	52.38%	62.04%	68.62%	<b>75.03%</b>

Source: Author's own elaboration

Factor load values in all 5 factors are high and explain a total of 75.03% of the variance. The performed factor analysis gives grounds to construct five synthetic measures of information included in the groups of 3, 4, 1, 1 and 1 item, respectively. Similarly to previous scales, the weights assigned to particular variables within each of the 5 factors are similar, therefore, it is possible to aggregate variables (items), e.g. by calculating the average value.

Summing up, the exploratory factor analysis made it possible to create a simple construct identifying 5 factors determining the management system(s) implementation, 3 factors describing the barriers to the management system(s) implementation and 5 factors describing the benefits of the implemented system.

## 6. Conclusion

Dissemination of the principles of systemic management based on ISO standards does not directly translate into a growing interest on the part of entrepreneurs in the systems certification. For several years, a downward trend has been observed in Europe, especially in relation to the most popular systems, i.e. based on ISO 9001 standards. The dynamics of changes in the number of certified systems in Poland is significantly different from the changes taking place in Europe and in the world. Therefore, it is reasonable to make an effort to identify the factors determining the decision about the system implementation, defining obstacles/barriers and indicating specific benefits for the Polish entrepreneur. The use of exploratory factor analysis can be a useful tool.

As a result of the survey conducted on a group of 36 enterprises, a construct was developed with separated scales for reasons, barriers and benefits of implemented management systems. The selected groups of factors identify problems in a more comprehensible way. For example, 3 latent variables specified for barriers, showed the problem of implementing systems focused around: creating documentation, attitudes of management and employees, and implementing/combining the system documentation with the one already existing in the organization

There are some constraints to the conducted research. Undoubtedly, increasing the sample size and expanding the group of respondents to representatives of the lower level staff should enable future optimization of the tool.

The conducted research should be considered as a pilot study and should constitute an introduction to further research on the analysed phenomenon. In the age of demographic challenges in Poland, the aging society, the needs and requirements of people aged 50+ and the disabled (internal clients), the implementation of systematic quality, environmental or health and safety management must also take into account these aspects. The presence of these special professional groups in organizations, in particular in enterprises with the status of sheltered workshops, still seems to be outside the interest of researchers (Boczkowska 2008). There is some gap for extended or new exploratory analyses in this field, therefore, these aspects will be the scope of the author's further research.

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### ***Determinanty wdrażania systemów zarządzania – wyniki badań***

#### ***Streszczenie***

Obserwowane w ostatnich latach spowolnienie w zakresie certyfikacji systemów zarządzania skłania do przemyśleń oraz poszukiwania przyczyn tego stanu. Wykorzystanie eksploracyjnej analizy czynnikowej może być przydatnym narzędziem. Celem artykułu jest identyfikacja czynników decydujących o podjęciu decyzji wejścia na drogę systemowego zarządzania zgodnie z wymaganiami norm serii ISO 9001, ISO 14001 oraz OHSAS/PN-N 18001, barier z tym związanych oraz efektów wdrożenia systemu/ów. W wyniku przeprowadzenia badań ankietowych metodą CAWI na grupie 36 przedsiębiorstw opracowano konstrukt z wyodrębnionymi skalami dla przyczyn, barier i korzyści wdrażanych systemów zarządzania. Wyłonione grupy czynników w bardziej czytelny sposób identyfikują problemy. Dla przykładu 3 zmienne latentne określone dla barier, ukazały problem wdrażania systemów skupiony wokół: tworzenia dokumentacji, postaw kierownictwa i pracowników oraz implementacji/połączenia dokumentacji systemowej z tą która istnieje w organizacji. Przeprowadzona analiza jest wstępem do szerszych i bardziej pogłębionych badań.

***Słowa kluczowe:*** ISO 9001, ISO 14001, OHSAS 18001, zintegrowane systemy zarządzania