



Relationships between the integration of audits and management systems

Relationships
between audits
and systems

An empirical study

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Abstract

Purpose – The purpose of this paper is to analyze the application and the level of integration of internal and external audits in organizations that are registered to multiple management system standards.

Design/methodology/approach – Using descriptive analyses, this work examines the manner in which organizations, categorized in a previous study with respect to the degree of integration of their standardized management systems (MSs), apply and integrate the related MS audits. The sample included 435 Spanish organizations registered to ISO 9001: 2000 and ISO 14001: 2004 at the minimum.

Findings – It was found that organizations that exhibited a higher level of integration of their standardized MSs also demonstrated more highly-integrated audits. In addition, the level of integration was generally higher for internal compared with the external audits.

Research limitations/implications – The main limitation was related to the survey responses, because they were asked and obtained from the organizations' managers only, and not from the registrars or other external audit bodies.

Originality/value – The study contributes to a more comprehensive understanding of the usage of auditing systems in organizations, in particular the level of integration of internal and external MS audits relative to the integration of the corresponding MSs.

Keywords Auditing, Integrated management systems, Integration levels, ISO 14001, ISO 9001, ISO 9000 series, Quality audit, Information systems

Paper type Research paper



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1. Introduction

The proliferation of Management System Standards (MSSs) in the first decade of this century (e.g., see ISO, 2009) has opened new possibilities for their integrative applications (e.g., see ISO, 2008). Organizations with two or more standardized Management Systems (MSs) can integrate these systems to become more efficient and to capitalize on the synergies among them (Karapetrovic and Willborn, 1998; Seghezzi, 2001; Karapetrovic, 2003; Zeng *et al.*, 2007). Other advantages of integration include the simplification of MS requirements, optimization of resources, reduction of audit costs and increased satisfaction of stakeholders (e.g., Wilkinson and Dale, 1999a, b; Beckmerhagen *et al.*, 2003; Zutshi and Sohal, 2005). Apart from these advantages, however, various difficulties have also been discussed in the literature. The main difficulties are related to MS models and common elements, lack of employee motivation and fear of job losses due to integration (e.g., Karapetrovic, 2003; Beckmerhagen *et al.*, 2003; Zeng *et al.*, 2007).

The integration process can be defined, according to Beckmerhagen *et al.* (2003), as:

a process of putting together different function-specific management systems into a single and more effective integrated management system.

Four important aspects characterize this process. The first one relates to the organization deciding upon the strategy to follow in the integration, for example implementing the Quality Management System (QMS) first and the Environmental Management System (EMS) second (e.g., Karapetrovic and Willborn, 1998). The second aspect refers to the methodology used in the process, which could be based, for instance, on a standard or a guidance document published by a standardization body, such as SAI Global (1999), Dansk Standard (2005), AENOR (2005), BSI (2006), and ISO (2008), or on an academic or practical literature (e.g., Karapetrovic and Willborn, 1998; Karapetrovic, 2003, 2005; Labodová, 2004; Zeng *et al.*, 2007).

This paper addresses the connections between the third and fourth aspects of the integration process. Namely, the third one is concerned with the achievable MS integration levels, since such levels depend on how the process is realized in each case (e.g., Karapetrovic, 2003; Bernardo *et al.*, 2009). The literature on the levels of integration of standardized MSs reflects such different possibilities. From the theoretical perspective, examples of the related studies include Seghezzi (1997), Wilkinson and Dale (1999a), Kirkby (2002), Karapetrovic (2002, 2003), Beckmerhagen *et al.* (2003), Pojasek (2006), and Jørgensen *et al.* (2006). Although smaller in numbers, empirical studies, such as Douglas and Glen (2000), Fresner and Engelhardt (2004), Zeng *et al.* (2005), Zutshi and Sohal (2005), Karapetrovic *et al.* (2006), Zeng *et al.* (2007), Salomone (2008), Bernardo *et al.* (2009, 2010), and Karapetrovic and Casadesus (2009), also exist. Finally, the fourth aspect, which is specifically focused on here, is the integration of internal and external audits (see, e.g. Karapetrovic and Willborn, 2000; ISO, 2002; Karapetrovic, 2002; Salomone, 2008; Bernardo *et al.*, 2010).

As some of the above-mentioned studies show, integration of internal and external audits is the aspect of the integration progress least researched empirically, although there are some examples, such as Salomone (2008) and Bernardo *et al.* (2009, 2010). Results from the available empirical analyses show that internal auditing is among the most integrated processes in the MSs of the studied organizations (Salomone, 2008, Bernardo *et al.*, 2009). Evidently, it can be expected that the more integrated MSs are,

the more integrated the respective internal audits will be. In addition, the actual levels of integration of internal audits or other subsystems can be related to such levels in the overarching MSs (see, e.g. Bernardo *et al.*, 2009). It is also possible to analyze the integration of auditing subsystems in the same manner as for the MSs themselves, namely based on the levels of integration of the main system components, i.e. audit goals, resources, and processes.

Since external audits are not subsystems of the studied organizations' MSs (as indicated in ISO 9001: 2008, internal audits are a process of the MSs, but no reference to external audits is made in that sense), establishing such a relationship between the levels of integration of these audits, on one hand, and of the MSs, on the other, will be challenging (Karapetrovic and Willborn, 1998; Kraus and Grosskopf, 2008; Darnall *et al.*, 2009). In a 1990s study of registrars, Wilkinson and Dale (1998) found that they did not offer integrated external audits at the time, but they offer "training on the integration" of MSs. Still, it is reasonable to expect that if the MSs of the audited organizations are integrated, the more likely it would be that the external audits are integrated, as well (Kraus and Grosskopf, 2008). In any case, the integration of external audits can also be analyzed through the levels of integration of the same system components as for the internal ones.

It should be noted that international standards covering both internal and external MS audits have been published, namely ISO 19011 and ISO 17021. While internal and external auditors alike can follow the ISO 19011 guidelines (ISO, 2002), the ISO 17021 requirements are specifically aimed at registrars (ISO, 2006).

Overall, it can be expected that the results will differ depending on the type of audits, considering the differences in the objectives (e.g., Bamber *et al.*, 2004; Power and Terziowski, 2005; Darnall *et al.*, 2009) and the processes applied in internal and external audits, respectively.

The main objective of this paper is to analyze the degrees of integration of internal and external audits with respect to the specific levels of integration of standardized MSs in organizations. The study described here could be used by both academics and practitioners, and contributes to a better understanding of the integration of the audit systems and their components. The methodology used and the results obtained are provided first. Subsequently, the main findings are summarized and some ideas for future such studies and examinations are presented.

2. Methodology

The methodology used in this paper is the same as in Bernardo *et al.* (2009). A mail survey was sent out in 2006 and 2007 to 1,615 Spanish organizations registered to both ISO 9001: 2000 and ISO 14001: 2004. As explained in the paper, 435 valid responses, representing a 27 percent response rate, were obtained. Organizations belonging to the sample are mainly (70 percent) small and medium sized. 42 percent of them operate in the production sector, while 16 percent are in construction. In the present analysis of the integration of audit systems, the same sample as in Bernardo *et al.* (2009) is used.

For the purposes of this research, we utilize the levels of integration proposed by Bernardo *et al.* (2009). In that study, organizations with multiple MSS certificates were categorized into the following four groups, according to the degree of integration of the goals, resources and processes of the implemented MSs:

- (1) *Group 0* was formed by 73 organizations (17 percent of the sample), which had not integrated their standardized MSs. Therefore, the level of integration of MS goals, resources or processes was not examined for this group. These organizations from Group 0 operate mostly in the production sector (45 percent) and have less than 250 employees (71 percent).
- (2) *Group 1* was characterized by partial integration of MSs. It consisted of only 8 organizations, (71 percent) of which have less than 250 employees, and mainly (57 percent) operate in the production and construction sectors. Due to such a small number, the results from this group were taken with caution. They indicated an average integration level of 29 percent for the goals and resources, with record control (100 percent) and management review (94 percent) being the most integrated processes. Due to its small size and lower significance compared to the other groups, this cluster of organizations will not be further analyzed.
- (3) *Group 2* had a higher level of integration than the preceding group, with 41 organizations categorized in it. The group is mostly composed of organizations with less than 250 employees (64 percent) and largely belonging to the production sector (32 percent). On average, goals and resources were integrated at 62 percent, the highest being the policy (78 percent), objectives (66 percent) and the manual (67 percent). The processes were integrated at 66 percent, with internal communication (74 percent) and internal audits (71 percent) being the most integrated.
- (4) *Group 3* consisted of 71 percent of the sample, or 310 organizations. They have 250 employees or less in 69 percent of the cases and operate mostly in the production sector (42 percent). This group had the highest level of integration among the four identified groups, although this level was not 100 percent. Goals and resources were integrated at the average level of 86 percent and processes at 96 percent. From the first set of components, the MS manual (94 percent), policy and objectives (87 percent) were integrated the most, while amongst the processes, it was document and record control (99 percent).

The survey questionnaire contained 16 questions on issues related to the integration of MSs, such as the challenges encountered during the process and models used to integrate MSs. One of the two questions devoted to MS audits contained eight sub-questions, examining how external and internal audits were conducted in the surveyed organizations. These variables were classified in two groups. The first group of variables related to the integration of audits, with degrees varying from no integration to complete integration. The second group related to the methodology used in the audits, for example the frequency of conducting individual audits. The respondents were asked to choose one of the different answers that were provided for each question.

In order to relate the integration of both internal and external audits to the groups obtained in Bernardo *et al.* (2009), the following three variables from the set corresponding to audit integration were taken into account:

- (1) “*Audit team*”, defined in the ISO 19011: 2002 audit guideline as “one or more auditors conducting an audit supported if needed by technical experts” (ISO,

2002). In organizations with multiple MSSs, audits of the respective MSs can be conducted by a single or multiple auditors or teams (ISO, 2002). The survey contained three possible options for the response, namely that auditors were the same for all implemented MSSs (“full integration”), were the same for certain MSSs only (“partial integration”) and that auditors were different for all MSSs used (“no integration”).

- (2) “*Audit time*” (“simultaneity”), related to whether or not audits of different MSs were conducted at the same time (ISO, 2002). The respondents also had three possibilities, specifically to indicate that audits against all MSSs were conducted at the same time (“full integration”), that audits against some, but not all, MSSs were conducted simultaneously (“partial integration”), or that they were conducted at different times (“no integration”).
- (3) “*Audit plan and audit report*”. A single variable was used in this case, although audit plans basically represent the inputs of MS audits and are defined as “descriptions of the activities and arrangements for an audit” (ISO, 2002), while audit reports are outputs or “source of information that is used for review of the MS” (ISO, 2002). Audit plans, just like the reports, can be integrated into a single document, or remain separate. To evaluate the levels of integration with respect to this variable, organizations had three possible options, namely that audits used a single plan and a single report (“full integration”), that only a single plan, but separate audit reports were generated for different MSSs (“partial integration”), and that audits were conducted using different plans and different reports (“no integration”).

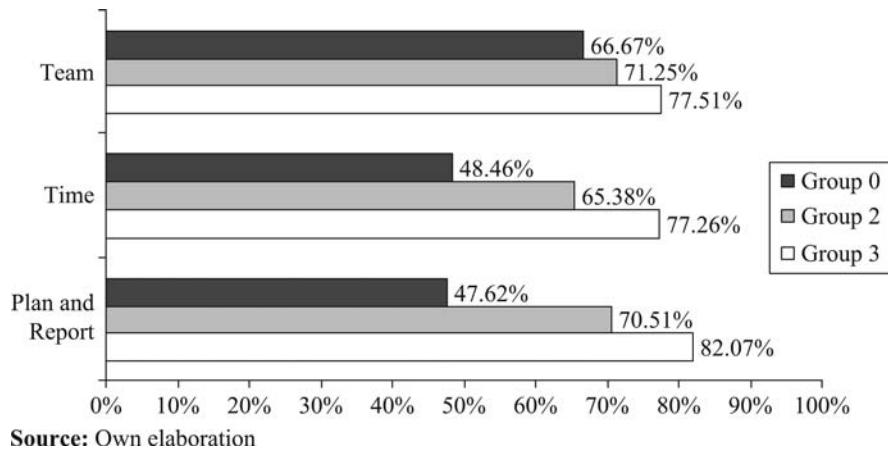
In the following two sections, the data are analyzed descriptively for internal and external audits, respectively. The intent is to examine the level of integration of audits with respect to the three above variables and within each of the four groups of organizations identified in Bernardo *et al.* (2009). The methodology for identifying the levels of integration of audits is the same as used by Bernardo *et al.* (2009) to determine the integration levels for the respective standardized MSs. In other words, for each variable related to audits, three possible levels of integration were determined and subsequently labelled with “0 percent”, “50 percent” or “100 percent” to indicate “no”, “partial” and “full” integration, respectively.

3. Internal audits

Figure 1 shows the average level of integration of selected internal audit components, such as audit goals, resources and processes, for the three groups of organizations (“0”, “2” and “3”) and with respect to the audit “team”, “time” and “plan and report” variables. This level is fairly high for all three groups, particularly for the audit “team” variable. Since the groups indicate particular overall levels of integration of standardized MSs, listed in increasing order (from Group 0 exhibiting “no integration” to the “most integrated” Group 3), Figure 1 relates the level of integration of internal audits with the level of integration of the corresponding standardized MSs.

Results from Bernardo *et al.* (2009) showed that Group 0 organizations integrated their internal auditing processes at the average level of 78 percent. Therefore, it can be stated that these organizations actually integrate at least some components of their auditing subsystems. However, it seems that not having integrated other subsystems

Figure 1.
Level of integration of
internal audits by level of
integration of
standardized MSs



brings about the perception of these organizations that their standardized MSs are not integrated. In terms of the internal audit resources and processes, this group integrates audit teams at 67 percent, likely indicating that single audit teams are applied to conduct audits against a selected set of MSSs. Nevertheless, the level of integration with respect to the other two variables studied is lower, approximately at 48 percent for both. Thus, internal audit resources and processes exhibit some level of integration, although the overarching MSs were not reported as integrated.

The level of integration in Group 2 ranges from 65 percent to 71 percent (Figure 1). The organizations from this group reported an average level of integration of their internal audit processes of 71 percent (Bernardo *et al.*, 2009). This number is practically identical to the level of integration reported for the audit “team” and “plan and report” variables, respectively. However, the “time” variable shows a lower average level of integration at 65 percent, indicating that “simultaneous audits” in this group of organizations are less prevalent than the “joint” audits (i.e. audits performed by a single audit team – see ISO, 2002) or audits conducted with a single audit plan and report.

For Group 3, which is not only the largest of the four identified groups, but is also characterized by the highest level of integration of MSs, the integration of internal audits is the strongest. The organizations from this group reported a 97 percent integration level for internal audit processes (Bernardo *et al.*, 2009). As Figure 1 illustrates, the audit “plan and report” variable shows the highest degree of integration among the three studied variables, at 82 percent, followed by the audit “team” and “time”. Interestingly, the level of integration of the audit processes reported by these organizations in the section of the survey related to the integration of different MS processes, namely 97 percent, is higher than the indicated level of integration of the audit components studied through the audit “team”, “time” and “plan and report” variables. This could be due to various reasons, for instance not including in the study one or more variables that are more related to the auditing process itself.

Consequently it seems that there is a fairly consistent pattern of integration of internal audits among these groups (Groups 0, 2 and 3). Overall, the integration of internal audits augments, and in terms of the corresponding levels also follows, the

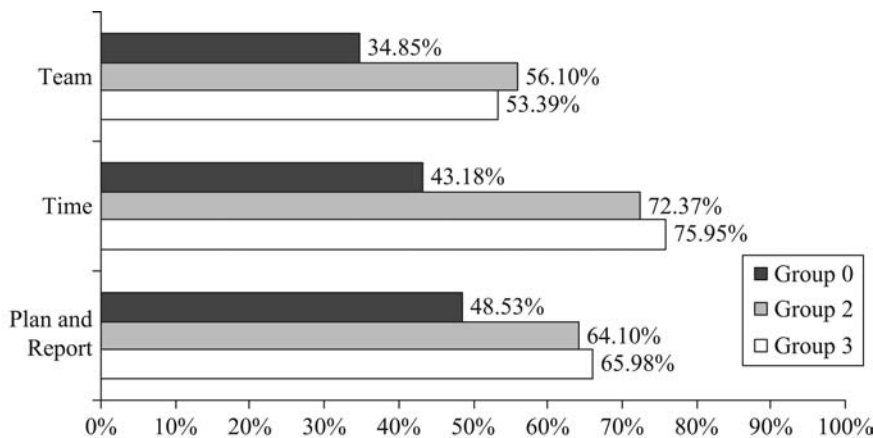
integration of the underlying MSs. For all three variables studied, the levels of integration of audits relate to such levels in MSs. Namely, Group 0, characterized by separate MSs, also shows the lowest level of integration of audit resources and processes. It is followed by Group 2, which shows less-integrated teams, plans and reports, as well as more audits conducted at different times, compared to Group 3. Therefore, the results point out that organizations with a higher degree of integration of their MSs seem to also have more integrated internal audit components.

4. External audits

Figure 2 illustrates the degree of integration of external audits, contrasted with the levels of integration of the underlying standardized MSs. Compared to internal audits, external audit components related to the audit “team” and “plan and report” variables exhibit a lower level of integration, while it seems that external audits are conducted simultaneously to a higher degree than internal audits.

When Figure 2 results are analyzed with respect to each group, Group 0 has the lowest level of integration. Audit “plans and reports” are integrated at about the 48 percent level, while the “time” variable resulted in a 43 percent integration level. The least integrated component is the audit “team”, showing a level of only 35 percent and indicating that most external audits of the organizations from this group are conducted by separate audit teams. Therefore, at least in the case of this group, it seems that external audits themselves reflect the actual separation of the MSs being audited. However, these results are in contrast with the internal audit findings. This is particularly true for audit teams, which were integrated in internal audits at almost double the level of the external audits. Such a finding is not surprising, considering the focus on the efficient use of available resources in internal audits and the availability of expertise in external audits (e.g., see Baldi, 1999; Kraus and Grosskopf, 2008; and Darnall *et al.*, 2009).

Groups 2 and 3 are characterized by similar levels of integration of external audits (Figure 2), which could indicate that registrars do not distinguish between organizations with different levels of MSs integration (Kraus and Grosskopf, 2008). Specifically, for Group 2 organizations, the most integrated resource is audit “time”,



Source: Own elaboration

Figure 2.
Level of integration of
external audits by level of
integration of
standardized MSs

indicating that external audits of the implemented MSs are conducted simultaneously. The audit time variable is followed by the audit “plan and report”, while the least integrated component is the audit “team”, at only 56 percent. This is almost 15 percent less than in the case of internal audit teams for the organizations from this group.

For Group 3, simultaneous audits are indicated at the highest level of 76 percent among the three variables. There is about a 2 percent difference between Groups 3 and 2 with respect to audit plans and reports. It is the opposite, although also not significantly different, in the case of audit “teams”, where the 54 percent level for Group 3 is about 2 percent less than for Group 2. Again, Group 3 is characterized by a higher level of integration of internal audit teams, plans and reports, while simultaneous audits are indicated by similar percentages for both internal and external audits.

Overall, it cannot be affirmed that a higher level of integration of standardized MSs brings about a higher level of integration of external audits in all the studied variables and for the analyzed groups. This relationship holds for the audit “time” variable, slightly also for the audit “plan and report” variable, but not for the audit “teams”. Therefore, the relationship between the integration of external audits, on one side, and the integration of MSs, on the other, seems to be different than in the case of internal audits.

5. Further comparative analysis

To better understand the differences in the integration levels between the internal and external audits, two additional variables are studied, namely the audit “process” and “results”. The “process” variable is drawn from the question posed to the surveyed organizations on how auditors were auditing different MSSs, i.e. as absolutely independent MSs (0 percent integration level), as interrelated MSs (50 percent), or as a unique IMS (100 percent). The findings of the analysis for this variable are presented in Figure 3. In terms of the “results” variable, the responding organizations indicated whether or not auditors presented the opportunities for improvement of the integration of MSs. It is important to note here that, according to ISO 17021, auditors:

may identify opportunities for improvement but shall not recommend specific solutions (ISO, 2006).

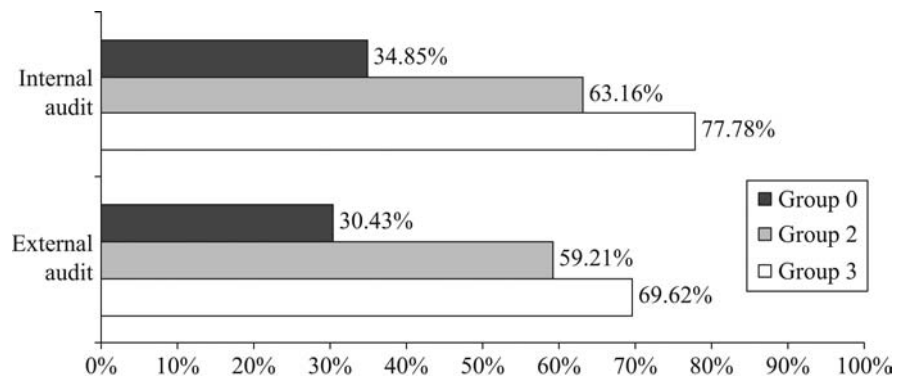


Figure 3.
Audit “process” variable
for internal and external
audits

Source: Own elaboration

Findings for this variable are presented in Figures 4 and 5 for internal and external audits, respectively.

Figure 3 shows that, even though Group 0 is characterized by separate MSs, internal auditors seem to view these systems as interrelated or integrated at least to some degree. A slightly lower, but still a rather significant, level of integration of approximately 30 percent is evident for external audits of this group, as well. Therefore, the perceptions of the level of integration of MSs, on one side, and of the auditors when they audit these systems, on the other, clearly differ.

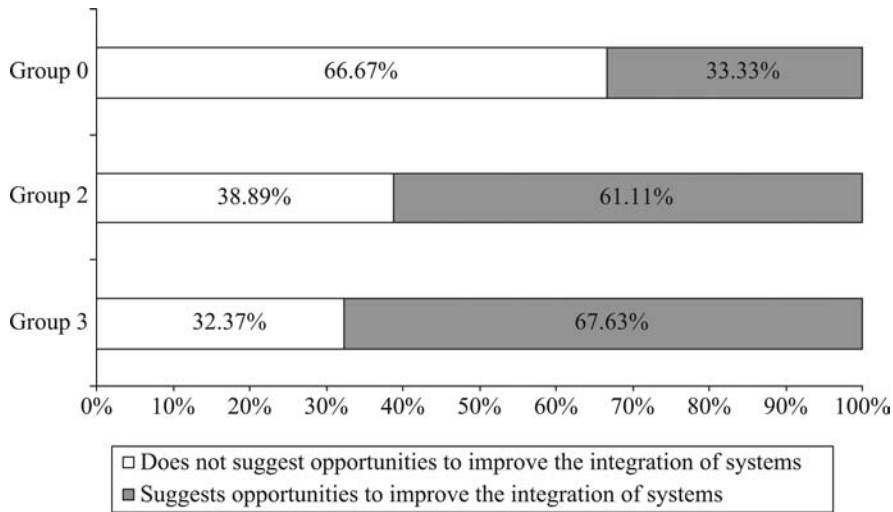


Figure 4.
Audit “results” variable
for internal audits

Source: Own elaboration

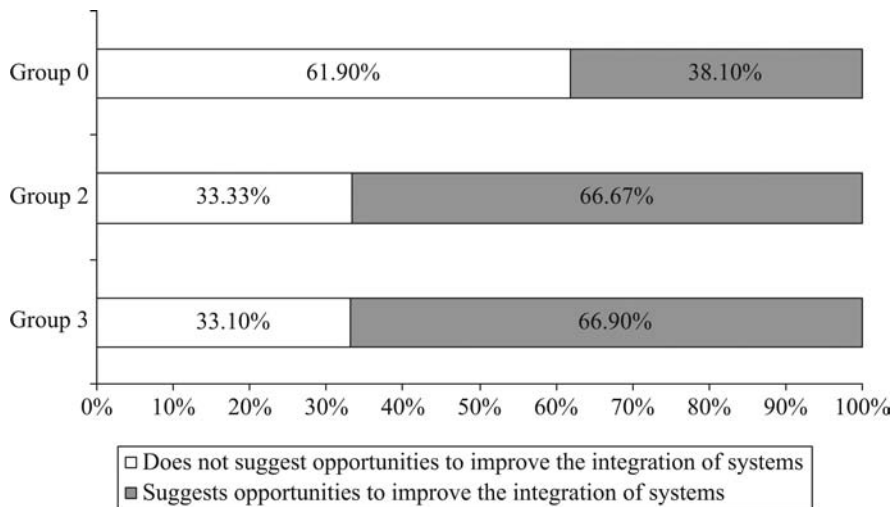


Figure 5.
Audit “results” variable
for external audits

Source: Own elaboration

For Group 2, this variable is characterized by an integration level of 63 percent for internal and 59 percent for external audits. These results allow for the interpretation that the perceptions of auditors and the reported level of integration of MSs coincide, since MSs are partially integrated and auditors are actually auditing them as such, i.e. mostly as interrelated and, in some organizations, as integrated MSs.

Finally, for Group 3, the level of integration with respect to this variable is higher than in all other groups, and is higher for the internal than for the external audits. In this sense, we can state that internal auditors audit the implemented standardized MSs largely as integrated MSs, since the corresponding integration level is quite high. On the other hand, external audits seem to exhibit a slightly lower such level, indicative perhaps of a higher prevalence of audits of interrelated, rather than integrated, MSs.

The analyses related to the audit “results” variable are presented in continuation, for both the internal (Figure 4) and external audits (Figure 5). As mentioned above, the findings are separated into two categories depending on whether or not auditors suggest opportunities for the improvement of the integration of MSs.

For internal audits, as can be expected, Groups 2 and 3 that have higher levels of MS integration also obtain suggestions for the improvement of such integration to a higher degree. For Group 0 this tendency is reversed, with about a third of organizations from Group 0 obtaining such feedback from the auditors. An interesting finding is that in Group 0, a significant portion of organizations are still receiving suggestions on how to improve the integration of their MSs from internal auditors.

External audit findings (Figure 5) do not differ much with the internal audits. Therefore, a significant number of organizations from Groups 2 and 3, specifically about two thirds for both groups, benefit from external auditors’ suggestions for improvement of the integration of the organizations’ MSs. Again, Group 0 exhibits the opposite tendency.

In summary, findings related to the “process” variable appear to differ from the discussions of Wilkinson and Dale (1998), since for the sample of organizations studied herein, external and internal auditors do differentiate between integrated and separate MSs (Kraus and Grosskopf, 2008). With respect to the “results” variable, the findings seem to show that, for a higher level of integration of the overall MSs, there is also a higher tendency of auditors to propose opportunities for improvement of the integration of these MSs, and not only detect nonconformities. One possible explanation may be derived from the notion of continual improvement, namely that the improvement of MS integration also facilitates improvements of both internal efficiency and external performance (ISO, 2004).

6. Conclusions

The objective of this paper was to analyze the level of integration of internal and external audits in organizations that integrate, to a specific degree, their standardized MSs. In order to accomplish this objective, the results related to MS audits from an empirical survey of 435 organizations with multiple MSS certificates were compared for the four groups of these organizations, originally categorized according to the level of integration of their standardized MSs in Bernardo *et al.* (2009).

The integration of audit system components were particularly focused on. The analysis included a total of five variables. Three of these variables related to the integration of audit teams, timing, and audit plans and reports in audits against

different MSSs, respectively. The remaining two variables were used to better explain the obtained levels of integration of audits. They related to the manner in which audits were undertaken with respect to the degree of integration of the audited systems and whether or not auditors also suggested opportunities for improvement of the integration of MSSs, apart from identifying nonconformities in MSSs. The results obtained from the analysis allow the drawing of five conclusions, as follows.

The first conclusion is related to the organizations that declared their standardized MSSs to be separate. Despite this declaration, we found that the organizations from this group still integrate their internal audits to a certain degree. This could be the result of some of these organizations starting the integration process and integrating the “common elements” of MSSs, including internal audits, first (e.g., Karapetrovic, 2002, 2003; Pojasek, 2006). Furthermore, external audits of these organizations also exhibit some integration, which also stands to reason. This is because external auditors also need to focus on efficiency and effectiveness that integrated audits provide, while minimizing disruptions and redundancies of multiple audits (Baldi, 1999; Karapetrovic and Willborn, 2000, 2001; Kraus and Grosskopf, 2008; Darnall *et al.*, 2009).

Second, it was possible to identify a tendency for the three analyzed groups of organizations, specifically Groups 0, 2 and 3. Namely, on average, as the level of integration of standardized MSSs increases, so does the level of integration of internal audit components, and thus the integration of the internal audits themselves. However, this tendency is not particularly clear for external audits, although these audits tend to be integrated to a certain degree for most organizations. The existence of integration in both these types of audits can be expected, since, for instance, internal audits are essentially subsystems of the overall MSSs in organizations, while organizations prefer to have integrated internal and external audits alike and to obtain synergies from such an application (e.g., Karapetrovic and Willborn, 1998; Wilkinson and Dale, 1999a; Douglas and Glen, 2000; Karapetrovic and Jonker, 2003; Zutshi and Sohal, 2005; Karapetrovic and Casadesus, 2009).

The third important finding is that internal audits are more integrated than external audits in the majority of the analyzed aspects. One exception is that, in Group 2, external audits seem to be conducted simultaneously to a higher degree than the internal audits. This could be since the objectives of internal and external audits are different (e.g., Bamber *et al.*, 2004, Power and Terziovski, 2005; Darnall *et al.*, 2009), or that the training and competence necessary to conduct audits is easier to obtain internally than externally (Wilkinson and Dale, 1998; Douglas and Glen, 2000; Power and Terziovski, 2005; Darnall *et al.*, 2009).

The fourth finding concerns the manner in which audits are conducted with respect to the level of integration of the audited MSSs. Specifically, it seems that, to a certain degree, auditors perceive, and thus audit, non-integrated MSSs from Group 0 as integrated, and at least for these two groups, the way that audits are conducted does not coincide with the way audited systems are organized. For Groups 2 and 3, however, auditors do seem to audit standardized MSSs as interrelated or integrated, thus largely reflecting the actual situation regarding the integration of MSSs in these organizations. It can also be concluded that the differences between internal and external audits in this respect, except for Group 3, are insignificant (e.g., see Wilkinson and Dale, 1998; Kraus and Grosskopf, 2008).

The fifth and final conclusion relates to the results of audits. We found that differences exist between the four groups of organizations, thus depending on the level of integration of MSs, but not between internal and external audits themselves. Specifically, the groups that have MSs integrated to a higher level obtain audit results that include the opportunities for the improvement of integration. In contrast, Group 0 does not obtain such suggestions to a large extent (e.g., see Kraus and Grosskopf, 2008).

It should be noted that this study contains two important limitations. The first limitation is related to the fact that the groups of organizations used for the analysis herein were already created in a previous study (Bernardo *et al.*, 2009). The second limitation refers to the specific perspective of the survey respondents. Namely, the responses were asked and obtained from the organizations' managers only, and not from the registrars or other external audit bodies. Related to this limitation was the absence of additional information on the MS managers or auditors themselves, such as competence, experience or background, which was not asked for in the survey.

Although the data obtained from the study is objective and results may not have been affected by these limitations, adding the related perspectives could enrich this research. Therefore, future research may include an examination of the integration of MS audits through the grouping based on the integration of specific audit aspects. In addition, auditors' perspectives may be taken into account.

References

- AENOR (2005), *UNE 66177 Sistemas de gestión. Guía para la integración de los sistemas de gestión*, Asociación Española de Normalización y Certificación, Madrid.
- Baldi, D. (1999), "Management system mergers", *Environmental Protection*, available at: www.eponline.com/ (accessed February 7, 2009).
- Bamber, C., Sharp, J. and Castka, P. (2004), "Third party assessment: the role of the maintenance function in an integrated management system", *Journal of Quality Maintenance Engineering*, Vol. 10 No. 1, pp. 26-36.
- Beckmerhagen, I., Berg, H., Karapetrovic, S. and Willborn, W. (2003), "Integration of management systems: focus on safety in the nuclear industry", *International Journal of Quality & Reliability Management*, Vol. 20 No. 2, pp. 209-27.
- Bernardo, M., Casadesus, M., Karapetrovic, S. and Heras, I. (2009), "How integrated are environmental, quality and other standardized management systems? An empirical study", *Journal of Cleaner Production*, Vol. 17 No. 8, pp. 742-50.
- Bernardo, M., Casadesus, M., Karapetrovic, S. and Heras, I. (2010), "An empirical study on the integration of management system audits", *Journal of Cleaner Production*, Vol. 18 No. 5, pp. 486-95.
- BSI (2006), *PAS 99 Specification of Common Management System Requirements as a Framework for Integration*, British Standards Institution, London.
- Dansk Standard (2005), *DS 8001 Ledelsessystemer – Vejledning i opbygning af et integreret ledelsessystem*, Dansk Standard, Copenhagen.
- Darnall, N., Seol, I. and Sarkis, J. (2009), "Perceived stakeholders' influences and organizations' use of environmental audits", *Accounting, Organizations and Society*, Vol. 14 No. 2, pp. 170-87.
- Douglas, A. and Glen, D. (2000), "Integrated management systems in small and medium enterprises", *Total Quality Management*, Vol. 11 Nos 4-6, pp. 686-90.
- Fresner, J. and Engelhardt, G. (2004), "Experiences with integrated management systems for two small companies in Austria", *Journal of Cleaner Production*, Vol. 12 No. 6, pp. 623-31.

- ISO (2002), *ISO 19011. International Standard: Guidelines for Quality and/or Environmental Management Systems Auditing*, International Organization for Standardization, Geneva.
- ISO (2004), *Auditing Continual Improvement*, ISO 9001 Auditing Practices Group, International Organization for Standardization, Geneva, available at: www.iso.org/tc176/sc2 (accessed January 20, 2009).
- ISO (2006), *ISO 17021. International Standard; Conformity Assessment – Requirements for Bodies Providing Audit and Certification of Management Systems*, International Organization for Standardization, Geneva.
- ISO (2008), *The Integrated Use of Management System Standards*, International Organization for Standardization, Geneva.
- ISO (2009), *The ISO Survey of Certifications – 2008*, International Organization for Standardization, Geneva.
- Jørgensen, T., Remmen, A. and Mellado, M. (2006), “Integrated management systems – three different levels of integration”, *Journal of Cleaner Production*, Vol. 14 No. 8, pp. 713-22.
- Karapetrovic, S. (2002), “Strategies for the integration of management systems and standards”, *The TQM Magazine*, Vol. 14 No. 1, pp. 61-7.
- Karapetrovic, S. (2003), “Musings on integrated management systems”, *Measuring Business Excellence*, Vol. 7 No. 1, pp. 4-13.
- Karapetrovic, S. (2005), “IMS in the M(E)SS with CSCS”, *Total Quality Management and Excellence – Menadžment Totalnim Kvalitetom i Izvršnost*, Vol. 33 No. 3, pp. 19-25.
- Karapetrovic, S. and Casadesus, M. (2009), “Implementing environmental with other standardized management systems: scope, sequence, time and integration”, *Journal of Cleaner Production*, Vol. 17 No. 5, pp. 533-40.
- Karapetrovic, S. and Jonker, J. (2003), “Integration of standardized management systems: searching for a recipe and ingredients”, *Total Quality Management*, Vol. 14 No. 4, pp. 451-9.
- Karapetrovic, S. and Willborn, W. (1998), “Integration of quality and environmental management systems”, *The TQM Magazine*, Vol. 10 No. 3, pp. 204-13.
- Karapetrovic, S. and Willborn, W. (2000), “Generic audit of management systems: fundamentals”, *Managerial Auditing Journal*, Vol. 15 No. 6, pp. 279-94.
- Karapetrovic, S. and Willborn, W. (2001), “Audit system: concepts and practices”, *Total Quality Management*, Vol. 12 No. 1, pp. 13-28.
- Karapetrovic, S., Casadesus, M. and Heras, I. (2006), *Dynamics and Integration of Standardized Management Systems: An Empirical Study*, Documenta Universitaria, Girona.
- Kirkby, A. (2002), “The one-stop shop”, *Quality World*, January, pp. 2-4.
- Kraus, J. and Grosskopf, J. (2008), “Auditing integrated management systems: considerations and practice tips”, *Environmental Quality Management*, Vol. 18 No. 2, pp. 7-16.
- Labodová, A. (2004), “Implementing integrated management systems using a risk analysis-based approach”, *Journal of Cleaner Production*, Vol. 12 No. 6, pp. 571-80.
- Pojasek, R. (2006), “Is your integrated management system really integrated?”, *Environmental Quality Management*, Vol. 16 No. 2, pp. 89-97.
- Power, D. and Terziovski, M. (2005), “The process, practice and outcomes of non-financial auditing: five Australian case studies”, *International Journal of Manufacturing Technology and Management*, Vol. 7 No. 1, pp. 52-82.
- SAI Global (1999), *AS/NZS 4581 Management System Integration – Guidance to Business, Government and Community Organizations*, SAI Global Sydney, Sydney.
- Salomone, R. (2008), “Integrated management systems: experiences in Italian organizations”, *Journal of Cleaner Production*, Vol. 16 No. 16, pp. 1786-806.

- Seghezzi, H. (1997), "Business concept redesign", *Total Quality Management*, Vol. 8 Nos 2/3, pp. 36-43.
- Seghezzi, H. (2001), "Business excellence: what is to be done?", *Total Quality Management*, Vol. 12 Nos 7/8, pp. 861-6.
- Wilkinson, G. and Dale, B. (1998), "System integration: the views and activities of certification bodies", *The TQM Magazine*, Vol. 10 No. 4, pp. 288-92.
- Wilkinson, G. and Dale, B. (1999a), "Models of management system standards: a review of the integration issues", *International Journal of Management Reviews*, Vol. 1 No. 3, pp. 279-98.
- Wilkinson, G. and Dale, B. (1999b), "Integration of quality, environment and health and safety management systems: an examination of key issues", *Journal of Engineering Manufacture*, Vol. 213 No. 3, pp. 275-83.
- Zeng, S., Shi, J. and Lou, G. (2007), "A synergetic model for implementing an integrated management system: an empirical study in China", *Journal of Cleaner Production*, Vol. 15 No. 18, pp. 1760-7.
- Zeng, S., Tian, P. and Shi, J. (2005), "Implementing integration of ISO 9001 and ISO 14001 for construction", *Managerial Auditing Journal*, Vol. 20 No. 4, pp. 394-407.
- Zutshi, A. and Sohal, A. (2005), "Integrated management system. The experience of three Australian organizations", *Journal of Manufacturing Technology Management*, Vol. 16 No. 2, pp. 211-32.

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