International Journal for Quality research
UDK - 005.591.45
Original Scientific Paper (1.01)

ARE METHODS USED TO INTEGRATE STANDARDIZED MANAGEMENT SYSTEMS A CONDITIONING FACTOR OF THE LEVEL OF INTEGRATION? AN EMPIRICAL STUDY

Merce Bernardo[1)]
Marti Casadesus[2)]
Stanislav Karapetrovic[3)]

1) Departament d'Economia i Organitzacio d'Empreses, Univeritat de Barcelona, Spain, merce.bernardo@ub.edu
2) Departament d'Organitzacio, Gestio Empresarial i Disseny de Producte, Univeritat de Girona, Spain, marti.casadesus@udg.edu
3) Department of Mechanical Engineering, University of Alberta, Canada, stanislav.karapetrovic@ualberta.ca

Abstract: *Organizations are increasingly implementing multiple Management System Standards (MSSs) and considering managing the related Management Systems (MSs) as a single system.The aim of this paper is to analyze if methods used to integrate standardized MSs condition the level of integration of those MSs. A descriptive methodology has been applied to 343 Spanish organizations registered to, at least, ISO 9001 and ISO 14001. Seven groups of these organizations using different combinations of methods have been analyzed Results show that these organizations have a high level of integration of their MSs. The most common method used, was the process map. Organizations using a combination of different methods achieve higher levels of integration than those using a single method. However, no evidence has been found to confirm the relationship between the method used and the integration level achieved.*

Keywords: *Quality, Environment, Integration, ISO 9001, ISO 14001*

1. INTRODUCTION

In recent years, organizations are increasingly implementing multiple Management System Standards (MSSs) to improve effectiveness, efficiency and stakeholder assurance. Evidence of this is provided by the ISO survey (ISO 2010a), which analyzes the number of registrations to MSSs worldwide. In the last available survey, the number of registrations to ISO 9001 (ISO 2008a) for quality management systems (MSs), ISO 14001 (ISO 2004a) for environmental MSs, and ISO 27001 (ISO 2005) for information security MSs, have a growth of 8%, 18% and 40%, respectively, compared to the 2008 data (see ISO 2010a). Organizations are also implementing other standardized MSs, such as the ones for occupational health and safety, e.g., OHSAS 18001 (BSI 2007), for corporate social responsibility, e.g., SA 8000 (SAI 2008), and for customer satisfaction, e.g., the ISO 10000 series (ISO 2004b, 2007a, 2007b and 2010b).

Another evidence of this growth are the studies of the evolution of implementation of MSSs, such as Franceschini et al. (2004), Marimon et al. (2006), Casadesús et al. (2008) and Marimon et al. (2009), who agree that there are different stages of growth, from the "introduction" (e.g., countries like China) to the "saturation" (e.g., countries belonging to the European Union).

Organizations with multiple MSs implemented are considering, more and more, managing these MSs as a single system, i.e., integrating them into an integrated management system (IMS), because of its efficiency and explotation of synergies (Karapetrovic and Willborn 1998a; Wilkinson and Dale 1999; Douglas and Glen 2000; Karapetrovic and Jonker 2003; Zutshi and Sohal 2005; Karapetrovic and Casadesús 2009). However, the integration process is not standardized and each organization may follow its own methodology or the existing multiple methods.

The aim of this paper is to analyze if the methods used to integrate MSs condition the level of integration of MSs.

The paper is structured as follows. First, a literature review is presented. Methodology and results of the field study are explained next. Finally, the main conclusions are discussed.

2. LITERATURE REVIEW

An organization considering to integrate its multiple MSs has to take into account the different aspects of the integration process, such as the implementation strategy (see, e.g., Karapetrovic and Willborn 1998a; Karapetrovic 2002; Karapetrovic and Jonker 2003; Labodová 2004; Griffith and Bhutto 2008), determining the level of integration to be attained by the IMS (see, e.g., Seghezzi 1997; Wilkinson and Dale 1999; Kirkby 2002; Karapetrovic 2003; Beckmerhagen et al. 2003; Pojasek 2006, Bernardo et

al. 2009); and the integration of internal and external audits (see, e.g., Karapetrovic and Willborn 2000; ISO 2002 and 2008b; Bernardo et al. 2010). Another important integration aspect is choosing the methodology the organization is going to use to implement the IMS.

Different methodologies have been proposed and analyzed in the literature, but the main difference between them is the origin. Two main sources of methodologies have to be taken into account: standardization bodies and academic authors. The proposals from the latter are more numeorous compared to the former. Methodologies from both sources are briefly described next.

2.1 Methodologies proposed by standardization bodies

National standardization bodies have published guidelines for the integration of MSs. Different countries have developed standards or guidelines, for example in Australia and New Zealand: AS / NZS 4581: 1999 (SAI Global 1999), in Denmark: DS 8001: 2005 (Dansk Standard 2005), in Spain UNE 66177: 2005 (AENOR 2005), and in the United Kingdom: PAS 99: 2006 (BSI 2006). The International Organization for Standardization (ISO) has not published a standard, but a handbook (ISO 2008b). They are described in Table 1.

Table 1 Standardization bodies' integration guidelines

Guidelines	**Description**
AS/NZS 4581: 1999	The Australian and New Zealand's Standard AS/NZS 4581: 1999 "*identifies the components that are common to all MSs and provides an overview*" (SAI Global 1999). The goal is to provide a "*guide for all management systems in which the common requirements of individual systems are integrated to avoid duplication and provide a uniform basis for the unique characteristics of each individual system. The common elements of MSs as the quality, safety and health, and environment (QSMA) can be integrated into a single system, although other systems such as human resource management or financial control can also be integrated*". The standard is classified into nine components that emphasize the responsibility of management and leadership, the identification and analysis of requirements, as well as system review and improvement plans (SAI Global 1999)
Guidelines	**Description**
UNE 66177: 2005	The Spanish standard UNE 66177: 2005 (AENOR 2005) provides "*guidelines for developing, implementing and evaluating the integration of quality management systems, environment and health and safety at work of those organizations that have decided to integrate these systems fully or partially, in the quest for greater efficiency in managing and increasing its profitability*" (AENOR 2005). The standard also aims to "*help the management team to design and implement an integrated management system and identify methods and tools applicable for the implementation of an integrated management system*". It is based on the PDCA cycle of continuous improvement. The process has three stages: 1. Development of the integration plan, which describes, among others, the expected benefits, the selection of the integration method and support of senior management. 2. Implementation of the integration plan, which describes the responsibilities for the integration plan and maintenance. 3. Review and improvement of the IMS, which describes a global analysis of facts and results, improvement of the consistency of decisions, and determination of the priorities for the IMS, using all possible synergies
PAS 99: 2006	The British standard PAS 99: 2006 (BSI 2006) "*defines the common requirements of MSs. Is intended for use as a framework to implement the common requirements or specifications for an integrated MSs*". The adoption of the standard allows the simplification of deployment of multiple MSs, although the particular requirements of each must be managed and satisfied for the achievement of certification (BSI, 2006), and helping organizations achieve the benefits of the consolidation of the common requirements of MSSs. The standard specifies that integration must be planned and improved in a structured manner, and adopted for internal benefits. (BSI 2006)
ISO Handbook	This handbook "*provides examples, discoveries, challenges and benefits to organizations that consider implementing the requirements of of multiple ISO or non-ISO management system standards through an integrated approach*". The methodology proposes seven steps to integrate the various MSs in the global system of the organization. In addition, each step presents several case studies of organizations that have carried out the integration process.

2.2 Methodologies proposed in the academic literature

As mentioned before, several authors have suggested different methodologies of integration. Table 2 summarizes some examples of models or contributions of academic authors who have studied the subject.

Table 2 Academic authors' methodologies

Author/s	Methodology
Puri (1996)	Presents a guideline to help companies manage environmental quality MSs. Presents a framework to integrate total quality management (TQM) with the environmental MS. Provides tools for implementing and certifying to ISO 14001 and ISO 9001. Discusses the quality manual and analyzes audits of environmental quality. Also proposes a roadmap of 10 phases to develop and implement an IMS of an environmental MS and TQM.
Author/s	**Methodology**
Renfrew and Muir (1998)	Propose a model in five steps to show the evolution of MSs. Begin with the introduction of ISO 9001 and ends with the introduction of a single standard and MS using QUENSH (Quality Health Safety Environmental), which aims to promote the strategic management of organization risks.
Karapetrovic and Willborn (1998b)	Propose a system based on seven steps: (1) goals definition, (2) goals evaluation, (3) design the system, (4) to obtain and allocate resources, (5) spread them as planned, (6) implement the system, and (7) evaluate the final output of the system with original objectives and their individual characteristics and requirements.
Wright (2000)	Model with the steps or "key elements" to integrate the ISO 14001-based MSs (five steps) and OHSAS 18001 (four steps), in organizations with a quality MS implemented. Proposes that all three standards contain the same basic disciplines and a common overall structure that makes them easy to integrate.
Karapetrovic (2003)	Methodology based on six steps, beginning with the specification of the objectives of integration, as well as determining the scope and capability of IMS to the alignment and integration of the information, goals, resources and processes, and the continuous improvement of IMS.
Karapetrovic and Jonker (2003)	Methodology based on the viewpoint of processes and has the audit as the central point. Involves the amalgamation of goals, processes and resources in the audits of quality MSs, environment, health and safety and other MSs, providing reports as outputs and integrated preventive and corrective actions, as well as improvement opportunities.
Jonker and Karapetrovic (2004)	Model should be: (1) able to incorporate all the common elements of function-specific MSs, (2) generic, (3) flexible, (4) fully compatible with specific models of existing MSSs and (5) support the implementation methodology, evaluation, improvement and maintenance of an IMS in an organization.
Karapetrovic (2005)	Different models may be applied: (1) initial model, in which the MSs form the framework of IMS (could be, e.g., process map or the PDCA); (2) combined model, which joined the MSs models that are part of the IMS in a single model, and (3) complacent model, which accommodates existing and future MSs.
Zeng et al. (2007)	Propose a "synergetic" model for implementing an IMS on three levels: (1) strategic synergy, which refers to goals, plans and strategic actions for quality, environmental and health and safety; (2) synergy of resources, structural and cultural, and (3) synergy of the documentation.
Asif et al. (2009)	Propose a methodology called PEDIMS (Process Embedded Design of Integrated Management Systems). The process begins with the 'design of core processes' that is integrated in the later stages.
Asif et al. (2010a)	Present a methodology developed through the application of both a system approach and a meta-management approach. It also provides a mechanism for satisfying the unique needs of various stakeholders.
Asif et al. (2010b)	Identify the archetypes of integration strategies and evaluate the comparative effectiveness of these strategies. Two strategies are possible: (1) "system approach" and (2) "techno-centric approach" (operational level).
Tari and Molina-Azorin (2010)	Propose the dimensions for a Quality and Environmental (QEM) IMS based on the European Foundation for Quality Management (EFQM) model. The EFQM model helps in the integration of quality and environmental MSs.

The variety of integration methodologies presented in this section demonstrates the great amount of

different methods that organizations can use to integrate their MSs. Analyzing if the method used is conditioning the level of integration is the aim of this study. To reach it, a survey was sent to the persons responsible for the MSs in a sample of Spanish companies. The details of the study are explained in the next section.

3. METHODOLOGY

The methodology used to collect the data was a survey, mailed in 2006 and 2007, to a sample of 1,615 Spanish organizations registered to, at least, ISO 9001: 2000 and ISO 14001: 2004, as described in Bernardo et al. (2009 and 2010). Spain is one of the countries with more registrations to these two standards, ranking fourth in the world in terms of the number of ISO 9001 registrations and third for ISO 14001 certificates (see ISO, 2010a). Specifically, the survey was sent in the three regions with the largest 'certification intensity' in Spain (Heras and Casadesus 2006): Catalonia, the Basque Country and Madrid.

435 valid questionnaires were obtained, representing a 27% response rate and a 96% confidence level. Some of the participating organizations had also implemented other standardized MSs, such as occupational health and safety and corporate social responsibility. An analysis of the number and the implementation order of these MSs can be found in Bernardo et al. (2011), and a descriptive study of Catalan organizations, with more related details, can be found in Karapetrovic et al. (2006).

For this paper, two questions of the survey are analyzed. The first question is related to the level of integration of MSs in the participating organizations and the second is related to the methods used in the integration process. The former question is analyzed in detail in Bernardo et al. (2009), but the integration level is measured considering the MS elements: goals, resources and processes (Karapetrovic and Willborn 1998b). Three integration degrees were defined: no integration, partial integration, and full integration (e.g., see Seghezzi 1997; Kirkby 2002; Karapetrovic 2002 and 2003; Pojasek 2006; Bernardo et al. 2009).

The second question is based on the three possible types of models analyzed in Karapetrovic (2002 and 2005), as discussed in the literature review section. The surveyed organizations could answer if they had used or not any of the four options proposed:

- Process map (PM)
- PDCA cycle for all processes involved in the IMS (PDCA)
- Detailed analysis of common elements among the standards (CE)
- Own model of the organization (OM)

Participating organizations could respond to multiple options, since the proposed methods can be combined to improve the integration process. In the empirical analysis of Karapetrovic et al. (2006), these methods are analyzed in a sample of 176 Catalan companies, obtaining the results that the most-commonly used methods are the analysis of common elements for the requirements (93% of respondents) and the process map (92% of respondents). Of the two remaining options, 70% of organizations surveyed use their own models and 50% use the PDCA cycle.

The final sample used in this paper is 343 organizations: those that have both declared that they had integrated their MSs (either partially or fully) and answered the question about the methods. The data processing is descriptive and presented in the next section.

4. RESULTS

Due to the multiplicity of responses that organizations could choose, a more detailed descriptive analysis of results has been realized.

Participating organizations have been classified according to two criteria: the level of integration and the method used. Two levels of integration have been considered: partial and full, as only those organizations that have integrated, to some degree, their MSs, could have used a method. The second classification is based on the combination of methods used by these organizations. For example, those organizations that have only used a process map are grouped together. Those organizations that used a combination of common elements and process map form another group, and so on. The results are presented in Table 3. Those combinations of methods used for more than 10 organizations are analyzed more deeply.

From the table, firstly, it appears that organizations that have integrated all MSs into a single system have used more different combinations, as fifteen have been detected, while those organizations integrating their MSs partially use nine different combinations. Secondly, the most used combination is the one with all the four methods (number 9 in the table), for both levels of integration (22.68% of organizations have full integration and 40% have partial integration).

In more detail, in those organizations that have full integration of their MSs, the second-most used model is the combination is the one with the process map, the analysis of common elements and the PDCA cycle (17.25%) (number 8 in the table), followed closely by the combination of the process map, analysis of common elements and own model (16.93%) (number 7 in the table). The other methods frequently combined are the process map and common elements (14.70%), common elements and own model (7.03%), analysis of common elements only (6.39%), and process map and own model (4.15%).

In the case of companies with partial integration of

their MSs, the three most common combinations are, firstly, the combination of the four methods (40%), secondly, the process map, common elements and own model (23.33%) and thirdly, the process map and common elements (13.33%).

It can be seen, therefore, that the third characteristic of organizations surveyed is that, of the fifteen possible combinations of methods, the process map and the common elements analysis are present in eight. Thus, the two most applied methods during the integration process are the process map and the common elements analysis. It is noteworthy that, from the organizations that have used only one of the possible methods, the common elements analysis is the most widely used, especially by companies with full integration. These results are in line with the study of Karapetrovic et al. (2006) mentioned above.

Regarding the PDCA cycle, used in standards such as ISO 14001: 2004 for environmental MS (ISO 2004a), OHSAS 18001: 2007 (BSI 2007) for occupational, health and safety management system, ISO 19011: 2002 (ISO 2002) for auditing quality and environmental MSs, UNE 66177: 2005 for integration of MSs (AENOR 2005), and some authors, such as Labodová (2004), it is not the most used by companies in the sample. In fact, as a unique model applied, only two organizations have used it, and both have fully-integrated systems, while no organizations with partially-integrated systems have indicated using it. However, it is present in seven combinations, including two of the most common ones.

Given the variety of methods applied in the process, it was decided to study the level of integration related to the combinations most frequently submitted by companies. Only those combinations that have been used by more than ten organizations that integrate their MSs, whether they do so fully or partially, are analyzed further. These seven groups represent 306 organizations (see table 3), approximately 89% of the initial sample of 343.

Table 3 Combinations of methods used by the organizations from the sample

Models		**Full integration**			**Partial integration**			**Total**
		No. Org.	% out of full integration	% out of total sample	No. Org.	% out of partial integration	% out of total sample	
1	Process map (PM)	8	2.56	2.33	0	0.00	0.00	8
2	Common elements (CE)	20	6.39	5.83	1	3.33	0.29	**21**
3	Own model (OM)	4	1.28	1.17	1	3.33	0.29	5
4	PDCA cycle	2	0.64	0.58	0	0.00	0.00	2
5	PM+CE	46	14.70	13.41	4	13.33	1.17	**50**
6	PM+OM	13	4.15	3.79	1	3.33	0.29	**14**
7	PM+CE+OM	53	16.93	15.45	7	23.33	2.04	**60**
8	PM+CE+PDCA	54	17.25	15.74	1	3.33	0.29	**55**
9	PM+CE+OM+PDCA	71	22.68	20.70	12	40.00	3.50	**83**
10	PM+OM+PDCA	9	2.88	2.62	0	0.00	0.00	9
11	CE+OM+PDCA	7	2.24	2.04	2	6.67	0.58	9
12	PM+PDCA	2	0.64	0.58	0	0.00	0.00	2
13	CE+OM	22	7.03	6.41	1	3.33	0.29	**23**
14	CE+PDCA	1	0.32	0.29	0	0.00	0.00	1
15	OM+PDCA	1	0.32	0.29	0	0.00	0.00	1
	Total	313	100	91.25	30	100	8.75	343

In order to know the level of the integration of goals, resources and processes for each group, the same methodology as in Bernardo et al. (2009 and 2010) has been applied. Thus, organizations that have declared integrating goals, documentation resources and procedures partially are codified with 50%, if they are fully integrated, 100%, and if none of them are integrated, are codified with 0%. The groups are represented in Figure 1. This codification facilitates the graphical representation of each group according to the aspects of MSs analyzed. In addition, the volume of the circle represents the number of organizations that

compose the group.

In the figure, and before describing each group, it can be observed that the level of integration of these groups is high and quite similar, and the procedures are integrated at a higher level than goals and documentation resources, as also happened in Bernardo et al. (2009).

- Group 1

This group consists of 7% of the sample or 21 organizations that have used only the analysis of common elements (CE) as the method to integrate. It is the group with the lowest level of integration of both goals and documentation resources, and procedures. The percentage is an average of 65.48% for the former and 81.67% for the latter (Figure 1).

Regarding the goals and documentation resources, the most integrated are work instructions at 71.88%, followed by the procedures and policy, both integrated at 71.43%. Records are those that present the lowest level of integration at 47.62%. In this group, the behavior is different from the rest, because, as it is analyzed later in this paper, it is the only group in which the operational aspects are those with a higher level of integration (see Seghezzi 1997; Douglas and Glen 2000).

In these organizations, procedures are integrated, on average, at 81.67%, 16% more than the goals and documentation resources. Procedures with the highest level of integration are system review and internal communication (97.62%) and records control (95.25%). The least integrated procedures, at 64.29%, are planning, product realization and requirements. Therefore, the most integrated procedures, when related to the chapters of ISO 9001, correspond to "management responsibility" (Chapter 5 of ISO 9001), while those less integrated mostly belong to Chapter 7 or "product realization", which are more difficult to integrate because of their specificity.

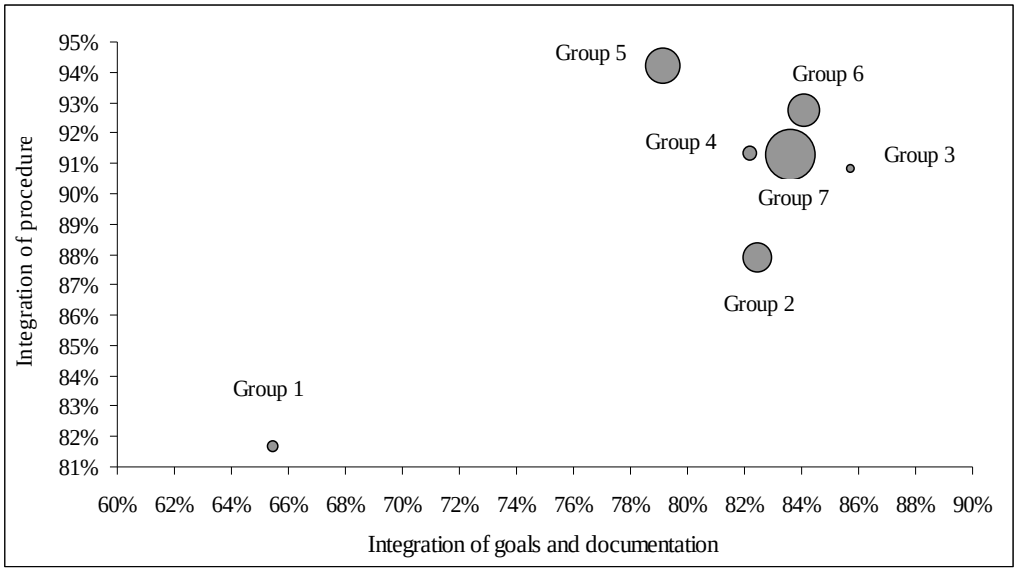

Fig. 1 Classification of organizations according to management models used in the integration process

- Group 2

The 50 organizations belonging to this group represent 16.34% of the sample. These companies have used a combination of methods consisting of the process map and the common elements analysis (PM+CE). As shown in Figure 1, the average level of integration of goals and documentation resources is higher than in the preceding group, specifically 82.46%, in the case of procedures, which are integrated on average at 87.88%.

In terms of the goals and documentation resources, the highest level of integration achieved is for the manual at 92.86%, followed with a certain difference by policy at 87.76%. However, the aspect least integrated are the work instructions (72%), contrary to what happened in the previous group, followed by records (75%). Therefore, as concluded in Bernardo et al. (2009), companies begin the integration process by integrating the strategic aspects first.

In the case of procedures, the most integrated are internal communication (96%), control of documentation (95%), and records (94%), related to Chapter 4 of ISO 9001. As in the previous group, planning is the least integrated aspect (78%), followed by product realization (78.57%).

- Group 3

4.58% organizations of the sample (14

members) belong to this group. These companies have applied the combination of the process map and an own model as the integration tool (PM+OM). On average, members of this group have integrated goals and documentation resources at 85.71%, and procedures at 90.80% (Figure 1). It is the group that presents the highest level of integration of goals and documentation resources out of the seven analyzed.

As in Group 2, the manual is one of the most integrated, at 92.86%, as are policy and objectives. Records are the least integrated, at 65.38%, as also happened in the previous group.

Internal audit and system review at 96.43% are the most integrated procedures, while the least integrated is product realization at 66.67%. Again, ISO 9001 Chapter 5-related aspects are the most integrated, with a very specific aspect ("Product Realization") being the least integrated.

- Group 4

This group comprises 23 organizations representing 7.52% of the sample. The method used has been a combination of the common elements analysis and an own model (CE+OM). As shown in Figure 1, this group has a very similar integration level of goals and documentation resources to Group 2, 82.21% on average, while procedures are integrated to a level similar to Group 3, 91.30% on average.

For goals and documentation resources, the most integrated elements are, again, the manual and policy at 89.13% and 84.78%, respectively. The aspect that achieves the lowest level of integration is records (69.57%).

Regarding the procedures, the most integrated is control of documentation at 95.65%, followed by preventive and corrective actions at 93.48%, and internal audit, nonconformities control and system review, at 91.30%. The least integrated procedure, again, is product realization, at 63.04%. In this case, it is noteworthy that the aspects related to Chapter 8 of ISO 9001 "Measurement, analysis and improvement" are the most integrated.

- Group 5

The 60 organizations of this group (19.61% of the sample) have used a combination of three methods to perform the integration process: process map, analysis of common elements and own model (PM+CE+OM). These organizations have integrated, on average, goals and documentation resources at 79.19%, while procedures are integrated, on average, at 94.17%, the highest level of all groups analyzed (see Figure 1).

The most integrated documentation resource in this group is the manual at 94.17%, an outstanding level compared to other goals and documentation resources. As in the other groups, records are the least integrated, at 70%.

Regarding the procedures, internal audit and control of documentation, both integrated at 97.50%, they are the most integrated, while the least integrated is planning (77.12%), as also happened in Groups 1 and 2.

- Group 6

This group comprises 55 companies (17.97% of the sample) who have used the process map, the analysis of common elements and the PDCA cycle as a tool (PM+CE+PDCA). Organizations integrate, on average, goals and documentation resources at 84.09% and procedures at 92.73%.

In this group, organizations have integrated to a higher level the policy (91.82%) and the manual (90%), while the least integrated are work instructions (77.27%) and records (77.78%).

Procedures follow the same pattern of integration as in Group 4, because the most integrated are internal audits, system review, corrective and preventive actions and nonconfirmities control, all integrated at 93.64%. So, again, it is the aspects related to the chapter on "measurement, analysis and improvement" of ISO 9001 that are the most integrated.

- Group 7

The last group is the largest, consisting of 83 organizations that used all the methods proposed to carry out the integration process (PM+CE+OM+PDCA). On average, these companies have integrated goals and documentation resources at 83.63%, while procedures at 91.27%.

Manual and objectives are the most integrated goals and documentation resources (90.85% and 87.80%, respectively) and work instructions and records are the least integrated (75.31%).

Record control is the most integrated procedure at 96.39%, followed by the document control and internal audits (95.78%). Therefore, aspects related to Chapter 4 of ISO 9001 are the most integrated ones in this group.

5. CONCLUSIONS

The aim of this paper is to analyze if the methods used to integrate MSs condition the level of integration of the MSs. From an empirical analysis performed on a sample of 343 Spanish organizations, the main conclusions to extract are the following.

First, organizations in the sample apply fifteen different combinations of methods to integrate their MSs. Of these, seven combinations are followed by more than ten organizations. It is noteworthy that the process map is the most common method.

This result is logical, as this is the model upon which ISO 9001 is based and the majority of organizations have implemented this standard first (Bernardo et al. 2011). Thus, a great number of

organizations may use this model as the base model for the IMS, as they have experience in applying and using it. Following Karapetrovic (2005), the main method used appears to be the 'initial model'.

Second, after analyzing in detail these seven groups of organizations categorized in this study, it can be stated that these organizations have very high levels of integration of MSs. The level of integration of procedures is higher than the level of integration of goals and documentation resources, as also happened in Bernardo et al. (2009). This means that the Spanish organizations are following an adequate strategy to be more efficient.

Third, organizations using more than one method to integrate their MSs reach a higher level of integration. This can be observed in Group 1, in which organizations have used only the analysis of common elements and which presents the lowest level of integration. Related to this, none of the groups achieves the highest level of integration for all MS elements analyzed, but it seems that it is Group 6 which has, on average, the highest levels.

Therefore, a method formed by the process map, common elements analysis and the PDCA cycle seems to help getting the best results for an overall system integration. We can state, although with caution, that applying an own model is not profitable for organizations as it may not be allowing them to achieve the highest level of integration possible.

Finally, taking into account these arguments, we can not completely say that the level of integration of MSs is conditioned by the method used to integrate them.

The contributions of these results are to know empirically that it may be better to combine different methods that complement each other and that allow achieving higher levels of integration. The results could also make organizations follow an existing guideline or standard more than apply an own model. The results obtained can be applied to all organizations willing to integrate their MSs.

The recommendations for organizations are to analyze the existing experiences of other organizations that can be in a similar position as them and use their experience as a guideline to start or improve the integration process. Second, in case of a lack of knowledge or experience, organizations can contract a consultant to help them.

This recommendation is also for consultants, as they have to be trained in finding the best methods for each organization and implementing them in the best way.

The main limitation of this study is the descriptive analysis of the sample. Additionally, the results allow knowing the method used, but not how the method was applied. This could be a future research question.

Future research will be oriented to measure the impact of MSs integration on the performance and management of organizations.

.

REFERENCES:

[1] AENOR (2005). UNE 66177 Sistemas de gestión. Guía para la integración de los sistemas de gestión.Madrid, Spain: Asociación Española de Normalización y Certificación

[2] Asif, M., Bruijn, E., Fisscher, O., Searcy, C., & Steenhuis, H. (2009). Process embedded design of integrated management systems. International Journal of Quality & Reliability Management, 26 (3), 261-282

[3] Asif, M., Joost de Bruijn, E., Fisscher, O. & Searcy, C. (2010a). Meta-management of integration of management systems, The TQM Journal, 22 (6), 570-582

[4] Asif, M., Fisscher, O., Joost de Bruijn, E., & Pagell, M. (2010b). An examination of strategies employed for the integration of management systems, The TQM Journal, 22 (6), 648-669

[5] Beckmerhagen, I., Berg, H., Karapetrovic, S., & Willborn, W. (2003). Integration of management systems: focus on safety in the nuclear industry. International Journal of Quality and Reliability Management, 20 (2), 209-227

[6] Bernardo, M., Casadesus, M., Karapetrovic, S., & Heras, I. (2009). How integrated are environmental, quality and other standardized management systems? An empirical study. Journal of Cleaner Production, 17 (8), 742-750

[7] Bernardo, M., Casadesus, M., Karapetrovic, S., & Heras, I. (2010). An empirical study on the integration of management system audits. Journal of Cleaner Production, 18 (5), 486-495

[8] Bernardo, M., Casadesus, M., Karapetrovic, S., & Heras, I. (2011). Integration of standardized management systems: Does the implementation order matter?, International Journal of Operations and Management, In press

[9] BSI (2006). PAS 99 Specification of common management system requirements as a framework for integration. London, UK: British Standards Institution

[10] BSI (2007). OHSAS 18001 Occupational health and safety management systems. Requirements, London, UK: British Standards Institution
[11] Casadesús, M., Marimon, F., & Heras, I. (2008). ISO 14001 diffusion after the success of the ISO 9001 model. Journal of Cleaner Production, 16 (16), 1741-1754
[12] Dansk Standard (2005). DS 8001 Ledelsessystemer - Vejledning i opbygning af et integreret ledelsessystem. Copenhagen, Denmark
[13] Douglas, A., & Glen, D. (2000). Integrated management systems in small and medium enterprises. Total Quality Management, 11 (4), S686-S690
[14] Franceschini, F., Galetto, M., & Gianni, G. (2004). A new forecasting model for the diffusion of ISO 9000 standard certifications in European countries. International Journal of Quality & Reliability Management, 21 (1), 32-50
[15] Griffith, A., & Bhutto, K. (2008). Improving environmental performance through integrated management systems (IMS) in the UK. Management of Environmental Quality: An International Journal, 19 (5), 565-578
[16] Heras, I., & Casadesús, M. (2006). Los estándares internacionales de sistemas de gestión: pasado, presente y futuro. Boletín ICE - Revista del Ministerio de Industria, Turismo y Comercio, 2876, 45-61
[17] ISO (2002). ISO 19011. International Standard: Guidelines for quality and/or environmental management systems auditing. Geneva, Switzerland: International Organization for Standardization.
[18] ISO (2004a). ISO 14001 Environmental management systems - Requirements with guidance for use. Geneva, Switzerland: International Organization for Standardization
[19] ISO (2004b). ISO 10002: Quality management - Customer satisfaction - Guidelines for complaints handling in organizations. Geneva, Switzerland: International Organization for Standardization
[20] ISO (2005). ISO 27001: Information technology - Security techniques - Information security management systems – Requirements. Geneva, Switzerland: International Organization for Standardization
[21] ISO (2007a). ISO 10001: Quality management - Customer satisfaction - Guidelines for codes of conduct for organizations. Geneva, Switzerland: International Organization for Standardization
[22] ISO (2007b). ISO 10003: Quality management - Customer satisfaction - Guidelines for dispute resolution external to organizations. Geneva, Switzerland: International Organization for Standardization
[23] ISO (2008a). ISO 9001: Quality management systems – Requirements. Geneva, Switzerland: International Organization for Standardization
[24] ISO (2008b). The integrated use of management system standards. Geneva, Switzerland: International Organization for Standardization
[25] ISO (2010a). The ISO survey of certifications – 2009. Geneva, Switzerland: International Organization for Standardization
[26] ISO (2010b). ISO/TS 10004: Quality management -- Customer satisfaction -- Guidelines for monitoring and measuring. Geneva, Switzerland: International Organization for Standardization
[27] Jonker, J., & Karapetrovic, S. (2004). Systems thinking for the integration of management systems. Business Process Management Journal, 10 (6), 608-615
[28] Karapetrovic, S. (2002). Strategies for the integration of management systems and standards. The TQM Magazine, 14 (1), 61-67
[29] Karapetrovic, S. (2003). Musings on integrated management systems. Measuring Business Excellence, 7 (1), 4-13
[30] Karapetrovic, S. (2005). IMS in the M(E)SS with CSCS. Total Quality Management and Excellence - Menadzment Totalnim Kvalitetom i Izvrsnost, 33 (3), 19-25
[31] Karapetrovic, S., & Casadesús, M. (2009). Implementing environmental with other standardized management systems: Scope, sequence, time and integration. Journal of Cleaner Production, 17 (5), 533-540
[32] Karapetrovic, S., & Jonker, J. (2003). Integration of standardized management systems: searching for a recipe and ingredients. Total Quality Management & Business Excellence, 14 (4), 451-459
[33] Karapetrovic, S., & Willborn, W. (1998a). Integration of quality and environmental management systems. The TQM Magazine, 10 (3), 204-213
[34] Karapetrovic, S., & Willborn, W. (1998b). The system's view for clarification of quality vocabulary. International Journal of Quality & Reliability Management, 15 (1), 99-120
[35] Karapetrovic, S., & Willborn, W. (2000). Generic audit of management systems: Fundamentals. Managerial Auditing Journal, 15 (6), 279-294.
[36] Karapetrovic, S., Casadesús, M., & Heras, I. (2006). Dynamics and integration of standardized management systems. An empirical study. Girona, Spain: Documenta Universitaria. GITASP 1
[37] Kirkby, A. (2002). The one-stop shop. Quality World, January, 2-4.
[38] Labodová, A. (2004). Implementing integrated management systems using a risk analysis based approach. Journal of Cleaner Production, 12 (6), 571-580

[39] Marimon, F., Casadesús, M., & Heras, I. (2006). ISO 9000 and ISO 14000 standards: an international diffusion model. International Journal of Operations & Production Management, 26 (2), 141-165
[40] Marimon, F., Heras, I., & Casadesus, M. (2009). ISO 9000 and ISO 14000 standards: A projection model for the decline phase. Total Quality Management & Business Excellence, 20 (1), 1-21
[41] Pojasek, R. (2006). Is your integrated management system really integrated?. Environmental Quality Management, 16 (2), 89-97.
[42] Puri, S. (1996). Stepping Up To ISO 14000: Integrating Environmental Quality with ISO 9000 and TQM. USA: Productivity Press
[43] Renfrew, D., & Muir, G. (1998). QUENSHing the thirst for integration, Quality World, 24, 10-13
[44] SAI (2008). SA 8000 Social Accountability Guidance Document. New York, USA: Social Accountability International,
[45] SAI Global (1999). AS/NZS 4581 Management system integration - Guidance to business, government and community organizations. Sydney, Australia
[46] Seghezzi, H. (1997). Business concept redesign. Total Quality Management, 8 (2), 42-49
[47] Tari, J., & Molina-Azorin, J. (2010). Integration of quality management and environmental management systems. Similarities and the role of the EFQM model, The TQM Journal, 22 (6), 687-701
[48] Wilkinson, G., & Dale, B. (1999). Integration of quality, environmental and health and safety management systems: an examination of the key issues. Proceedings of the Institution of Mechanical Engineers. Part B. Journal of engineering manufacture, 213 (3), 275-283
[49] Wright, T. (2000). IMS- Three into One Will Go!: The Advantages of a Single Integrated Quality, Health and Safety, and Environmental Management System. The Quality Assurance Journal, 4 (3), 137-142
[50] Zeng, S., Shi, J., & Lou, G. (2007). A synergetic model for implementing an integrated management system: an empirical study in China. Journal of Cleaner Production, 15 (18), 1760-1767
[51] Zutshi, A., & Sohal, A. (2005). A framework for environmental management system adoption and maintenance: an Australian perspective. Management of Environmental Quality: An International Journal, 16 (5), 464-475

Received: 20.01.2011 Accepted: 06.07.2011 Open for discussion: 1 Year