



Synergies in standardized management systems: some empirical evidence

Standardized
management
systems

73

Martí Casadesús

*Departament d'Organització, Gestió Empresarial i Desenvolupament de Producte,
Universitat de Girona, Girona, Spain*

Stanislav Karapetrovic

*Department of Mechanical Engineering, University of Alberta, Edmonton,
Canada, and*

Iñaki Heras

*Departamento de Organización de Empresas, Universidad del País Vasco,
San Sebastián, Spain*

Received February 2009
Revised August 2009
Accepted October 2009

Abstract

Purpose – Management system standards (MSSs) have spread in an unprecedented manner in the last few years. Thus, there are now many companies that rely on more than one such standard to establish the criteria for organizational management systems (MSs). The objective of this article is to analyze the existence of possible synergies in the application of a wide range of MSSs through an examination of the benefits obtained from the implementation of one particular MSS, namely ISO 9001.

Design/methodology/approach – The starting point is a set of results from an empirical survey of more than 500 Spanish companies. Specifically, the differences between the benefits recognized by companies implementing a single MSS, namely ISO 9001:2000 for quality MSs, and those that implemented a second standard, in this case ISO 14001:2004 for environmental MSs, are discussed. An additional comparison is made between those organizations that have integrated the two MSSs into a single MS and those organizations that have developed separate quality and environmental MSs.

Findings – The results show that organizations with multiple MSSs actually perceive more benefits from the implementation of ISO 9001 than those that implemented that standard only. Furthermore, organizations with integrated management systems (IMSSs) also report higher levels of ISO 9001 benefits compared to those organizations with the ISO 9001 certificate only, but generally not when compared to their counterparts with separate standardized MSs.

Originality/value – Relatively little is known about the synergies yielded by the use of multiple MSSs or by integrating standardized MSs in organizations. Using the benefits obtained from the implementation of ISO 9001 as a measure, this paper contributes empirical results from a large number of organizations to the study of both of these issues. Therefore, it is of value to researchers and practitioners in quality, environmental, safety, security and other such MSs, but also specifically in the area of IMSSs.

Keywords Management techniques, Standards, International standards, Quality management, Management standards, Spain

Paper type Research paper



This paper is based on Casadesus, M., Heras, I. and Karapetrovic, S. (2009), "Los sistemas de gestión estandarizados: ¿existen sinergias?", *Revista Europea de Dirección y Economía de la Empresa*, Vol. 18 No. 2, pp. 161-74.

The TQM Journal
Vol. 23 No. 1, 2011
pp. 73-86
© Emerald Group Publishing Limited
1754-2731
DOI 10.1108/1754273111097506

Introduction

Although new management system standards (MSSs) – for example those for supply chain security (ISO 28000) and energy management (ISO 50001) from the International Organization for Standardization (ISO) – keep appearing, it seems that the older such standards, for example ISO 9001 and ISO 14001, are still being applied. By the end of 2007, more than 950,000 ISO 9001:2000 and 150,000 ISO 14001:2004 certificates were granted in 175 and 148 “countries and economies”, respectively (International Organization for Standardization, 2008a). However, the success in the application of management systems (MSs) based on standards does not end with the diffusion of ISO 9001 and 14001. Following the path opened by these two standards, national and international MSSs are being applied in a wide range of areas, such as occupational health and safety (e.g. OHSAS 18001, CSA Z1000 and ANSI Z10), information security (e.g. ISO 27001), human resources management (e.g. “Investors in People”) and innovation management (e.g. UNE 166000) (Heras, 2006).

On the global level, a number of authors have studied the diffusion of MSSs. For example, and in the case of the ISO 14001 standard, Corbett and Kirsch (2001) state that the degree of ISO 14001 registration in a particular country depends, among other factors, on the degree of ISO 9001 registration in that country. Marimón *et al.* (2006) put forward a model that gives a satisfactory explanation for the international dissemination of ISO 9001 and ISO 14001, both by country and by industry sector.

Although the purpose of MSSs is widely known – for example ISO addresses this both generally (i.e. for all its MSSs) on its website (see International Organization for Standardization, 2008b) and specifically (i.e. for each MSSs) in the standards’ opening sections – there are many studies on the motivation to implement individual MSSs. For instance, Brown and van der Wiele (1995), Buttle (1997), Terziovski *et al.* (1997), Leung *et al.* (1999) and Heras *et al.* (2006) discuss this issue for ISO 9001, while Mohammed (2000) and Nakamura *et al.* (2001) address the same topic in the case of ISO 14001. The impact of specific MSSs on the organizations implementing them is extensively researched, as well. Examples of such studies on ISO 9001 include Romano (2000) and Dick *et al.* (2008).

Nevertheless, the practical effect of the organizational application of more than one of these standards has not been studied extensively from the empirical viewpoint. Existing theoretical contributions (e.g. Karapetrovic and Willborn, 1998; Wilkinson and Dale, 2001; Karapetrovic and Jonker, 2003), are largely oriented towards the development of organizational theories that attempt to define how different international MSSs can be incorporated and standardized MSs actually integrated in a company. A new ISO publication, namely a handbook on *The Integrated Use of MSSs* (International Organization for Standardization, 2008b), also provides a related methodology supported by a variety of case studies.

However, Jorgensen *et al.* (2006) state that “clear cross-references are appropriate between the different management systems and should provide the following benefits: minimisation of documentation and records; less bureaucracy and reduction of paperwork; cost savings by optimisation of time and resources assigned to the systems; simplification of internal and external audits”. Based on that statement and further analysis, they point out the creation of synergies among standardized MSs (Jorgensen *et al.*, 2006).

Referring to the concept of synergy, the definition of the classical authors of management literature, such as Penrose (1959) and Ansoff (1965), is used here. The latter author defines the term “synergy” by simply naming it “The 2 + 2 = 5 Effect”, or “the effect by which the incorporation of several elements produces a maximization of the qualities of each of the elements with a greater result than that which comes from the simple addition of these elements”. In his later contributions, Ansoff refined this definition, even establishing a typology of synergies, as Iversen (2000) pointed out.

The existence of synergies in the application of different MSSs has been highlighted in a number of works (e.g. Beechner and Koch, 1997; Matias and Coelho, 2002). For instance, del Brío *et al.* (2006) use several sources from the MS literature which indicate that standardized MSs are based on “similar practices” to point out that this “allows for the synergies to be obtained”. While many authors underline the specific synergic effects of the implementation of multiple MSSs (e.g. Zwetsloot, 1995; Puri, 1996; Beechner and Koch, 1997; Ovretveit, 2001; Chan *et al.*, 2002; Zeng *et al.*, 2005), some even make a distinction between the different types of synergies. This is the case of Zwetsloot (1995), who defines three such types:

- (1) “common aspect synergy”;
- (2) “management synergy”; and
- (3) “organizational synergy”.

In the same sense, Zeng *et al.* (2005) propose an integrating MS model based on three levels of synergies. They have “strategic synergy” at “level 1”, “organizational, structural, resource and cultural synergy” at “level 2”, and “documentation synergy” at “level 3”. However, del Brío *et al.* (2006) also provide a list of authors who seem to either “have doubts as to the existence of these synergies because of the different scope” of the MSSs or to require structural similarities in the MSSs being implemented, such as the “common procedures”, for the synergies to occur.

Unfortunately, this interesting debate has not been enriched by empirical information, but has been largely limited to theoretical discussions. In fact, there are very few empirical studies (we found only six) that have researched this topic, despite its great practical relevance. Generally, these studies investigate an incremental incorporation of MSSs (for example del Brío *et al.*, 2002, study the synergies from the EMS perspective), examine the effects of MSSs on the overall performance (Feng, 2006), analyze the application of standards in specific industry sectors (e.g. Zeng *et al.*, 2005), or are able to provide fairly limited descriptive results owing to the research method used (e.g. Stamou, 2003; Zutshi and Sohal, 2005; Renzi and Cappelli, 2000). For instance, the study of Zeng *et al.* (2005) focuses on 68 Chinese companies from the construction sector, Stamou (2003) provides results from 37 companies based in Norfolk, East Anglia, the research of Zutshi and Sohal (2005) is limited to three case studies in Australian companies, while Renzi and Cappelli (2000) studied a single Italian company.

The two most comprehensive empirical studies to date are those of Feng (2006) and del Brío *et al.* (2002). In a doctoral thesis on the effects of the motivation and effort to implement MSSs on the overall performance of the organization, Feng (2006) found that those organizations that implemented both ISO 9001 and ISO 14001 obtained better results in terms of the four categories analyzed in a survey of 613 firms from

Australia and New Zealand, namely “organisational, operational, business and social performance”, than the organizations which implemented ISO 9001 only (Feng, 2006).

del Brio *et al.* (2002) attempted to ascertain, within the framework of a wider investigation, the existing synergies in the application of different MSSs. This was done by analyzing the viewpoints of Spanish companies that had implemented or were about to implement some of these standards regarding the convenience of their joint application. del Brio *et al.* (2002) deduced that, out of the 200 studied companies which were either registered, or were in the process of, or at least considering, registration to ISO 14001, the majority thought it convenient to combine the standards because of the synergies that existed (90.5 percent were of this opinion), while only 9.5 percent (19 out of 200) could not see the need or convenience for such a combination. Another inference drawn from the del Brio *et al.* (2002) study is that the reason with the greatest importance for combining standards in companies with an existing EMS is that it allows the documentation to be combined (90.3 percent gave this “great”, or “quite a lot of” importance), indicating that companies favor the elimination of superfluity in MS documentation.

Therefore, the aim of the investigation presented here is to analyze the existence of possible synergies in the application of MSSs in organizations, i.e. to study whether organizations implementing a particular standard benefit from applying another standardized MS. To do so, we first describe three hypotheses regarding the MSSs implementation synergies. Subsequently, the methodology and the results of an empirical survey carried out in more than 500 companies registered to ISO 9001:2000 are illustrated. Finally, the survey findings are summarized and related to the development, integration and future study of standardized MSs.

Hypotheses

To analyze whether or not the application of one standardized MS is influenced by the implementation of another, a large empirical study was carried out. The initial step of choosing the particular MSs and MSSs to study resulted in the selection of quality (ISO 9001) and environmental (14001) MSs. These two MSSs were selected due to their generic character (see “Application” sections in International Organization for Standardization, 2004, 2008c), public registration availability, widest dissemination of all MSSs (International Organization for Standardization, 2008a) and recognition as “global management standards” (Uzumeri, 1997; Corbett and Kirsch, 2001; Mendel, 2002).

Since both ISO 9001 and ISO 14001 are applicable to practically the whole organization, the contact points of the respective MSs in the organization implementing them are evident and unavoidable. Consequently, if synergies occur in the application of two MSSs, companies registered to both these standards should be able to detect them. The main assumption is that organizations with more than one MSS would not apply these standards in a totally independent way, as the corresponding systems influence by default the same organizational areas.

Therefore, two types of organizations were selected, namely those registered to ISO 9001 only, and those with both ISO 9001 and ISO 14001 certificates. In this way, the existence or absence of synergies could be studied by means of an analysis of the analogous features in both types of sample companies, registered either to a single standard or to more than one standard. Thus, companies in the latter group would, at

minimum, have an ISO 14001-based environmental MS in addition to a quality MS following ISO 9001, but could also be registered to more MSSs or have other standardized MSs, such as an OHSAS 18001-compliant occupational health and safety MS or an SA 8000-based social responsibility MS.

Significant differences between these two groups would confirm the notion that the implementation of two or more MSSs produces synergies in the original standardized MS. The benefits derived from the implemented standards, as perceived by the companies' managers, were selected as the particular feature to study. In this way, if the benefits derived by ISO 9001 – registered companies are significantly lower than those obtained from the implementation of the same standard by the organizations registered to both ISO 9001 and ISO 14001, the existence of synergies can be ascertained. Thus, the following hypothesis was put forward:

- H1.* Organizations registered to both ISO 9001:2000 and ISO 14001:2004 obtain greater benefits from the application of ISO 9001:2000 than the organizations registered to ISO 9001:2000 only.

Taking into account that standardized MSs can be implemented independently or, more sensibly, integrated (see, for example, Wilkinson and Dale, 2001; Karapetrovic and Willborn, 1998; and International Organization for Standardization, 2008b), a second hypothesis was also proposed:

- H2.* Organizations which integrated ISO 9001:2000 and ISO 14001:2004 into a single MS obtain greater benefits from the application of ISO 9001:2000 than the organizations which are registered to both standards but did not implement them in an integrated way.

The third hypothesis addresses the point that synergies can be produced by integration itself, rather than by independent implementation of several standards:

- H3.* Organizations which integrated ISO 9001:2000 and ISO 14001:2004 into a single MS obtain greater benefits from the application of ISO 9001:2000 than the organizations which are registered to ISO 9001:2000 only.

Methodology

To test the proposed hypotheses, questionnaires were mailed to quality managers of two groups of organizations from the Spanish autonomous region of Catalonia, namely 1,741 companies with ISO 9001:2000 certificates only, and 535 companies which at least had both ISO 9001:2000 and ISO 14001:2004 certificates. After a telephone follow-up, valid answers were obtained from 353 and 176 organizations, representing a 20 percent and 33 percent response rate and a confidence level ($p = q = 0.5$) of 95 percent and 93 percent, for ISO 9001 and ISO 9001/14001 registered groups, respectively. A total of 66 companies from the second group (38 percent) reported having implemented additional MSSs, for instance for ISO/TS 16949 or OHSAS 18001, with a significant proportion of these being for MSs other than quality or environment.

Since this survey, with initial descriptive results available in Karapetrovic *et al.* (2006), focused on the questions related to the integration of standardized MSs, a further analysis of the second group was possible. The result was its differentiation

into two subgroups, with the organizations that had integrated the standards into a single MS and those that applied them independently.

The survey used an indicator table for analyzing the ISO 9001:2000 implementation benefits. This table is very similar to the one proposed by Vloeberghs and Bellens (1996), a pilot study on the effects of ISO 9000 standards that later had a great impact in this field of research, and was used by Casadesus *et al.* (2001), Casadesus and Alberti (2003) and Casadesus and Karapetrovic (2005), among others. It should be noted that there are many studies (more than 100 were found by Casadesus *et al.*, 2007) proposing different sets of indicators, although they all investigate ISO 9000 implementation effects through quantitative information gathered in mail surveys. Furthermore, a significant amount of research was carried out using other methods, such as case studies or database analyses of the companies' financial information.

Vloeberghs and Bellens (1996) divided the implementation benefits into four large areas, namely the impact of the standard on the financial results, on customers, on the workforce, and on the operational results of the company. For each of these items, the Vloeberghs and Bellens (1996) survey asked whether the impact of the ISO 9000 application could be considered as positive, non-existent or negative. In the study illustrated here, the percentage of organizations that considered the impact on a particular item to be positive will be used as a reference, as was the case in Casadesus and Karapetrovic (2005). The complete data set can be found in Karapetrovic *et al.* (2006). In any case, as Vloeberghs and Bellens (1996) had already detected in their study, the percentage of organizations that considered the impact to be negative in any of the analyzed items is very low. In the Catalonian study described here, the median of negative impacts reported across all items was 5 percent, and in no case was the proportion of companies responding in such a way higher than 10 percent. Furthermore, a great majority of organizations that consider that the implementation of ISO 9001:2000 was not positive for a particular item actually report that it had no impact at all.

Results

To test the first hypothesis, Figure 1 illustrates the benefits obtained from the implementation of ISO 9001:2000, specifically comparing the organizations that have only implemented this standard with those that have also applied ISO 14001:2004. Clearly, the patterns followed by both groups are very similar, and it seems that synergies could really appear by implementing two standards instead of just one. Namely, in 15 out of the 16 benefits studied, the percentage of companies reporting a positive effect is higher for the organizations with multiple MSS certificates than for those with a single certificate. The only benefit showing the opposite result is "employee absenteeism", but it is reported by such a small fraction of the responding companies compared to the other effects (less than 10 percent, which is consistent with previous studies; e.g. Casadesus and Karapetrovic, 2005) that it can be considered as insignificant.

This descriptive analysis shows that organizations applying both standards are more satisfied with the implementation of ISO 9001 than those applying only that standard. This is an interesting and insightful finding, pointing to the synergies when two or more MSSs are implemented as a possible and more likely cause of such greater satisfaction than the particular application of ISO 14001 would be. Namely, ISO 9001

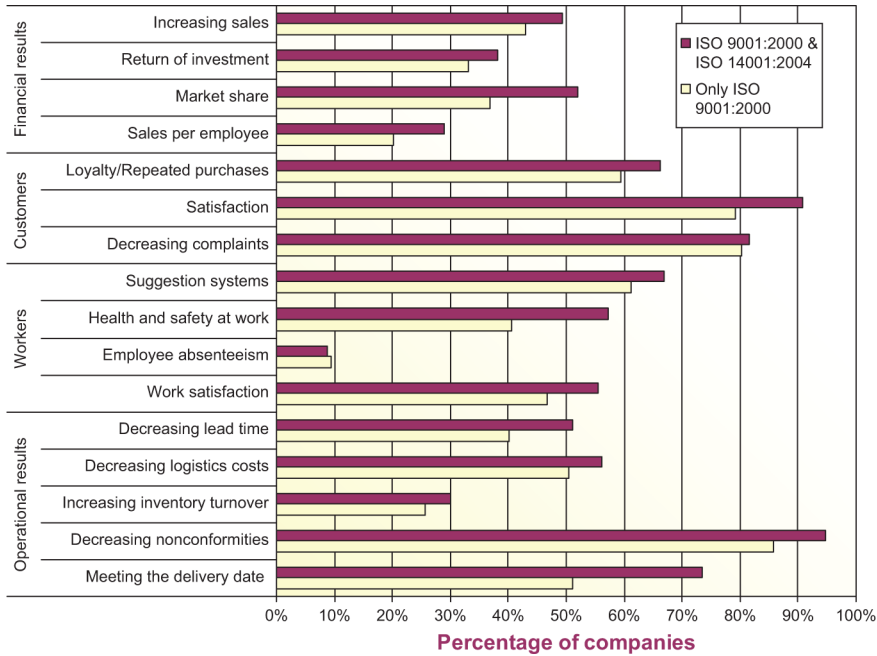


Figure 1. Comparison between organizations with multiple MSSs and a single MSS

and ISO 14001 cover different functions in an organization, so an effective and direct impact of the implementation of the second standard (ISO 14001) on the items analyzed in the first (ISO 9001) is not as likely a source of the improved perception of ISO 9001 as the existing synergies are. In addition, this finding is in line with the previously mentioned result of Feng (2006), since that study showed better performance of companies that had both ISO 9001 and ISO 14001, as well.

Other aspects related to the first hypothesis and the corresponding analysis can be found in Karapetrovic *et al.* (2006). For instance, in terms of the motivation for implementing new MSSs, this work provides a list of reasons and their relative importance, as perceived by the companies responding to the survey (Figure 2). Since the survey specifically examined why organizations implement other MSSs after the

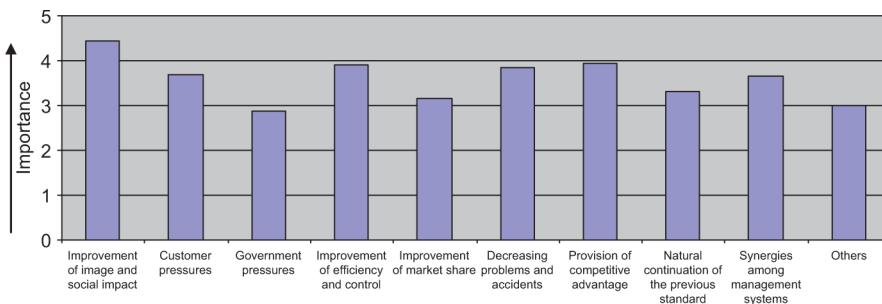


Figure 2. Motivation for implementing the second and further MSSs

Source: Karapetrovic *et al.* (2006)

application of the first such standard, i.e. the motivation to implement the second and further MSSs (as denoted in the title of Figure 2), only the companies with two (ISO 9001 and ISO 14001) or more MSS certificates were asked and then answered the related question. The possible existence of synergies among MSs is one of the more relevant reasons to implement another MSS (3.64 out of 5), together with the company's image and social impact (4.43), improving the company's competitive position (3.92), improving efficiency and control (3.90), reducing problems and accidents (3.85) and customer pressures (3.65).

Therefore, as organizations with multiple MSS certificates seem to emphasize these synergies from the beginning of the implementation of additional MSSs (Figure 2), it is not surprising that a higher percentage of these organizations, compared to those with only the ISO 9001 certificate, are satisfied with their ISO 9001-compliant quality MS. This makes sense both when all the studied benefits are analyzed together and when the benefits specifically related to the declared purpose of the ISO 9001 standard, such as "customer satisfaction" and "decreasing nonconformities", are focused on (see, for example, Karapetrovic *et al.*, 2006). As Figure 1 illustrates, companies with two or more standardized MSs are not only more satisfied across practically all the benefits studied, but are also reporting a positive effect on customer satisfaction and decreasing nonconformities in more than 90 percent of the cases.

In order to evaluate the statistical significance of the detected sample differences for the first hypothesis, the non-parametric Mann-Whitney test was carried out on each of the sixteen categories of specific benefits. Table I illustrates the results for the five benefits that were found to have statistical differences between the organizations with both ISO 9001 and ISO 14001 on the one hand, and those that had ISO 9001 only on the other.

Evidently, five out of 16 is not a high number and it seems difficult to argue for the existence of synergies when these five items actually pertain to four different groups of

ISO 9001 benefits	Organizations with ISO 9001 + ISO 14001		Organizations with ISO 9001 only		Analysis Mann- Whitney <i>U</i>
	Number of responses	Percentage positive	Number of responses	Percentage positive	
<i>Finances</i>					
Market share	160	52	344	37	22,942
<i>Customers</i>					
Satisfaction	175	91	352	79	27,132.5
<i>Workers</i>					
Health and safety at work	173	57	350	41	25,048
<i>Operations</i>					
Decreasing lead time	166	51	349	40	25,477.5
Meeting the delivery date	169	73	353	51	22,927.5

Table I.
Benefits with significant
differences for firms with
multiple MSSs and ISO
9001 only

benefits, as the first column of Table I shows. Nevertheless, together with the descriptive analysis above, it seems obvious that organizations, when implementing another standard with requirements common to the previously or concurrently implemented standard – for example training, auditing and documentation control – take advantage to improve many of the implemented procedures and processes, especially if some or all of these requirements are integrated in a single MS. This should lead to an improvement in the impact produced by the ISO 9001 standard itself. However such improvements may possibly occur not in any particular item, since different items may be affected in different organizations, but rather in the whole group of benefits, as can be seen in Figure 1.

Furthermore, an average of 11 percent more organizations with two implemented standards reported positive effects compared to those organizations that implemented only one MSS. Therefore, although the first hypothesis was not conclusively confirmed with the empirical information available, there is enough theoretical and practical evidence to suggest that it could be valid. These findings can also be related to the surveyed organizations' clear preference for the application of additional MSSs in the future. Namely, as reported in Karapetrovic *et al.* (2006), only 15 percent of the organizations with multiple MSSs, and only 18 percent of companies registered solely to ISO 9001, indicated that their first priority was not to implement any new MSS or excellence model.

The results related to the second hypothesis are illustrated in Figure 3, specifically with the second and third horizontal bars in each item studied. In nine of these items, organizations which did not integrate the two standards into a single MS obtain greater benefits from ISO 9001 implementation, while for the seven remaining items,

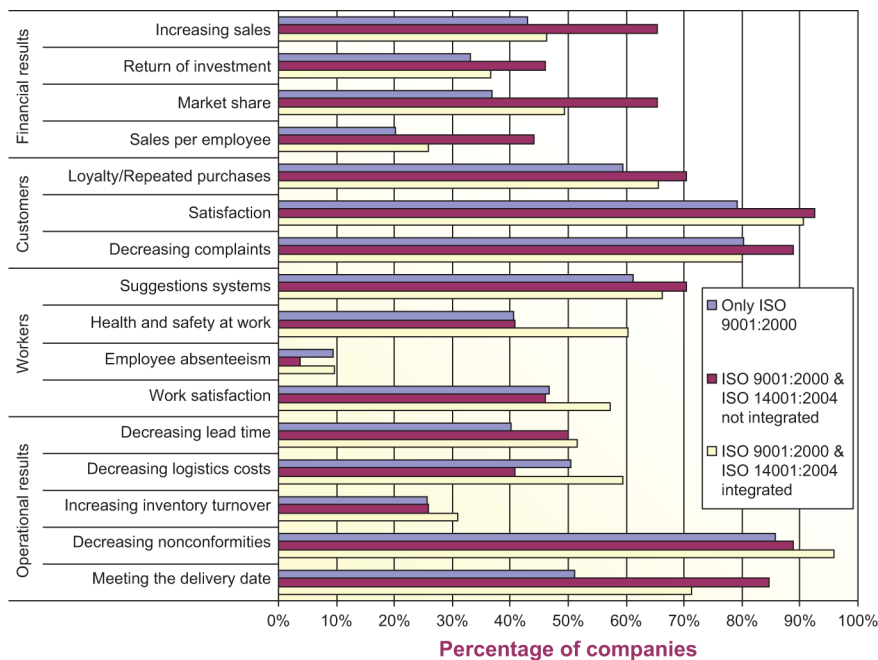


Figure 3.
Comparison of firms with
integrated MSs,
independent MSs and ISO
9001 only

greater benefits correspond to organizations which have implemented an integrated standardized MS. However, seven out of the nine cases where higher percentages of companies with separate QMS and EMS were reported refer to the financial and customer-related benefits (see the top half of Figure 3). In the case of financial results, the differences seem to be rather large, especially for sales (“increasing sales” at 19 percent and “sales per employee” at 18 percent). The reasons behind such a result are not quite clear. For customer-related benefits, the percentages seem to be closer, although still higher for organizations without an IMS in all three cases.

Almost exactly the opposite situation is evident with the employee-related and operational results, where all of the seven items indicating higher proportions of companies with integrated management systems (IMs) are located (see the bottom half of Figure 3). Particularly high differences were reported for “health and safety at work” (19 percent) and “decreasing logistics costs” (18 percent). Considering the focus of ISO 9001 on product quality and customer satisfaction, as well as the likely improvement of operational and overall effectiveness and efficiency caused by integration, these findings appear to make both practical and theoretical sense.

No statistically significant differences (at $\alpha = 0.05$) were found with the Mann-Whitney analysis. This result is likely due to a very small number of organizations (27 or 15 percent of the total) that did not integrate the standards into a single MS compared to those that did (149), making it difficult to obtain a sufficiently high sample of organizations from the former subgroup in this or any subsequent studies. All these findings, coupled with almost all previous theoretical works reported in the literature, lead to integration being the much more likely direction in the application of multiple MSSs than independent implementation. In other words, organizations are themselves integrating their standardized MSs, possibly because they bring greater benefits or perhaps because the MS maintenance costs are reduced. Therefore, the second hypothesis can neither be accepted nor rejected.

Since the majority of organizations implementing two MSSs integrate them into a single MS, the third hypothesis will possibly be the most interesting to study. The related results are presented in Figure 3 (first and third horizontal bars) and Table II. All 16 items analyzed are evaluated more positively by organizations with an IMS registered to both ISO 9001 and 14001 than by those with ISO 9001 only, showing an average difference of 13 percent. The results therefore ascertain that an organization compliant with ISO 9001 will obtain greater benefits by integrating ISO 14001 into its MS, independently of the benefits derived directly from the implementation of ISO 14001 itself.

As with the two previous hypotheses, the differences in the data were analyzed statistically. Table II illustrates the results for the six items that indicated statistically significant differences. These benefits are mainly related to the internal aspects of the organization – namely, two of the statistically higher items refer to the operational results and two refer to the workforce. Also importantly, the positive effect of ISO 9001 on “customer satisfaction” was reported by a significantly-larger proportion of organizations with IMs. Although the percentages for this item were high in both groups, as was the case with “decreasing nonconformities”, a total of 91 percent of companies that integrated their standardized MSs responded in this way, for a statistically significant 12 percent difference. Overall, therefore, we consider the third working hypothesis as validated.

ISO 9001 benefits	Organizations with an IMS		Organizations with ISO 9001 only		Analysis Mann-Whitney <i>U</i>
	Number of responses	Percentage positive	Number of responses	Percentage positive	
<i>Finances</i>					
Market share	134	49	344	37	19,797
<i>Customers</i>					
Satisfaction	148	91	352	79	23,026
<i>Workers</i>					
Health and safety at work	146	60	350	41	20,371
Work satisfaction	145	57	353	47	22,567.5
<i>Operations</i>					
Decreasing lead time	140	51	349	40	21,467
Meeting the delivery date	143	71	353	51	19,901.5

Standardized management systems

83

Table II.
Benefits with significant differences for firms with an IMS and with ISO 9001 only

Conclusions

With the participation of a high number of organizations, especially when compared to the previous studies reported in the literature, this article illustrated the results of descriptive and statistical analyses of the extensive empirical information gathered on standardized MSs. As the first important finding, it has been ascertained that organizations that have an IMS registered to both ISO 9001 and 14001 perceive greater benefits from the application of ISO 9001 than those that have only applied that particular standard. However, we have not been able to confirm the existence of statistically significant differences in any of the benefits studied between the organizations with an IMS and those without it. Finally, comparing the organizations with ISO 9001 and ISO 14001 certificates at the minimum on the one hand and those ones with ISO 9001 only on the other, we found statistically significant differences in five of the 16 benefits, all with larger proportions of organizations with multiple MSS certificates.

As in all research, a set of limitations also appeared here. A “spatial limitation” is a consequence of the study being performed in one particular geographical region, namely Catalonia. However, as Heras and Casadesus (2006) point out, this is one of the Spanish regions with the highest “certification intensity” with respect to ISO 9001 and ISO 14001. Moreover, Spain is one of the countries with the highest degree of certification intensity in the world. At the end of 2007, Spain was the fourth (after China, Italy and Japan) and the third (behind Japan and China) country in the world in terms of the number of ISO 9001 and ISO 14001 registrations, respectively (International Organization for Standardization, 2008a). Therefore, this spatial limitation is less pronounced considering that the research location exhibits a large impact of MSSs. Furthermore, empirical studies of standardized MSs are sparse. Although this study consequently adds novelty and knowledge to the overall body of

research, the results obtained cannot be compared to another study with similar characteristics, making conclusions beyond the purely descriptive ones difficult to draw.

In a world in which new MSSs appear very frequently, developed by various national and international organizations, business associations, and governmental bodies, their possible integration into organizational MSs will be studied increasingly. Different results stemming from the empirical research presented here lead us to such a conclusion. Firstly, the organizations surveyed clearly preferred the application of additional MSSs in the future, as reported in Karapetrovic *et al.* (2006) to the implementation of excellence models or no further implementation of MSSs. Secondly, the majority of organizations with different MSs decided to integrate them into a single system. According to the Karapetrovic *et al.* (2006) study, only 15 percent of respondents with both ISO 9001 and ISO 14001 had not performed such integration. Finally, as our research here illustrates, the existence of synergies could lead to the eventual success and subsequent diffusion of still more new MSSs. One specific direction of future related studies could be how to undertake the integration of standardized MSs so that the resulting synergies are maximized.

References

- Ansoff, I. (1965), *Corporate Strategy*, McGraw-Hill, New York, NY.
- Beechner, A.B. and Koch, J.E. (1997), "Integrating ISO 9001 and ISO 14001", *Quality Progress*, Vol. 30 No. 2, pp. 33-6.
- Brown, A. and van der Wiele, T. (1995), "Industry experience with ISO 9000", *Asia Pacific Journal of Quality Management*, Vol. 4 No. 2, pp. 8-17.
- Buttle, F. (1997), "ISO 9000: marketing motivations and benefits", *International Journal of Quality & Reliability Management*, Vol. 14 No. 9, pp. 936-47.
- Casadesus, M. and Alberti, M. (2003), *La innovació i la gestió de la qualitat a les empreses de Catalunya*, Col·lecció Estudis, CIDEM, Generalitat de Catalunya, Barcelona.
- Casadesus, M. and Karapetrovic, S. (2005), "Has ISO 9000 lost some of its lustre? A longitudinal impact study", *International Journal of Operations and Production Management*, Vol. 25 No. 6, pp. 580-96.
- Casadesus, M., Giménez, G. and Heras, I. (2001), "Benefits of ISO 9000 implementation in Spanish industry", *European Business Review*, Vol. 13 No. 6, pp. 327-35.
- Casadesus, M., Heras, I. and Karapetrovic, S. (2007), "Evolution of the benefits and costs of ISO 9001 over time", paper presented at the 14th International Annual Euroma Conference, Istanbul.
- Chan, Y.K., Kam, J. and Neailey, W.H. (2002), "How IMS can achieve ISO 9001:2000 certification", *The TQM Magazine*, Vol. 14 No. 14, pp. 345-9.
- Corbett, C.J. and Kirsch, D.A. (2001), "International diffusion of ISO 14000 certification", *Production and Operations Management*, Vol. 10 No. 3, pp. 327-42.
- del Brío, J.A., Fernández, E. and Junquera, B. (2002), "Sinergias ISO 14001/9000/prevención de riesgos laborales en las empresas industriales españolas: un estudio empírico", *Cuadernos de Economía y Dirección de Empresas*, No. 11, pp. 59-78.
- del Brío, J.A., Fernández, E., Junquera, B. and Vázquez, C. (2006), "Implantación conjunta de ISO 14001-ISO 9000 – Prácticas de prevención de riesgos laborales en las empresas industriales

- españolas: un estudio descriptivo”, in Heras, I. (Ed.), *ISO 9000, ISO 14001 y otros estándares de gestión: pasado, presente y futuro*, Civitas, Madrid.
- Dick, G.P.M., Heras, I. and Casadesús, M. (2008), “Shedding light on causation between ISO 9001 and improved business performance”, *International Journal of Operations & Production Management*, Vol. 28 No. 7, pp. 687-708.
- Feng, M. (2006), “The relationship between motivation and effort in the implementation of ISO management systems and organisational performance”, PhD thesis, Department of Management and Marketing, University of Melbourne, Melbourne.
- Heras, I. (2006), “Génesis y auge de los estándares de gestión: una propuesta para su análisis desde el ámbito académico”, in Heras, I. (Ed.), *ISO 9000, ISO 14001 y otros estándares de gestión: pasado, presente y futuro*, Editorial Civitas, Madrid.
- Heras, I. and Casadesus, M. (2006), *Los estándares internacionales de sistemas de gestión: pasado, presente y futuro*, Boletín ICE no. 2876, Revista del Ministerio de Industria, Turismo y Comercio, Madrid, pp. 45-61.
- Heras, I., Arana, G. and Casadesús, M. (2006), “A Delphi study on motivation for ISO 9000 and EFQM”, *International Journal of Quality & Reliability Management*, Vol. 23 No. 7, pp. 807-27.
- International Organization for Standardization (2004), *ISO 14001: Environmental Management Systems – Requirements with Guidance for Use*, International Organization for Standardization, Geneva.
- International Organization for Standardization (2008a), *The ISO Survey of Certifications – 2007*, International Organization for Standardization, Geneva.
- International Organization for Standardization (2008b), *The Integrated Use of Management System Standards*, International Organization for Standardization, Geneva.
- International Organization for Standardization (2008c), *ISO 9001: Quality Management Systems – Requirements*, International Organization for Standardization, Geneva.
- Iversen, M. (2000), “Synergies and sustainable competitive advantage”, Working Paper No. 7, Department of Industrial Economics and Strategy, Copenhagen Business School, Copenhagen.
- Jorgensen, T.H., Remmen, A. and Mellado, M.D. (2006), “Integrated management systems – three different levels of integration”, *Journal of Cleaner Production*, Vol. 14 No. 8, pp. 713-22.
- Karapetrovic, S. and Jonker, J. (2003), “Integration of standardized management systems: searching for 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., Casadesus, M. and Heras, I. (2006), “Dynamics and integration of standardized management systems”, *Documenta Universitaria, Serie Gitasp No. 1*, Girona.
- Leung, H.K.N., Chan, K.C.C. and Lee, T.Y. (1999), “Costs and benefits of ISO 9000 series: a practical study”, *International Journal of Quality & Reliability Management*, Vol. 16 No. 7, pp. 675-91.
- Marimón, F., Casadesus, M. and Heras, I. (2006), “ISO 9000 and ISO 14000 standards: an international diffusion model”, *International Journal of Operations and Production Management*, Vol. 26 No. 2, pp. 141-65.
- Matias, J.C.O. and Coelho, D.A. (2002), “The integration of the standards systems of quality management, environmental management and occupational health and safety management”, *International Journal of Production Research*, Vol. 40 No. 15, pp. 3857-66.

- Mendel, P.J. (2002), "International standardization and global governance: the spread of quality and environmental management standards", in Hoffman, A.J. and Ventresca, M.J. (Eds), *Organizations, Policy and the Natural Environment: Institutional and Strategic Perspectives*, Stanford University Press, Stanford, CA.
- Mohammed, M. (2000), "The ISO 14001 EMS implementation process and its implications. A case study of central Japan", *Environmental Management*, Vol. 25 No. 2, pp. 177-88.
- Nakamura, M., Takahashi, T. and Vertinsky, I. (2001), "Why Japanese firms choose to certify: a study of managerial responses to environmental issues", *Journal of Environmental Economics and Management*, Vol. 42 No. 1, pp. 23-52.
- Ovretveit, J. (2001), "The Norwegian approach to integrated quality development", *Journal of Management in Medicine*, Vol. 15 No. 2, pp. 125-41.
- Penrose, E.T. (1959), *The Theory of the Growth of the Firm*, Oxford University Press, Oxford.
- Puri, S.C. (1996), *Stepping up to ISO 14000: Integrating Environmental Quality with ISO 9000 and TQM*, Productivity Press, Portland, OR.
- Renzi, M.F. and Cappelli, L. (2000), "Integration between ISO 9000 and ISO 14000: opportunities and limits", *Total Quality Management*, Vol. 11 Nos 4-6, pp. 849-56.
- Romano, P. (2000), "ISO 9000: what is its impact on performance?", *Quality Management Journal*, Vol. 7 No. 3, pp. 38-56.
- Stamou, T. (2003), "Integrated management systems in small-medium size enterprises: theory and practice", PhD thesis, University of East Anglia, Norwich.
- Terzioski, M., Samson, D. and Dow, D. (1997), "The business value of quality management systems certification", *Evidence from Australia and New Zealand, Journal of Operations Management*, Vol. 15 No. 1, pp. 1-18.
- Uzumeri, M. (1997), "ISO 9000 and other metastandards: principles for management practice?", *Academy of Management Executive*, Vol. 11 No. 1, pp. 21-36.
- Vloeberghs, D. and Bellens, J. (1996), "Implementing the ISO 9000 standards", *Quality Progress*, Vol. 29 No. 6, pp. 43-8.
- Wilkinson, G. and Dale, B.G. (2001), "Integrated management systems: a model based on a total quality approach", *Managing Service Quality*, Vol. 11 No. 5, pp. 318-30.
- Zeng, S.X., Tian, P. and Shi, J.P. (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.S. (2005), "Integrated management system: experiences of three Australian organizations", *Journal of Manufacturing Technology Management*, Vol. 16 No. 2, pp. 211-32.
- Zwetsloot, G. (1995), "Improving cleaner production by integration into the management of quality, environment and working conditions", *Journal of Cleaner Production*, Vol. 3 Nos 1/2, pp. 61-6.

Corresponding author

Martí Casadesús can be contacted at: marti.casadesus@udg.edu