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THE PLACE OF OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEM IN THE INTEGRATED MANAGEMENT SYSTEM

Abstract: *The purpose of this paper is to analyze the place of occupational health and safety management system (OHSMS) within the integrated management system. Implementation aspects of management systems are discussed, namely the different management system standards used for registration, for example ISO 14001, ISO 9001, OHSAS 18001, ISO 27001, the order in which they were implemented, the time required for each implementation, as well as the scope of integration of these management system standards into a single Integrated Management System and the level of integration. In order to do so, some of the results of a survey carried out in 81 organizations registered to at least two management systems selected from popular international standards, e.g.: ISO 9001, ISO 14001, OHSAS 18001, ISO/IEC 27001, ISO 22000 were used. OHSMS is not the system that is implemented as a first one. Usually it is implemented after or simultaneously with ISO 9001 and ISO 14001 standards. Time of implementation of MSSs in second and further round of implementation is shorter than during the implementation of first standards. There is a higher level of integration of implemented management standards in organizations where one of the standards in OHSMS, than in a companies without OHSMS. The paper analyses those sequences of management systems implementation of safety management systems with other system, that allow organizations to achieve higher levels of integration and presents a possible pattern for the companies initiating the integration process.*

Keywords: *OHSAS 18001, Safety management systems, Integration, level of integration, safety certification system*.

1. Introduction

The popularity of the standards relating to management started with the publication of ISO 9001 quality management standard. In 2012, more than one million certificates were issued that confirmed the compliance with the requirements of the ISO 9001 standard (ISO, 2012). Besides the quality management standard, other standardized management systems gain an increasing popularity. The systems can be mentioned as follows: OHSAS 18001: Occupational Health and Safety Management System; ISO 14001 Environmental Management System,

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ISO/IEC 27001: Information Safety Management System, and Social Accountability of Business: SA 8000. There are also other standards which refer to a specific industrial lines such as: ISO/TS 16949, ISO 13485, and ISO 22000 or NATO standards - AQAP.

Taking into consideration the increase in industrial accidents and loss of life as well as environmental issues, more and more organizations is voluntarily implementing and certifying management systems. These management system certifications are expected to integrate safety management with the rest of the functions of the organization (Vinodkumar and Bhasi, 2011). Large number of various systems implemented in one organization, demands many duplicate activities (Simon *et al*., 2011). Simultaneously, the construction of updated editions of management standards are so arranged that the integration of MSSs (management system standards) in any organization introducing them is almost certain, and any attempts to concurrently keep several systems are very difficult (Pheng and Tan 2005; Zeng *et al*., 2007; ISO, 2008; Kafel and Sikora 2010). Sooner or later, nearly all the organizations, achieved a high degree of integration involving strategy, policy, documentation, records, audit, etc. (Salomone, 2008). The reference literature mentions many theoretical integration models of standardized management systems e.g: (Wilkinson and Dale, 1999; Karapetrovic, 2002; Jonker and Karapetrovic, 2004). There were also developed national standards which describe integration processes. The most recognized standards are: PAS 99, Global SAI. AS/NZS 4581:1999, HB 10190:2001 or UNE 66177:2005.

During the last years many researchers from different countries have focused their attention on this subject, having studied and evaluated the possibility of integrating management standards, identifying their benefits and drawbacks for organizations and characterizing the level of integration within organizations. However, there are only a few studies on the practical aspects linked to implementation and integration of OHSMS (occupational health and safety management system) with other MSS especially in the sphere of the order and level of MSS integration.

2. Literature review

2.1. Occupational health and safety management standards - history

OHS (Occupational health and safety) can be described as "conditions and factors that affect, or could affect, the health and safety of employees or other workers (including temporary workers and contractor personnel), visitors, or any other person in the workplace" (BSI, 2007).

First standards and guidelines concerning OHS management were developed in the early nineties of twentieth century. In 1996, International Organization for Standardization (ISO) held a discussion inviting many nations to develop international OHSMS. Some of 33 representatives had participated in the discussion including 6 international organizations like ISO, ILO - International Labour Organization, governments, labor unions, employers, worldwide safety and health administrations, and insurance institutes.

In 1999, US Occupational Health and Safety Administration in cooperation with international certifying bodies from 15 countries on 3 continents published the Occupational Health and Safety Assessment Series - OHSAS 18000 (Vinodkumar and Bhasi, 2011; Fernández-Muñiz, *et al.*, 2012b). It comprises two parts, 18001 and 18002. In the creation process, the following documents and standards were used (Vinodkumar and Bhasi 2011):

- BS8800:1996. Guide to occupational health and safety management systems.

- DNV Standard for Certification of Occupational Health and Safety Management Systems (OHSMS):1997.
- Technical Report NPR 5001:1997. Guide to an occupational health and safety management system.
- Draft LRQA SMS 8800. Health and safety management systems assessment criteria.
- SGS and ISMOL ISA 2000:1997. Requirements for Safety and Health Management Systems.
- BVQI Safety Certification: Occupational Safety and Health Management Standard.
- Draft AS/NZ 4801. Occupational health and safety management systems specification with guidance for use.
- Draft BSI PAS 088. Occupational health and safety management systems.
- UNE 81900 series of pre-standards on the prevention of occupational risks.
- Draft NSAI SR 320. Recommendation for an occupational health and safety (OH and S) management system.

Since its publication OHSAS 18001 has gained considerable acceptance worldwide and firms from diverse sectors and of varying sizes have implemented and certified it. The standard was revised, and its latest version is BS OHSAS 18001:2007 "Occupational Health and Safety Management Systems" (Fernández-Muñiz, *et al.*, 2012b).

Some countries, do not accept the OHSAS 18001 and decided to develop their own standards which were mainly modifications of "Guidelines on occupational safety and health management system" published by International Labour Organization. In Poland PN-N 18001:1999 standard was developed. It was one of the standards that were used instead of OHSAS 18001. PN-N 18001 was revised in 2004 and from that date is the most popular OHSMS voluntary implemented and certified in Poland.

Recently, new OHSMS international standard is being produced by a Project Committee, ISO PC 283, with the intention of publication in October 2016. The ISO 45001 standard will be aligned with ISO 9001 and ISO 14001, which are themselves undergoing revision and are due for publication in 2015. One of the goals of new standard is to increase the possibility of integration of all management standards (BSI, 2014).

2.2. The levels of MSSs integration

The integration on MSSs may refer to different categories, such as: objects, targets and relations, structures, processes and resources (Bagiński, 2000; Kafel and Sikora, 2010). In literature, there are available various methods to measure the integration degree of managements systems. Those methods depend on the approach to integration by the enterprises themselves (Jørgensen, *et al.*, 2006; Karapetrovic and Jonker, 2003). Depending of the authors, the degree of integration of MSS are named variously. Seghezzi (Seghezzi, 1997) define three different ways of integration: addition, merge and integration while Kirkby (Kirkby, 2002) named the levels as: separate, aligned and integrated. Some of the authors described the level of MSS integration in a simple levels such as: partial or full integration (Karapetrovic, 2002; Bernardo *et al.*, 2012b) or documental harmonization, partial integration and full integration (Abad *et al.*, 2013). Other use international standards to describe those levels (Projasek, 2006). Griffith and Bhutto described three types of IMS: a merged system, a conversion system and an engineered system (Griffith and Bhutto, 2008).

No matter, how the integration level are described, the degree of integration always ranges between two theoretical extremes:

- the 'zero' level where individual standardized MSs coexist completely differently from each other,
- full integration where all elements and aspects of individual standardized MS operate within one system.

Those two extreme possibilities are possible, however, in practice, the level of integration will be placed somewhere between. There are some evidence, that QMS and EMS are integrated with some success although OHSMS is seen as less flexible as well as less interest is shown in integrating OHSMS with other systems (Griffith and Bhutto, 2008; Khanna *et al.*, 2010).

2.3. Order and time of MSs implementation

There are two most common ways of implementation and integration of MS. In the first one, particular standards are implemented separately one by one and then integrated. The other option is to implement simultaneously more than one MS and integrate it during the implementation time.
When considering two most popular management standards (QMS and EMS), the most common strategies of implementation and integration (Karapetovic, 1998), are:

- the QMS is implemented first and EMS second,
- the EMS is implemented first and QMS second,
- the QMS and EMS are implemented simultaneously.

When more systems are considered (e.g. OHSAS 18001), the number of possible combinations grow, but according to the literature implementation of QMS first and other systems afterwards, is most popular within the companies (Casadesús and Karapetrovic 2005; Karapetrovic *et al.*, 2006; Bernardo *et al.*, 2012b). For most of the companies, QMS is also a platform for integration (Griffith and Bhutto, 2008; Griffith and Bhutto, 2009; Khanna *et al.*, 2010). Recently, more and more organizations decide to implement simultaneously ISO 9001, ISO 14001 and OHSAS 18001 and integrate it in one management system (Labodová, 2004).

Many studies have been undertaken to investigate the OHSMS implementation and integration with other systems (see, for example, Jørgensen *et al*., 2006; Griffith and Bhutto, 2008; Fan and Lo, 2012; Oliveira, 2013; Rebelo *et al.*, 2014).The process of implementing OHSMS standard and obtaining the certificate takes approximately one year on average (Fernández-Muñiz *et al.*, 2012a). According to Pun, many companies rush to certificate OHSMS in nine to 12 months' time. That time pressure is an important problem in the implementation process (Pun *et al.*, 2003). Time restrictions on implementation are also noticed by Zutshi and Sohal (Zutshi and Sohal 2005).

Organizations that implemented more than one management system, usually required more time to implement first system (Karapetrovic and Willborn, 1998; Casadesus and Karapetrovic, 2009). When two systems are implemented simultaneously synergy effect is visible. According to Karapetrovic and Casadesús' research, an average time for the companies that implemented QMS and EMS simultaneously was shorter, compared to the average time for the sequential implementation of these two standards in the other organizations (Karapetrovic and Casadesús, 2009). In table 1. there are described main conclusions from the research concerning the order, time and level of integration.

3. Methodology

The methodology used to collect the data was a survey mailed in 2014 to a sample of Polish organizations registered to at least two MSSs selected from popular

international standards implemented in Polish organizations, e.g.: ISO 9001, ISO 14001, OHSAS 18001, ISO/IEC 27001, ISO 22000. The reason for conducting the study in Poland was because it is one of the countries with the average number of registered MSS, ranking 11 place in Europe with ISO 9001 and ISO 14001 certificates according to The ISO Survey (ISO, 2012). It is possible to obtain a sample big enough to analyze MSSs implementation aspects in a country which is not in the top in the word in terms of issued certificates and popularity of MSSs implementation. Authors' country of origin was also an important factor. The survey in paper version was send to 885 organizations located in Poland. Follow up e-mails were also sent after one month form the time that was indicated as the deadline for response. The reminders restated the objectives of the survey and requested participants to complete the questionnaire, which was attached in e-mail. There were 81 valid questioners obtained, representing 9,2 % respond rate. When comparing the number of organizations in the sample with the number of issued ISO 9001 certificates in Poland, according to ISO survey (ISO, 2012), the indicator is on the level of 0,8% which is higher than used in similar studies e.g. (Bernardo et al. 2010; Simon et al. 2011). Within the sample there were 41 organizations with implemented OHSMS and that is final sample described in this article.

Table 1. Main research of OHSMS concerning the order, time and level of integration

Author	Sample	Conclusions
(Santos *et al.,* 2013)	12 SMEs organizations with the OHSMS certificate according to OHSAS 18001, Portugal	- The first system that was certified in Portuguese SMEs was the Quality Management System (QMS). After this system was consolidated, the certified Environmental Management System (EMS) followed. In some cases, the Occupational Health and Safety Management System was the last to be analyzed. - study presents the results of OHSMS certification, after the QMS certification.
(Fernández-Muñiz, Montes-Peón, and Vázquez-Ordás, 2012a)	131 Spain organizations with OHSAS 18001 certificate	- The process of implementing OHSMS standard and obtaining the certificate takes approximately one year on average.
(Zeng *et al*., 2008)	76 construction industry companies from China with ISO 9001 MS certificate	- OHSAS 18001 system should be integrated with the ISO 9001 quality management system (93% of studied organizations). - The main reasons to integrate of ISO 9001 and OHSAS 18001 standards are similarity and compatibility those standards.
(Karapetrovic and Casadesús, 2009)	176 Catalonia, Spain companies	- Most of the companies implemented OHSAS standard as a third or fourth standard. It was usually preceded by ISO 9001 and ISO 14001 systems. - ISO 9001 and ISO 14001 are the most-widely applied standards while OHSAS 18001 is following them, but the distance is quite big. - An average lead time for the implementation of the first management system was 19 months, with the median of 18 months. The second standard took an average of 15 months, while the median was 12.

		Averages for the third and fourth implementation were identical at 11 months. - An average time for the companies that implemented QMS and EMS simultaneously was shorter, compared to the average time for the sequential implementation of these two standards in the other organizations.
(Salomone, 2008)	103 companies from Italy with QMS, EMS and OHSAS certificate.	- 73% of the companies declared that they had totally integrated various aspects of QMS, EMS and OHSMS and 26% said they had achieved partial integration. - Integration of MSs evolved spontaneously. Sooner or later, nearly all the organizations in the sample had embarked on this undertaking and, in many cases, achieved a high degree of integration involving strategy, policy, documentation, records, audit, etc.
(Chen *et al.*, 2009)	Eleven Taiwan manufacturers and twenty-six OHSMS specialists from the academia.	Environmental health and safety system integration is one of the internal factors affecting the motivation of implementing the OHSAS 18001.
(Khanna *et al.*, 2010)	60 organizations from India with EMS (29 with OHSMS)	Less interest is shown in integrating OHSAS than other management systems e.g. integrating of QMS and EMS. QMS is a common platform for integration.
(Zutshi and Sohal, 2005)	Three organizations in Australia that undertook the integration of their management systems for quality, environmental, and occupational health and safety.	The key driver for integration for all three companies was to make better use of resources. In studied companies QMS was implemented first and after that EMS and OHSMS simultaneously were implemented. The integration processes were initiated in the companies, when a formal EMS was being implemented.
(Griffith and Bhutto, 2008)	A questionnaire survey of ninety contractors; Interviews within thirty principal contracting organizations; Five case studies.	EMS and QMS have been integrated to form IMS with some success although OHSMS is seen as less flexible, based more on strict compliance procedures than wider functional management procedures.

Source: Own elaboration

According to the European Commission's (European Commission, 2003) classification, there are 19,5% of small organizations, having 50 employees or less in the studied sample. About 31,7% of medium sized organizations with the number of employees between 51 and 250, while 48,8 % are large organizations having more than 250 employees.

The level of integration of MSS was measured by the degree of integration of the system goals, resources and processes. In order to measure the degree of integration of system goals, resources and processes 3 point scale was used (not integrated, partially integrated and fully integrated). Companies were asked about integration of policy, objectives, procedures (planning, internal audits, management review, control of nonconformities, preventive and corrective

actions, product realization, resource management, determination of requirements, improvements, document control, record control and internal communication), instructions and records.

In the survey, the organizations indicated whether certain aspects of integration were fully integrated, partially integrated or not integrated. That kind of measure is popular and used by other authors (Seghezzi, 1997; Karapetrovic, 2002; Kirkby, 2002; Karapetovic, 2003; Pojasek, 2006; Bernardo *et al.*, 2009; Bernardo *et al.*, 2012a).

Cluster analysis of the level of MSSs integration used in study was analogical to the one used and widely described by Bernardo (Bernardo *et al.*, 2009). The only difference in this study was there was no data about the integration of quality manuals and that variable was not used in a cluster analysis.

Descriptive analysis were used in order to present the results. That analysis enables an illustration of the time and order of MS implementation. Successively, the scope and level of integration and of MSSs were examined.

4. Results

4.1. Scope and order of OHSMS implementation in IMS

In Poland there are two OHSMS that are usually implemented and certified within the companies. The first one is BS OHSAS 18001 and the other one is polish standard PN-N 18001. Within the studied companies, 75,6% implemented OHSMS according to polish standard, 9,7% implemented BS OHSAS 18001 standard, while 14,6% of companies implemented both Polish and British OHSMS.

Table 2. Number of management systems implemented in organization

Number of MS	Number of organizations
2	2
3	22
4	11
5	4
6	2

Source: Own elaboration

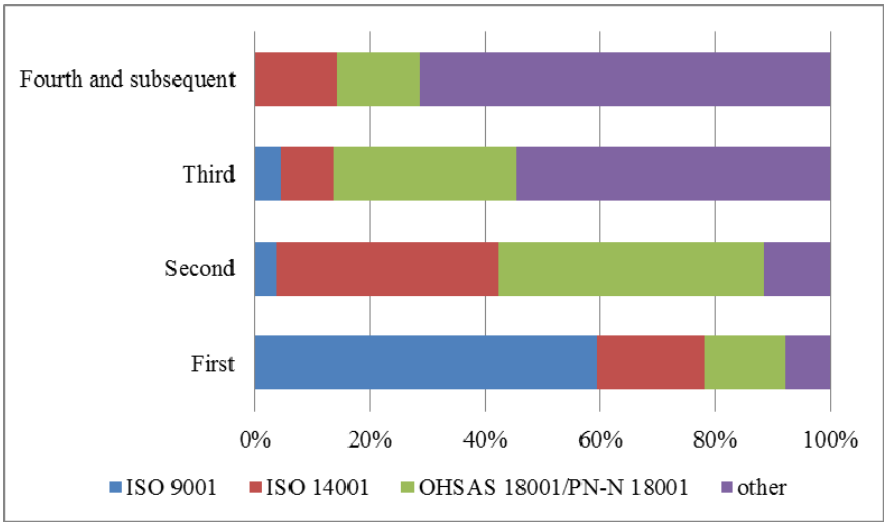

Figure 1. Order of implementation of standards

Integrated Management System, is a system that combine at least 2 MS. In studied organizations three or four MSS are usually implemented. Specific details are placed in

table 2. Most popular standards that are implemented with OHSMS are: ISO 9001 – all organizations, ISO 14001 – 85,3%. Other standards that are implemented in more than one of studied organizations are: AQAP 2110 – 14,6% organizations, ISO/IEC 27001 – 9,7%, and ISO 3834-2 – 9,7% organizations

In figure 1 there are information about the order of management standard implementation and the place of OHSMS in integrated management system. OHSMS is mostly implemented in a second or third round of standards implementation. In the first round of implementation OHSMS was chosen only by 14% of organizations. Within those organizations, in most cases QMS, EMS and OHSMS standards were implemented simultaneously. Moreover there was no case in which OHSMS was implemented as a first standard without any other standards implemented in the same time. This data suggests, that in polish organizations which implemented more than one MSS, OHSMS is not the standard of the first choice. Obtained results confirms theoretical expectations about the order of MSS implementation described by Karapetrovic and Casadesus (Karapetrovic and Casadesús, 2009).

4.2. Time required for OHSMS implementation

Average time of OHSAS 18001/PN-N 18001 implementation was 11,5 months, with the median of 8 months. In first round of implementation, OHSMS was implemented in 11,5 months on average. When OHSMS was implemented in the second round of implementation the average time was 7,5 months. Surprisingly, the average time of implementation in the third and further rounds was 19,5 months which is quite long. According to theoretical expectations, time of implementation in those round should take less time than in previous rounds of implementation (Karapetrovic and Willborn, 1998; Karapetrovic and Casadesús 2005, 2009). Long time of OHSMS implementation in organizations that have an experience with other management standards can be explained by the fact that those companies were mostly the biggest one in the sample.

Table 3. Time of implementation of MSS in second and further rounds of implementation

Time of implementation of MS in second and further round of implementation	Number of organizations
Faster than before	20
In the same time	5
Slower than before	4
Only one round of implementation (all standards implemented simultaneously)	5
No data	7

Source: Own elaboration

In table 3 there are data concerning the time of implementation of MSS in second and further rounds of implementation. It is quite clear, that in most cases time of implementation of MSS in second and further round of implementation is shorter than in the first one. Only in 11,7% cases (4 organizations) implementation time was longer than before.

4.3. Level of integration

In order to classify the studied organizations into different groups of organizations with similar MS integration level, cluster analysis was done. Two groups of variables were used in the analyze. The first one was integration of goals and documentation e.g. policy, objectives, procedures, instructions

and records. The other one was integration of procedures, such as planning, internal audits, management review, control of nonconformities, preventive and corrective actions, product realization, resource management, determination of requirements, improvements, document control, record control and internal communication. The method used to obtain the groups was the Ward method. In order to present the results, methodology described in (Bernardo, 2009) was used. Figure 2. shows the two groups obtained as well as its level of integration. Additionally it is possible to define a third group of organizations which haven't integrated their management systems.

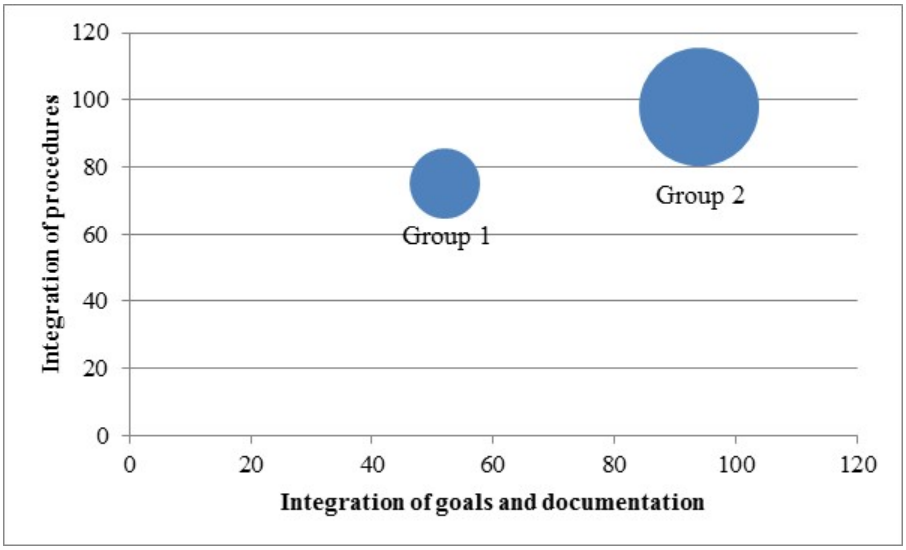

Figure 2. Levels of integration of OHSMS with other MS.

Group 1.
In this group there are 9 organizations, representing 21,9% of the sample. The average level of integration of goals and documentation is 52%, while integration of procedures is on the average level of 75%. The less integrated item from the goals and documentation category is policy with average level of 33,3%. The less integrated items from the part of procedures are planning and determination of requirements. On average this procedures were integrated on the level of 61,1%. Within the organizations in first group, all organizations have implemented OHSMS according to polish PN-N 18001 standard.

Group 2.
This group is made up of 26 organizations representing 63,4% of the sample. Organizations belonging to that group have integrated MSSs on higher level than organizations in group 1. The average level of integration of goals and documentation is 94%, while integration of procedures is on the average level of 98%. The less integrated items from the part goals and documentation category is the records category, with the average level of 52,9%. The less integrated items from the part of procedures are internal communication and determination of requirements at an average level of 94,2%. All organizations which implemented BS OHSAS 18001 standard were in group 2.

Group 3.
This is the smallest group of organizations represented by 6 companies, which is 14,6% of the sample. Three representatives of this organizations, stated that implemented MS are not integrated. In other 3 cases, MS were integrated but there was no data about the level of integration provided.

5. Conclusions

There is lot of research concerning the level of safety management where organizations with certified and non certified MSs were analyzed. Mostly organizations with implemented ISO 9001 and OHSAS 18001 standards are compared in those studies. Nevertheless usually studies do not consider the order and level of MS implementation (Chen *et al.*, 2009; Vinodkumar and Bhasi, 2011; Fernández-Muñiz *et al.*, 2012a; Lo *et al.*, 2014). In organizations which implemented more than one MS, OHSMS is not the standard of the first choice. Usually it is implemented after ISO 9001 and ISO 14001 standards or in the same time. That result is in line with the conclusions presented by other authors (Zutshi and Sohal 2005; Karapetrovic and Casadesús, 2009; Santos *et al.*, 2013). This situation can suggest, that health and safety issues in that organizations may have lower priority than in organizations which implemented only OHSMS. It seems reasonable to investigate the order and level of integration of management systems in a future research of OHSAS 18001 performance issues, e.g. obtained benefits after the implementation.

Polish organizations that implemented OHSMS and at least one more management system, integrate them usually into a single IMS. From the results obtained within the study, it can be concluded that big number of companies already integrated their MS. Integration of MSSs was declared by 92,6% of studied companies. Surprisingly, it is much higher than in a primary sample of 81 organizations with at least 2 MS implemented where the integration was declared by 88,8% of companies. This result is similar to other studies, e.g. according to Bernardo (Bernardo *et al.*, 2009) it is 86%, and Douglas and Glen (Douglas and Glen, 2000) it is 78%. The less integrated item from the goals and documentation category is policy whereas the less integrated procedures are: planning and determination of requirements procedures. Requirements in other procedures that were considered in the study, e.g. management review, control of nonconformities, document control or record control are similar in all management standards. Integration of that procedures is usually the easiest one. That result confirms the results obtained by Bernardo et al. (Bernardo *et al.*, 2012b).

Another conclusion that can be highlighted from the findings, is that in most cases time of implementation of MSSs in second and further round of implementation is shorter than during the implementation of first standards. Moreover within three groups of organizations on a different levels of MSS integration, the group with a higher level of integration is the biggest one. That results are similar to results obtained in other countries and suggested by literature (Bernardo *et al.*, 2009).

Finally, study confirms that there are two popular OHSMS that are implemented in polish companies. The first one is OHSAS 18001 standard and the second one is the PN-N 18001 standard. All organizations which implemented BS OHSAS 18001 standard were in group 2 which is a group with high level of MS integration.

For further research, it would be interesting to conduct the survey in different countries, as conducting it only in Poland was the main limitations of this study.

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