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# Evolution of integrated management systems research on the Journal of Cleaner Production: Identification of contributions and gaps in the literature

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ABSTRACT

Certifiable management systems, such as ISO 9001 Quality Management System (QMS), ISO 14001 Environmental Management System (EMS) and OHSAS 18001 Occupational Health and Safety Management System (OHSMS), have gained popularity within different countries around the world. The integration of these management systems (MS) that work in a separated way has been pointed out by many researchers as a way to improve the overall management system efficiency. In this context, it is remarkable the engagement of the Journal of Cleaner Production (JCP) in contributing to developing the Integrated Management System (IMS) field. The objective of the present study is to analyze the evolution of IMS research on JCP, presenting its contributions and gaps in the IMS scope. The analysis was conducted through a theoretical framework of IMS on JCP. The identified contributions were split into five groups: (I) IMS and Sustainability, (II) IMS and Strategy, Performance and Innovation, (III) Analysis of integration levels and motivations, benefits and difficulties of IMS implementation, (IV) IMS methods, guidelines and maturity model and (V) IMS and Corporate Social Responsibility. The results showed the JCP is the most influential journal in IMS area. Regarding the gaps in the IMS literature, we found lack of studies approaching IMS and performance (mainly environmental performance), IMS and sustainability, methods and guidelines for IMS based on empirical evidences, analysis of the levels of integration and motivations, benefits and difficulties taking into account the implementation strategy adopted, IMS and innovation management and IMS and social responsibility. It is suggested the gaps found in this paper are explored in future studies.



## 1. Introduction

Companies operate in a global scenario characterized by intense competition, where is necessary to meet the minimum requirements of customers and of legislation to survive. The certifiable management systems have gained popularity within different countries around the world, especially when it comes to Quality Management Systems (QMS) based on ISO 9001, Environmental Management Systems (EMS) based on ISO 14001 and Occupational Health and Safety Management Systems (OHSMS) based on OHSAS 18001, which are the most widespread and known certifiable management systems today (Zeng et al., 2007; Santos et al., 2011; Oliveira, 2013).

Systems covering quality, environment, and occupational health and safety have been frequently implemented in parallel with each other or sequentially. Although theses management systems can be operated separately, it is remarkable the difficulties that companies have faced when operating these multiple parallel management systems simultaneously. Hence, many studies aiming the integration of quality management, environment and security have emerged in order to adopt a single and more efficient management system which reduces time, bureaucracy and reduces the use of human, technical and financial resources (Zeng et al., 2007; Karapetrovic and Casadesús, 2009; Oliveira, 2013; Abad et al., 2014).

In this context, it is remarkable the engagement of the Journal of Cleaner Production (JCP) in developing the Integrated Management System (IMS) field. The JCP is one of the main international forums to IMS research where many important IMS studies have been published. Since 1995 were accounted 30 publications published on this platform. These studies have used various elements of

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research, such as those pointed out by Yin (2009) which include case studies, surveys and cross-sectional analysis to find contributions to the wide topic IMS.

The aim of the JCP is to exchange information and research concepts that encourage innovation and creativity towards making societies and regions more sustainable. The JCP impact factor has increased throughout time, and, in 2015, it reached the mark of 4.959 on a scale of 0–5 (Thomson Reuters Journal Citation Reports, 2015).

In general, IMS studies have approached some topics including the main motivations, drawbacks and benefits of IMSs, classification of levels of integration and models and guidelines to IMS implementation. Moreover, other issues, such as the strategic role of IMS, how to conduct the audit function and how to manage the information flow in an integrated context are also discussed.

Thus, taking into account the participation of JCP in developing state-of-the-art IMS literature, the main objective of the present study is to analyze the evolution of IMS research on JCP, identifying its contributions and gaps in the IMS scope over the years and to understand how and whether the contribution groups are interacting with each others at the research structure in order to add value to IMS field.

At the sequence, this paper is organized on a theoretical framework section, which presents contents about Management Systems and Integrated Management System, followed by a method section, which describes the methodology of research and by a section that presents the discussion and results of this study. Finally, the last section presents the conclusions and suggests for future studies.

## 2. Theoretical framework

### 2.1. Management systems

A management system (MS) can be defined as a set of procedures the organization needs to follow in order to reach its objectives, or as a "*process of systemizing how things are done*" (ISO, 2016). The certification of MSs recognizes the MS accomplishment of the requirements of a specific normative standard (Santos et al., 2011; Oliveira, 2013).

In this context, the certification of Quality Management System (ISO 9001 - QMS), Environmental Management System (ISO 14001 - EMS) and Occupational Health and Safety Management System (OHSAS, 18001 - OHSMS) become widely used by companies around the world. (Zutshi and Sohal, 2005; Zeng et al., 2007; Oliveira, 2013).

ISO 9001 is a certifiable standard accepted worldwide (Corbett, 2006; Sampaio et al., 2009; Boiral, 2011) composed of requirements that aims to guarantee the quality of products and services and, consequently, the most effective relationship between the supplier and the customer (ISO 9001, 2008).

The benefits perceived through ISO 9001 implementation are achieved in accordance with company certification motivations (Corbett et al., 2003; Williams, 2004). Typically, both internal and external motivators and benefits are mixed. Motivators and benefits of internal nature are related with improvements of ISO 9001 inside the organization, such as improvement of productivity, operational efficiency, product quality, employee motivation, among others. Those of external nature are related with external pressure, such as sales, market-share, customer satisfaction, delivery and organizational image-related factors (Sampaio et al., 2009; Kim et al., 2011).

Furthermore, the difficulties frequently associated with ISO 9001 standard adoption include the following: lack of top management involvement during the implementation process (Sampaio et al., 2009; Al-Najjar, 2011), employee and middle-management resistance, lack of financial and human resources, insufficient knowledge about quality programs (Al-Najjar, 2011; Magd and Nabulsi, 2012) and involvement of a long and bureaucratic documentation (Zeng et al., 2007; Boiral, 2011; Magd and Nabulsi, 2012).

In 2015 alone, 1.1 million certificates to the standard were issued across 170 countries. A new version of the standard, ISO 9001:2015, was published in 2015. The ISO 9001:2015 is less prescriptive than its predecessor, focuses on identifying and controlling risks at strategic and operational level and brings about the involvement of interested parties (ISO, 2016).

At an environmental level, many companies across the world have adopted the ISO 14001 EMS to manage their environmental issues. In contrast with ISO 9001, which is driven by customer's satisfaction, the ISO 14001 certification is guided mostly by social demands and stakeholders' expectations, such as government, community and customers (Zeng et al., 2005; Prajogo et al., 2012).

The ISO 14001 standard aims to guide companies into developing a green production, requiring them to manage systematically their environmental responsibilities and impacts at organizational, process and product levels, thus reflecting in improvements in the environmental pillar of sustainability and consequently and indirectly in CSR (ISO, 2016; Prajogo et al., 2012; To and Lee, 2014; Arimura et al., 2016).

Prajogo et al. (2012) found that benefits stemming of ISO 14001 adoptions, as for ISO 9001, are mixed with motivations that led to implementation process. In this sense, the scientific literature has presented the following benefits and motivations from ISO 14001: saving resources and increase of internal efficiency improvements (both achieved through reduction of pollution and engagement in accomplish laws and regulations), improvements in marketing place acceptance and enhancement of corporate image and reputation, enabling the participation of the companies in public services in countries where the law only requires the participation of companies certified by environmental standards, as is the case of Denmark (Christiansen and Kardel, 2005; Oliveira et al., 2010; Santos et al., 2011; Prajogo et al., 2012; Gavronski et al., 2013).

On the other hand, difficulties faced in order to achieve the ISO 14001 implementation are frequently related with the considerable amount of resources required to do it, which includes investments in training and contract personnel, adaptation of operations, acquisition of new equipments, among others, resulting in high certification costs. Another difficulty that can be noted is that important products such as building materials, wood companies, mining companies, quarries, transportation in general, etc. are typically not covered by the green procurement schemes (Johannson, 1997; Christiansen and Kardel, 2005; Santos et al., 2011; Oliveira et al., 2010; Boiral, 2011).

Up to December 2014, there were 324.148 companies certified to ISO 14001 worldwide. The latest version of ISO 14001, as well as ISO 9001, was published in 2015 and takes into account the latest changes in environmental management practices, and reflects the increasingly complex, demanding and dynamic environment in which modern-day organizations operate (ISO, 2016).

OHSAS 18001 certification came to follow the dissemination of ISO 9001 and 14001 standards. Since its creation, the OSHAS become the most international used standard for evaluating safety management processes at the firm level (Lo et al., 2014; Abad et al., 2014).

The objective of OHSAS 18001 is to establish components for construction of an effective OHSMS able to mitigate accident risks and protect collaborators and other interested parties who may be exposed to occupational health and safety risks associated with its activities (Vinodkumar and Bhasi, 2011; Oliveira, 2013).

Some benefits and drawbacks of OHSMS certification were identified recently by authors investigating OSHAS 18001 effectiveness and operating performance. The findings showed that OSHAS 18001 improves working conditions and management practices, ensures compliance with legislation and improves internal safety communication, which involves safety rules and procedures (Vinodkumar and Bhasi, 2011; Santos et al., 2013; Lo et al., 2014), whereas the main drawbacks include high certification costs, lack of employee motivation, difficulties in changing the company's culture and increased bureaucracy (Santos et al., 2013).

Although there is no public database containing OHSAS 18001 certified firms, the BSI group has released statistics of a rapid growth in the use of OHSAS 18001 over the last decade (OHSAS Standards and Certificates Survey, 2011).

Lo et al. (2014) suggests that in a fairly short period of time OHSAS 18001 certification could become a norm. The BSI Group also emphasized the worldwide necessity of an international standard to harmonization of health and safety management systems (BSI Group, 2016). In order to supply this need, the ISO 45001 (Occupational health and safety management systems – Requirements) will be launched in October 2016.

The ISO 45001 is being developed by a committee of occupational health and safety experts and will follow other generic management system approaches, such as ISO 14001 and ISO 9001. Besides, it will take into account other International Standards of the area, such as OHSAS 18001, the International Labour Organization's ILO-OSH Guidelines, several national standards and the ILO's international labor standards and conventions (ISO, 2016).

### 2.2. Integrated management systems

Over the last decade, management systems standards have become more aligned. This alignment is characterized by a common base that supports the structure of ISO 9001 QMS, ISO 14001 EMS, and OHSAS 18001 OHSMS, the PDCA cycle (Plan, Do, Check, Act) of continual improvement (Bernardo et al., 2015; Oliveira, 2013; Zeng et al., 2007). The PDCA structure is shown in Fig. 1.

The requirements of these three standards, such as politics, objectives, training, document and operating control and audits were designed taking into account the steps of the PDCA structure in order to enable the companies meeting the customer satisfaction (Quality), society (Environment) and workers (Security).

Certified systems working separately have increasingly been seen as efforts wasted with excessive bureaucratic, costs and redundancies. In this context, the integration of management systems that work in a separated way has been pointed out by many researchers as a way to improve the overall management system efficiency (Zeng et al., 2007; Santos et al., 2011; Simon et al., 2012; Oliveira, 2013; Abad et al., 2014; Bernardo et al., 2015).

An Integrated Management System (IMS) is a construction to avoid duplication of tasks that aims to take advantage from the elements common to two or more separate systems, putting them to work together in a single and more efficient IMS (Beckmerhagen et al., 2003; Labodová, 2004; Zeng et al., 2007; Karapetrovic and Casadesús, 2009; Oliveira, 2013; Abad et al., 2014).

At the last decade, several approaches to IMS have being studied, such as evaluation of motivations, benefits and drawbacks of integration (see i.e. Simon et al., 2012; Bernardo et al., 2015; Gianni and Gotzamani, 2015), characterization of the integration levels (Bernardo et al., 2012; Abad et al., 2014), integration of audits (Karapetrovic and Willborn, 2000; Bernardo et al., 2010; Simon et al., 2011), integration strategy (Zeng et al., 2007; Savino and Batbaatar, 2015) and models and guidelines for the integration process (Domingues et al., 2016; Oliveira, 2013).

The benefits of integration is a topic that has been extensively discussed over the years. The findings showed that motivations to implement an integrated management system are associated with the benefits derived from IMS, which include the improvement of organizational efficiency (reduce redundancies of tasks, human efforts, time, etc.), improvement of internal communication, company image for external benefits, competitiveness, as well as reduction of the costs of managing each system individually (Tarí and Molina-Azorín, 2010; Santos et al., 2011; Oliveira, 2013; Abad et al., 2014; Bernardo et al., 2015).

On the other hand, the drawbacks associated with the integration process include the following: increase management costs, incur cultural incompatibility and cause complexity of internal management (Zeng et al., 2007; Santos et al., 2011).

According to Bernardo et al. (2015), the integration process can be defined by four main aspects: integration level, which is about the degree achieved by the IMS, audit systems' integration, related to integration level of internal and external audits, integration methodology, which consist in "*models or tools used in the process*" and integration strategy, which refers to the "*number and implementation sequence of MSs that the organization decides to integrate*".

The levels of integration can be achieved in accordance to the integration level of objectives, resources and procedures (Bernardo et al., 2012). Despite of the difference existing between integration levels approaches; the most studies classified the IMS into three levels of integration (Karapetrovic, 2002; Beckmerhagen et al., 2003; Pojasek, 2006; Jørgensen, 2008; Bernardo et al., 2009; Abad et al., 2014).

Seghezzi's (1997) approach, for example, defines the following integration levels: "addition" (systems for quality, environment, etc. are managed in a separate way, i.e., using separate documents which "contents are maid comparable"), "merger" (work instructions are totally integrated, but not the procedures and the manual) and "integration" (*"companies can choose or develop a generic MS as their general system and include all partial systems in it"*).

In the same way, Jørgensen et al. (2006) and Jørgensen (2008) describe a three-level model grouped in "correspondence" *("cross references and internal coordination"*), "generic" *('understanding of generic processes and tasks in the management cycle"*) and "integration" (consolidation of a culture of continuous improvement, learning and stakeholder participation).

Moreover, the integrated audits, considered an essential resource for intensify the inter-relation between IMS, can also be classified in three levels of integration (Bernardo et al., 2009, 2010; Simon et al., 2012). Aiming to answer frequent issues about it, studies focusing specifically integration of audits were developed (see e.g., Karapetrovic and Willborn, 2000; Bernardo et al., 2010; Simon et al., 2011; among others).

Regarding integrated audits, ISO 19011:2011 should be mentioned. The ISO 19011 provides guidance on auditing management systems that is applicable to all organizations that need to conduct internal or external audits of management systems or manage an audit programme (ISO, 19011, 2011). Comparing with its last published version (ISO, 19001:2002) the updated version consider a broader scope of management system auditing, including the approach to "combined audit", which is adopted when two or more management systems of different disciplines are audited together, that is the case of IMS (ISO, 2016). This perspective of ISO 19011:2011 has favored the IMS implementation process and thus has to be highlighted.

The integration strategy discusses about the sequence or order in which the integration process is implemented by organizations. In general, previous studies indicate two possible strategies: sequential integration, that first implements the quality and then implements and integrates other systems, or simultaneous

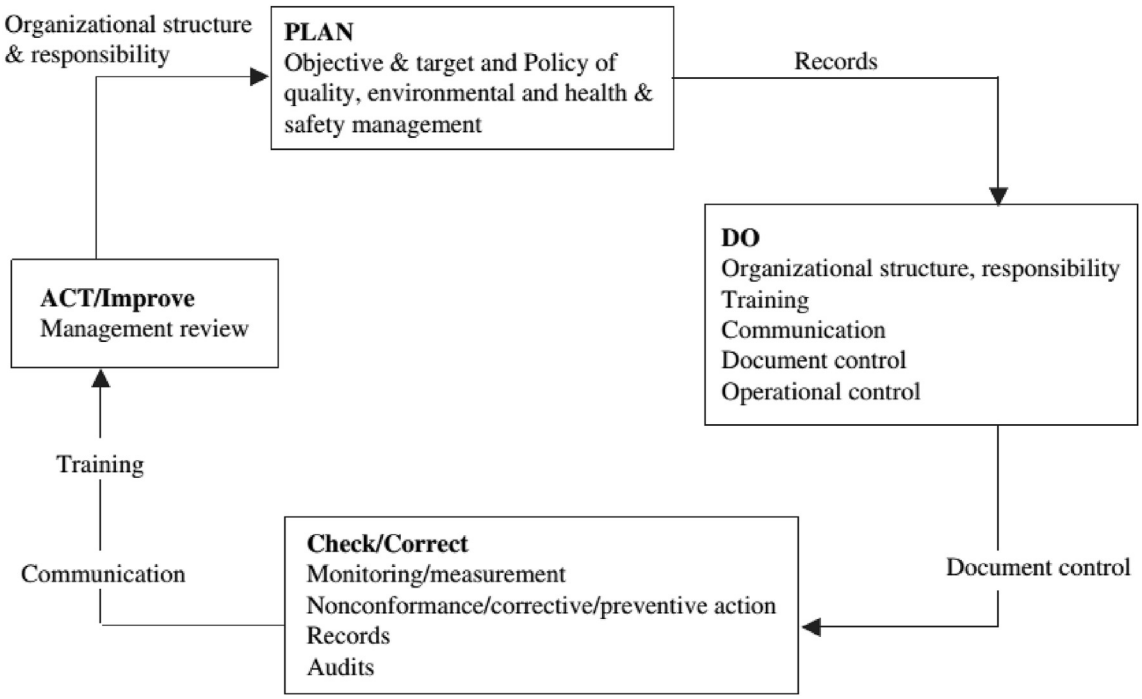



**Fig. 1.** PDCA structure (Zeng et al., 2007).

integration, that all systems are implemented in an integrated manner (Karapetrovic and Casadesús, 2009; Zeng et al., 2007).

Based on these studies, methodologies and guidelines for integration of management systems have emerged at the IMS literature to help organizations to deal with the integration process, once that it does not exist an international standard covering it. Some studies in this line include, among others, studies of Wright (2000), Karapetrovic (2003), Labodová (2004), and more recently, Zeng et al. (2007), Asif et al. (2009), Tarí and Molina-Azorín (2010) and Oliveira (2013).

Oliveira (2013) has identified this "deficit" and claimed on his studies that an international world-wide standard is needed for the effectively integrated adoption. Moreover, some efforts to guide the integration process have been spent by important entities and governments from different countries.

In this sense, integration norms were developed in Australia and New Zealand (AS/NZS 4581: 1999), England (PAS 99: 2006), Denmark (DS 8001: 2005) and Spain (UNE 66177: 2005) (SAI Global, 1999; BSI, 2006; Dansk Standard, 2005; AENOR, 2005).

Moreover, ISO has also presented some important initiatives regarding IMS, as the publication of the ISO handbook that provides various methodologies, tools and practices to integration of management system standards in 2008, and more recently, the publication of the annex SL. The Annex SL presents the ISO's High Level Structure (HLS), which is defined as a standardization that aims to promote compatibility between the various standards of management systems and to facilitate their integration and implementation by certified companies. Both ISO 9001:2015 (QMS) and 14001:2015 (EMS) were revised based in the guidelines of Annex SL (ISO, 2016; Domingues et al., 2016).

## 3. Methodology

This paper is a literature review in which we aim to identify the contributions of the JCP to IMS research. The literature review report the current knowledge on a topic and base this summary on previously published research, providing the reader with a comprehensive overview on the subject (Green et al., 2006). Its goal is to bring the reader up-to-date with current literature on a topic and form the basis for another goal, such as the justification for future research in the area (Carnwell and Daly, 2001).

The literature review carried out in this study was based on an electronic search only on Science Direct, database which contains, among others, JCP articles. The research strategy used the following terms in the titles, keywords, or abstracts of the articles: "Integrated Management Systems"; "Management System Integration"; "IMS"; "ISO 9001" AND "ISO 14001"; "ISO 9001" AND "OSHAS 18001", and finally, "ISO 14001" AND "OSHAS 18001".

The results were refined by academic papers published only on the JCP until 1 April 2016. At the final were selected 30 academic papers. The steps traced by the methodology are summarized at the flowchart in Fig. 2.

As can be seen in Fig. 2, firstly, a literature search in the scope of management systems and integrated management systems was carried out. Then, lacks on literature which led to theme definition were identified. The next step was the establishment of objectives and methodology research. The literature review was the selected method, comprising only JCP publications. This decision was taken based on results of another wider study ours, which is a bibliometric study regarding IMS that indicated the JCP is the most influential journal in IMS.

Based in the literature search on JCP, publications framed in the IMS scope were selected and analyzed according to their year of publication, objectives, methods and findings and general contributions to IMS research. Hence, analyses were conducted.

First of all, an analysis regarding the overall ranking of the most cited articles in IMS (Table 1) is presented in order to show that JCP publications are expressive and relevant when compared to publications of other journals of IMS area. Based on these results was possible to confirm the relevance of this study and justify the theme delimitation.

The second one was a group analysis carried out in order to identify the main IMS areas that the JCP has contributed over the years (Table 2). In the sequence, a time line overview of the JCP

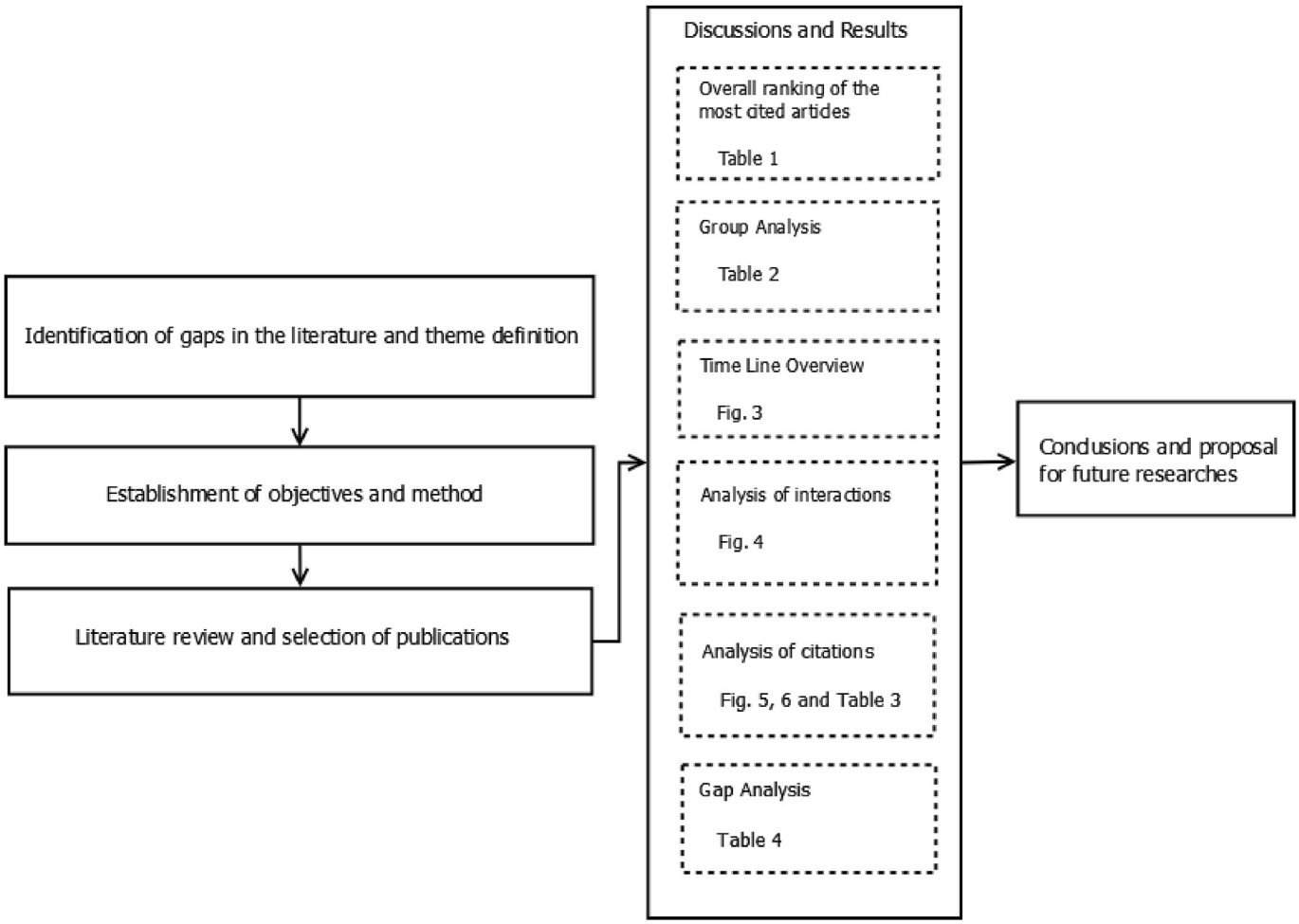



**Fig. 2.** Methodology flowchart.

contributions to IMS research is presented (Fig. 3), following by an interaction analysis between contributions groups (Fig. 4), by an analysis of the most cited IMS articles on JCP (Table 3 and Figs. 5 and 6) on JCP and by a gap analysis which identify the lacks in the IMS literature on JCP (Table 4). Finally, the findings are discussed and conclusions about the relevance of the JCP in the development of IMS research are presented as well as proposal for future researches.

## 4. Discussion and results

The aim of this study is to identify the contributions of the JCP to IMS research and identifying gaps in its IMS scope. First of all, in order to evaluate the expressiveness of the JCP in the IMS area and explain why we have limited this study to this journal, the most cited articles analysis was carried out contemplating publications of all journals, as presented in Table 1.

The most cited articles analysis consists in an analysis of the ten most cited IMS publications on the IMS field based on information available in the Scopus database on 30 June 2016. The overall ranking of the most cited articles shows that six of the ten most cited articles in IMS were published by JCP. Further, the six most cited JCP papers represent 76% of the citations of the 10 most cited articles. This fact presents the high expressivity of the JCP contributions to IMS area.

Thus, a literature review comprising only JCP publications was conducted. The findings indicated that in the last 20 years, the academic papers published on the JCP added up a total of 30 publications at the IMS field, each one of these presenting different types of contributions to IMS research.

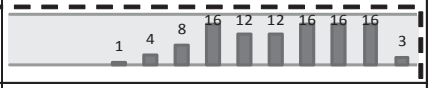
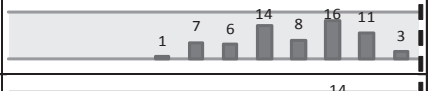
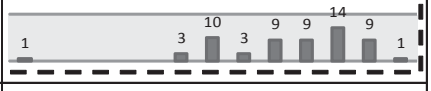
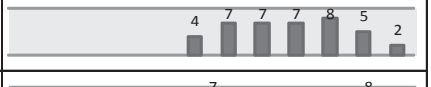
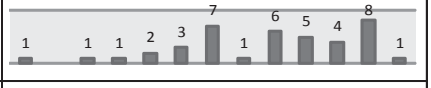
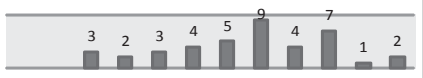
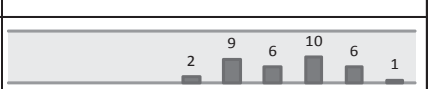
The contributions were grouped by the authors of this study. The groups were formed based on the similarities existing between the subjects discussed in each one articles analyzed. As a result, five groups of similarities were created.

The first one is concerning “IMS and Sustainability”. In this group was allocated articles that suggest the IMS as driver to sustained success. The second one took into accounting articles that deal with IMS and its relationship with strategy, performance and innovation, which are topics that have been emerged recently in IMS and since then have been usually addressed together. The proposed integration of Corporate Social Responsibility (CSR) in IMS is another recent topic identified for which a group has been created. The group entitled “Analysis of integration levels and motivations, benefits and difficulties of IMS implementation” is the largest group, which comprises publications that provided important basis for the development of IMS literature. Finally, the last group brings together articles that present methods, guidelines and maturity model for IMS. This group is characterized by presenting contributions to facilitate and/or “normalize” the integration process derived from different strategies of implementation.

Observe in Table 2 the description of these five groups and their respective contributions.

**Table 1**
Overall ranking of the most cited articles.

**Table 1 -** Overall ranking of the most cited articles.

| # | Most cited articles | Author(s)/Year | Journal | Total of citations | Evolution of citation per year |
|---|---|---|---|---|---|
| 1 | Integrated management systems – three different levels of integration | Jørgensen et al. (2006) | Journal of Cleaner Production | 104 |  |
| 2 | A synergetic model for implementing an integrated management system: an empirical study in China | Zeng et al. (2007) | Journal of Cleaner Production | 92 |  |
| 3 | Integrated management systems: experiences in Italian organizations | Salomone (2008) | Journal of Cleaner Production | 88 |  |
| 4 | How integrated are environmental, quality and other standardized management systems? An empirical study | Bernardo et al. (2009) | Journal of Cleaner Production | 79 |  |
| 5 | Implementing environmental with other standardized management systems: Scope, sequence, time and integration | Karapetrovik and Casadesús (2009) | Journal of Cleaner Production | 66 |  |
| 6 | Towards more sustainable management systems: through life cycle management and integration | Jørgensen (2008) | Journal of Cleaner Production | 59 |  |
| 7 | Towards occupational health and safety systems in the construction industry of China | Zeng et al. (2008) | Safety Science | 40 |  |
| 8 | Integrated management systems as a corporate response to sustainable development | Oskarsson and Von Malmborg (2005) | Corporate Social Responsibility and Environmental Management | 40 |  |
| 9 | Implementing integration of ISO 9001 and ISO 14001 for construction | Zeng et al. (2005) | Managerial Auditing Journal | 40 |  |
| 10 | Integration of quality management and environmental management systems similarities and the role of the EFQM model | TARÍ and MOLINA-AZORÍN | TQM Journal | 34 |  |

Source: Prepared by the authors.

**Table 2**
Contribution groups.

| Group | Contribution | Author(s)/Year |
|---|---|---|
| IMS and Sustainability | The IMS is a driver that can conduct companies to achieve the sustained success. | Rebelo et al., 2016; Siva et al., 2016; Witjes et al., 2016; Kurdve et al., 2016; Holm et al., 2015; Jørgensen, 2008; Fresner and Engelhardt, 2004; Zwetsloot, 1995. |
| IMS and Strategy, Performance and Innovation | The IMS is a strategic asset that has positive impact on innovation, financial, operational and marketing firm performance. | Savino and Batbaatar, 2015; Bernardo, 2014; Llach et al., 2013; Zeng et al., 2007. |
| Analysis of integration levels and motivations, benefits and difficulties of IMS implementation | There are different levels of integration (normally three) which characterize the nature of motivations, benefits and difficulties of implementation. | Bernardo et al., 2015; Gianni and Gotzamani, 2015; Abad et al., 2014; Bernardo et al., 2012; Simon et al., 2012; Ródriguez-Antón et al., 2012; Pereira-Moliner et al., 2012; Simon et al., 2011; Santos et al., 2011; Bernardo et al., 2010; Bernardo et al., 2009; Karapetrovic and Casadesús, 2009; Salomone, 2008; Jørgensen et al., 2006. |
| IMS methods, guidelines and maturity model | Methods, guidelines and a maturity model are proposed in order to facilitate and/or "normalize" the integration process. | Domingues et al., 2016; Oliveira, 2013; Labodová, 2004. |
| IMS and Corporate Social Responsibility | The IMS structure provides the integration of CSR. | Asif et al. (2013) |

Source: Prepared by the authors.

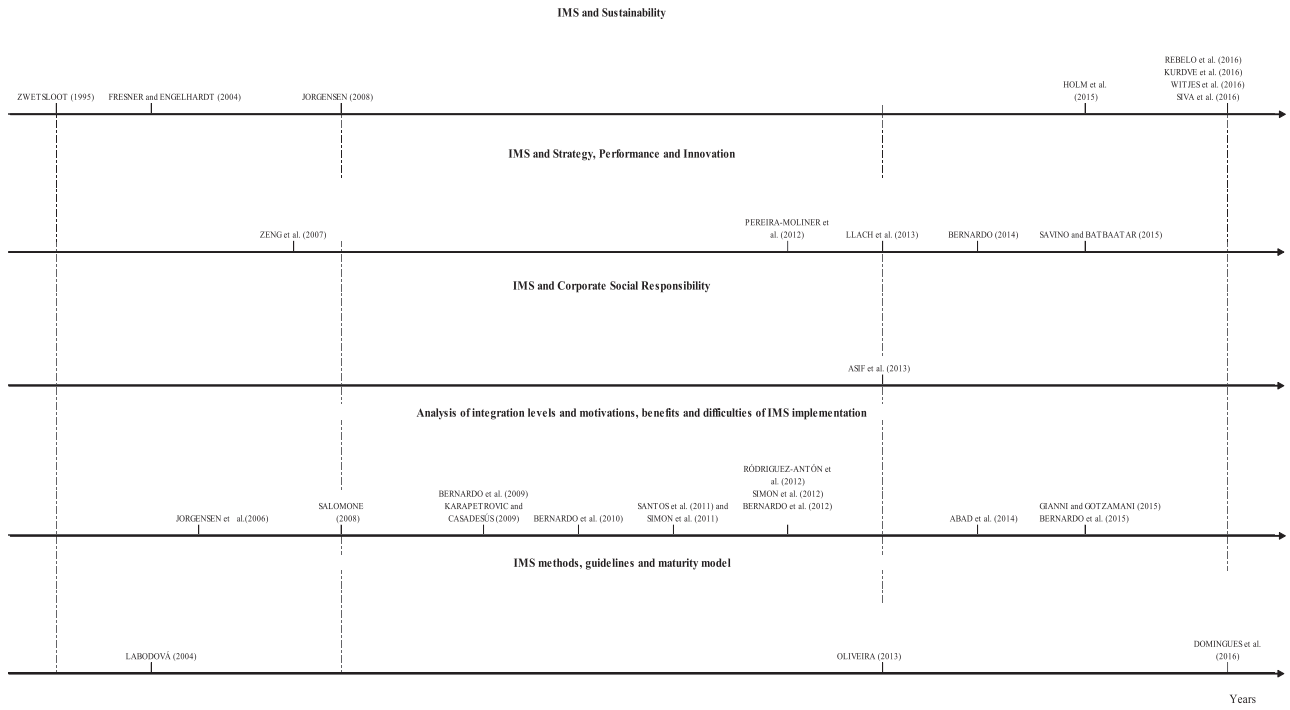



**Fig. 3.** Time line of evolution of IMS research groups on JCP.

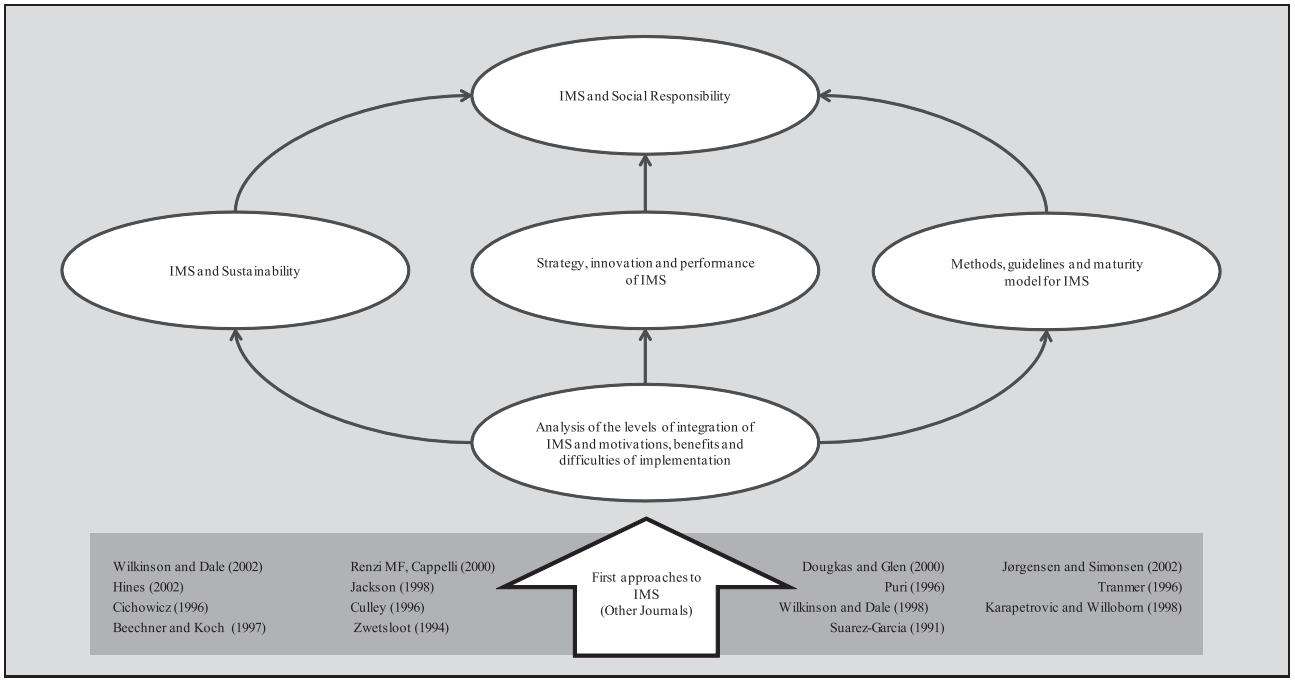



**Fig. 4.** Map of interactions.

Table 2 shows that the 30 papers analyzed were classified into five groups, each one adding value to a specific and important area of IMS research.

Regarding the findings of the "IMS and Sustainability" group, it was perceived that although companies in growth stage in CSR have more certified management systems, the management system itself is not used for the integration of corporate sustainability (Witjes et al., 2016). Some authors (e.g. Zwetsloot, 1995; Jørgensen, 2008; Rebelo et al., 2016) have argued that companies should include the sustainable management in a quality, environmental and health and safety integrated management system, although Siva et al. (2016) have emphasized the area of IMS is still unclear about the contributions to sustainability initiatives.

Furthermore, the findings of the "IMS and Strategy, Performance

**Table 3**
Most cited articles.

| | Most cited articles | Author(s) | Year | Total of citations | Citations evolution |
|---|---|---|---|---|---|
| 1 | Integrated management systems – three different levels of integration | JøRGENSEN et al. | 2006 | 103 | 0 0 0 1 4 8 16 12 12 15 16 16 3 |
| 2 | Integrated management systems: experiences in Italian organizations | SALOMONE | 2008 | 88 | 1 0 0 0 0 0 4 12 8 15 16 17 12 3 |
| 3 | Implementing integrated management systems using a risk analysis based approach | LABODOVÁ | 2004 | 86 | 2 5 1 2 2 4 13 10 12 11 12 10 2 |
| 4 | How integrated are environmental, quality and other standardized management systems? An empirical study | BERNARDO et al. | 2009 | 77 | 0 0 0 0 0 0 8 7 15 14 19 12 2 |
| 5 | Implementing environmental with other standardized management systems: Scope, sequence, time and integration | KARAPETROVIC; CASADESÚS | 2009 | 66 | 0 0 0 0 0 1 7 6 14 8 16 11 3 |
| 6 | Experiences with integrated management systems for two small companies in Austria | FRESNER; ENGELHARDT | 2004 | 64 | 0 1 1 2 2 4 8 9 7 10 9 7 3 |
| 7 | Towards more sustainable management systems: through life cycle management and integration | JøRGENSEN | 2008 | 59 | 0 0 0 0 0 3 10 3 9 9 14 9 1 |
| 8 | Quality management, environmental management and firm performance: direct and mediating effects in the hotel industry | PEREIRA-MOLINER et al. | 2012 | 42 | 0 0 0 0 0 0 0 0 0 3 11 18 10 |
| 9 | Certification and integration of management systems: the experience of Portuguese small and medium enterprises | SANTOS et al. | 2011 | 32 | 0 0 0 0 0 0 0 0 2 7 14 6 3 |
| 10 | An empirical study on the integration of management system audits | BERNARDO et al. | 2010 | 30 | 0 0 0 0 0 0 0 5 7 8 5 5 0 |

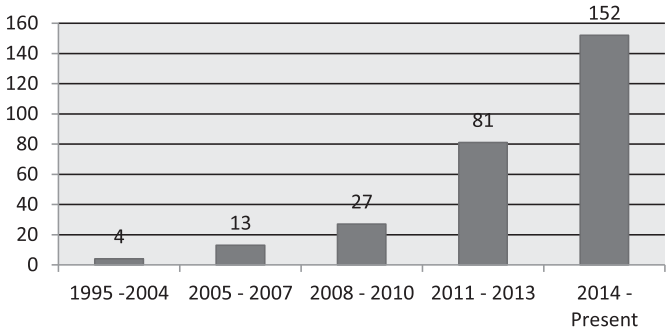



**Fig. 5.** JCP citations.

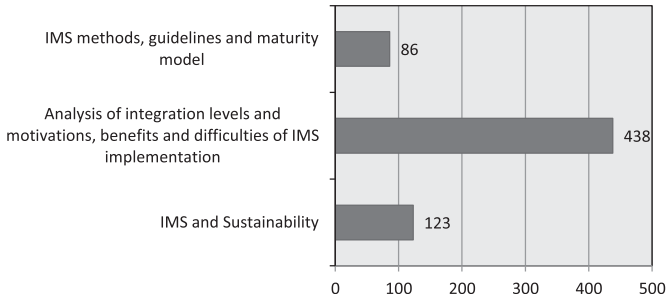



**Fig. 6.** Most cited by group.

and Innovation" group shows that IMS is a strategic asset that has positive impact on innovation, financial, operational and marketing firm performance. Hence, recently published studies have indicated that organizations which innovate in implementing IMS can improve their performance and achieve strategic competitive success (Bernardo, 2014; Savino and Batbaatar, 2015).

On the JCP, Asif et al. (2013) were the only authors who have argued specifically about IMS and CSR. According to the authors, IMS can provide the foundation for a top-down approach to CSR, through the development of "integrated manuals, procedures, and processes that specifically address implementation of CSR". Despite this, the current literature on the integration of CSR into business processes is still limited and needs further researches focusing on top-down and bottom-up approaches discussed in practice.

Most of the JCP publications have contributed to clarify aspects related to levels of integration of IMS and characterize the nature of motivations, benefits and drawbacks of implementation. An extensive literature review concerning this group has been previously carried out by Bernardo et al. (2015). In his work, 59 empirical academic papers from four databases were identified on the literature search with the purpose of identify the benefits of integrated management systems by comparing them with the benefits obtained through the individual implementation of ISO 9001 and ISO 14001 standards. In order to get a better view of the expressiveness of the JCP in this group, we can observe the analysis of the benefits from the integration of ISO 9001 and ISO 14001 standards held by this author, in which almost half of the referenced publications are the JCP.

**Table 4**
Lines of research for future studies.

| Line of research for future studies | Author(s)/Year |
|---|---|
| IMS + Performance | Siva et al., 2016; Abad et al., 2014; Savino and Batbaatar, 2015. |
| IMS + Sustainability | Kurdve et al., 2016; Witjes et al., 2016; Savino and Batbaatar, 2015; Holm et al., 2015. |
| Methods and guidelines for IMS | Savino and Batbaatar, 2015. |
| Levels of integration of IMS and motivations, benefits and difficulties of implementation + Strategy | Gianni and Gotzamani, 2015; Abad et al., 2014. |
| IMS + Innovation management | Bernardo, 2014. |
| IMS + Social Responsibility | Asif et al., 2013; Llach et al., 2013. |

Source: Prepared by the authors.

Although the "methods, guidelines and maturity model" group have comprised some approaches, the most recently study published by Domingues et al. (2016) highlighted that although the mainstream literature in IMS have checked relevant and crucial information, conclusions derived seldom are easily incorporated in IMSs considering its dynamic context.

After all, it is important highlight that many subjects have been target increasingly by researches in order to continue the construction of the state of the art of the IMS literature (see groups of contributions to "IMS and Sustainability", "IMS and Strategy, Performance and Innovation" and "IMS and Social Responsibility").

To better visualize the distribution of the referred contributions by group in a chronological view, a time line analysis was carried out, which is presented in Fig. 3.

A time line overview indicated the first approaches to IMS field on the JCP date from the final of 90s and in the early 2000s. In this period, the IMS publications had no background of the own JCP to support the development of their research. Thus, the JCP publications ended up been backed up by publications from other journals.

Moreover, a more specific analysis by group shows that although the "IMS and Sustainability" group has aroused the interest of researchers since the beginning of IMS research on JCP (note at the time line that Zwetsloot presented the first study that reported this relationship in 1995), the research on this proposal is actual and meeting in constant development, once that in the last three years five publications in the area were published, four of these recently published.

Observe in Fig. 3 that, over the years, researches on the JCP have focused mostly on approaches to the levels of management systems integration and its motivations, benefits and implementation difficulties (see Jørgensen et al., 2006; Salomone, 2008; Karapetrovic and Casadesús, 2009; Bernardo et al., 2009, 2010; Santos et al., 2011; Simon et al., 2011; Pereira-Moliner et al., 2012; Ródriguez-Antón et al., 2012; Bernardo et al., 2012; Simon et al., 2012; Abad et al., 2014; Bernardo et al., 2015; Gianni and Gotzamani, 2015).

In contrast, a small part of the studies (see Domingues et al., 2016; Labodová, 2004; Oliveira, 2013) has focused in the development of IMS methods, guidelines and, more recently, a maturity model for integration of Quality Management Systems, Environment and Security was published on the journal in order to facilitate and/or "normalize" the integration process.

Since 2012 publications of integrated management systems on JCP have presented new approaches. The consolidation and advance of scientific knowledge on integrated management systems and the constant evolution of the market requirements have revealed new possibilities for IMS research. As a result, new fields of research, for instance, IMS and Strategy, Performance and Innovation (see Savino and Batbaatar, 2015; Bernardo, 2014; Llach et al., 2013; Zeng et al., 2007) and IMS and Social Responsibility (see Asif et al., 2013) are emerging.

To identify how the state of the art of IMS on JCP was built and describe whether and how the contribution groups are correlated, an analysis of interaction between groups was performed. The results reveal a structure of interaction between groups that aid to better understand the actual state of contributions of JCP to IMS research. This structure of interactions is shown in the map of interactions (Fig. 4).

Notice that, corroborating with the content presented at the time line, the analysis of the map of interactions reveals an initial lack of preliminaries studies to support the IMS research on JCP. Puri (1996) and Karapetrovic and Willborn (1998) are some examples of references from other journals that supported the IMS production during the verified gap period. This lack can be observed in Fig. 5 in terms of JCP citations in the analyzed papers per period. This analysis took into account the number of JCP citations in each paper analyzed.

Despite this first moment marked by low production, observe in Fig. 5 that in a subsequent period the production of the JCP in the IMS area experienced an intensive development, characterized mostly by publications that contributed to the group of integration levels of IMS and motivations, benefits and drawbacks of implementation, which resulted in a wide base that interacted with the development of new works.

These contributions, in turn, were backed up and interacted with the works of Labodová (2004), Oliveira (2013) and Domingues et al. (2016), which presented IMS methods, guidelines and a maturity model. It also interacted with studies of IMS and Strategy, Performance and Innovation of Zeng et al. (2007), Llach et al. (2013), Bernardo (2014) and Savino and Batbaatar (2015) and interacted with studies of identification of synergies between IMS and Sustainability, initially discussed by Zwetsloot (1995) and Fresner and Engelhardt (2004), and later by Jørgensen (2008), Holm et al. (2015), Siva et al. (2016), Kurdve et al. (2016), Witjes et al. (2016) and Rebelo et al. (2016).

Moreover, still following the interaction structure presented in Fig. 4, the proposal for integrating CSR (Asif et al., 2013) has interacted with contributions of all previous studies. These results reveal a synergistic structure for the IMS research on JCP which has added important contributions to IMS field.

The most cited articles analysis limited to JCP publications aims to measure how useful the JCP contributions have been to IMS research in general. The results are shown in Table 3.

The analysis indicates that the ten most cited articles on the JCP add up a total of 647 citations, which means that the JCP has contributed significantly to development of IMS field. Observe in Table 3 that Jørgensen et al. (2006) is the most cited of all, cited 103 times. In sequence, the second most cited is Salomone (2008), cited 88 times. Both works are classified in the same group that discuss about the levels of integration of IMS, benefits and difficulties of implementation.

Within the ten most cited it can be noticed the presence of works classified into three distinct groups which presents different

types of contributions (IMS and Sustainability group; methods, guidelines and maturity model group and analysis of integration levels and motivations, benefits and difficulties of IMS implementation). Fig. 6 shows the most cited publications according to their contribution group.

Observe that IMS and Sustainability group has two publications between the most cited (Jørgensen, 2008; Fresner and Engelhardt, 2004) that add up a total of 123 citations. In addition, the IMS methods, guidelines and maturity model group has just one publication (Labodová, 2004) that was cited 86 times.

Finally, the most cited group, "analysis of integration levels and motivations, benefits and difficulties of IMS implementation" pursue seven of the ten most cited IMS publications on the JCP (Jørgensen et al., 2006; Salomone, 2008; Bernardo et al., 2009; Karapetrovic and Casadesús, 2009; Pereira-Moliner et al., 2012; Santos et al., 2011; Bernardo et al., 2010) that added up 438 citations.

The "IMS and Strategy, Performance and Innovation IMS" and "IMS and Corporate Social Responsibility" groups have no publications among the ten most cited.

Finally, the gaps in the literature and suggestions for future research were analyzed. Table 4 shows the main lines of research for future studies in the scope of IMS highlighted by researchers who published on JCP in the last 3 years.

In the "IMS + Performance" category was found the lack of empirical evidence of the effect of IMS in performance, especially regarding environmental performance. Thus, the authors suggest that, in order to advance this field of research, when examining the relationship between IMS and environmental performance, future research could investigate whether and how the IMS helps companies reduce the potentially negative impact of their operations on the environment.

On the other hand, the "IMS + Sustainability" category has identified the need to investigate the impact of certifiable management systems on the sustainable development as well as the need to develop IMS integration proposals to corporate sustainability in order to optimize the related results to sustainable management. In addition, studies aiming improvements to integration of IMS operations management as a contribution to the area of sustainable development are suggested.

Savino and Batbaatar (2015) highlight the need to develop integration methodologies based on empirical research, while Gianni and Gotzamani (2015) and Abad et al. (2014) suggest conducting strategic orientation studies for decision the right level of integration according to the benefits sought.

Finally, Bernardo (2014) highlights the lack of IMS research directed to the empirical test of the impact of IMS at the performance of innovation management and suggests researches in this line and Asif et al. (2013) and Llach et al. (2013) show the need for research on how IMS can be integrated with social responsibility in practice.

## 5. Conclusions

The main academic contribution of the present study is to identify the state-of-the-art of the IMS field on the JCP, presenting its contributions and gaps in the scope of IMS literature. Thus, the analysis carried out identified five groups of contributions: (I) IMS and Sustainability, (II) IMS and Strategy, Performance and Innovation, (III) Analysis of integration levels and motivations, benefits and difficulties of IMS implementation, (IV) IMS methods, guidelines and maturity model and (V) IMS and Corporate Social Responsibility.

With the results of the studies presented in this paper is concluded that the JCP is an important source of research which presents many contributions to IMS field and where many authors find important data to support the IMS research, especially data regarding analysis of integration levels and motivations, benefits and difficulties of IMS implementation and data relating IMS as a driver to sustainable development. In addition, it was found that the journal has also contributed due to the publication of papers that address the IMS from the point of view of innovation management, performance and strategy and from the standpoint of standardization of the integration process.

Moreover, this work has raised the possibilities for future research in the IMS scope based on gaps identified by the articles analyzed. In this regard, it was verified lack of studies approaching IMS and performance (mainly environmental performance), IMS and sustainability, methods and guidelines for IMS based on empirical evidences, levels of integration of IMS and motivations, benefits and difficulties of implementation linked with strategy, IMS and innovation management and IMS and social responsibility.

Further, another gap that should be explored in future researches deals about the implications of ISO's high level structure to IMS. Although the ISO's high level structure is the most important contribution to IMS for decades, no articles concerning it have been written yet.

Thus, it can be said that, despite the initial gap presented in the paper in an early stage, when the first publications in the IMS field were published, the JCP currently is, without doubt, a complete platform of research with current and relevant contents used as reference for many authors who study IMS.

However, it is important to consider that this study was limited to analyze JCP publications. To complementation and evolution of this research, it suggests for future research its expansion to other journals, such as the TQM Journal, Quality Progress, the Journal of Environmental Management, Environmental Quality Management, among others in order to identify gaps and contributions that make up the state-of-the-art IMS literature on a wider scale.

## References


Abad, J., Dalmau, I., Vilajosana, J., 2014. Taxonomic proposal for integration levels of management systems based on empirical evidence and derived corporate benefits. J. Clean. Prod. 78, 164–173.

AENOR, 2005. UNE 66177: Sistemas de gestion. Madrid, Spain: gu ıa para la integracion de los sistemas de gestion. AENOR.

Al-Najjar, S.M., 2011. ISO 9001 implementation barriers and misconceptions: an empirical study. Int. J. Bus. Adm. 2, 1923–4007.

Arimura, T.H., Darnall, N., Ganguli, R., Katayama, H., 2016. The effect of ISO 140 01 on environmental performance: resolving equivocal findings. J. Environ. Manag. 166, 556–566.

Asif, M., Bruijn, E.J., Olaf, A.M., Steenhuis, F.C.S.H., 2009. Process embedded design of integrated management systems. Int. J. Qual. Reliab. Manag. 26, 261–282.

Asif, M., Searcy, C., Zutshi, A., Fisscher, O.A.M., 2013. An integrated management systems approach to corporate social responsibility. J. Clean. Prod. 56, 7–17.

Beckmerhagen, I.A., Berg, H.P., Karapetrovic, S.V., Willborn, W.O., 2003. Integration of management systems: focus on safety in the nuclear industry. Int. J. Qual. Reliab. Manag. 20 (2), 210–228.

Bernardo, M., 2014. Integration of management systems as an innovation: a proposal for a new model. J. Clean. Prod. 82, 132–142.

Bernardo, M., Casadesús, M., Heras, I., 2009. Management audits: an empirical study. Dirección Organ. 39, 37–44.

Bernardo, M., Casadesus, M., Karapetrovic, S., Heras, I., 2010. An empirical study on the integration of management system audits. J. Clean. Prod. 18, 486–495. http://dx.doi.org/10.1016/j.jclepro.2009.12.001.

Bernardo, M., Casadesús, M., Karapetrovic, S., Heras, I., 2012. Do integration difficulties influence management system integration levels? J. Clean. Prod. 21, 23–33.

Bernardo, M., Simon, A., Tarí, J.J., Molina-Azorín, J.F., 2015. Benefits of management systems integration: a literature review. J. Clean. Prod. http://dx.doi.org/10.1016/j.jclepro.2015.01.075 (in press).

Boiral, O., 2011. Managing with ISO systems: lessons from practice. Long. Range Plan. 44 (3), 197–220.

British Standards Institution, 2006. PAS 99:2006 – Specification of Common Management System Requirements as a Framework for Integration. London, UK.

BSI Group - British Standards Institution, 2016. Available in: http://www.bsigroup.

com/ (accessed 12.04.16.).
Carnwell, R., Daly, W., 2001. Strategies for the construction of a critical review of the literature. Nurse Educ. Pract. 1, 57–63.
Christiansen, K., Kardel, D., 2005. Environmental certificates: Danish lessons. J. Clean. Prod. 13, 863–866.
Corbett, C., 2006. Global diffusion of ISO 9000 certification through supply chains. Manuf. Serv. Oper. Manag. 8 (4), 330–350.
Corbett, C., Luca, A., Pan, J., 2003. Global Perspectives on Global Standards. ISO Management Systems. January-February.
Dansk Standard, 2005. DS 8001:2005. Ledelsessystemer. Vejledning i opbygning af et integreret ledelsessystem, Copenhagen, Denmark.
Domingues, P., Sampaio, P., Arezes, P.M., 2016. Integrated management systems assessment: a maturity model proposal. J. Clean. Prod. http://dx.doi.org/10.1016/j.jclepro.2016.02.103 (in press).
Fresner, J., Engelhardt, G., 2004. Experiences with integrated management systems for two small companies in Austria. J. Clean. Prod. 12, 623–631.
Gavronski, I., Paiva, E.L., Teixeira, R., Andrade, M.C.F., 2013. ISO 14001 certified plants in Brazil - taxonomy and practices. J. Clean. Prod. 39, 32–41.
Gianni, M., Gotzamani, K., 2015. Management systems integration: lessons learned from an abandonment case. J. Clean. Prod. 86, 265–276.
Green, B.N., Johnson, C.D., Adams, A., 2006. Writing narrative literature reviews for peer-reviewed journals: secrets of the trade. J. Chiropr. Med. 5, 101–117.
Holm, T., Vuorisalo, T., Sammalisto, K., 2015. Integrated management systems for enhancing education for sustainable development in universities: a memetic approach. J. Clean. Prod. 106, 155–163.
ISO 14001, 2004. Environmental Management Systems e Requirements with Guidance for Use.
ISO - International organization for Standardization, 2016. Available in: www.iso.org (accessed 04.10.16.).
ISO 9001, 2008. Quality Management Systems e Requirements.
Johannson, L., 1997. The challenge of implementing IS0 14001 for small- and medium-sized enterprises surviving in the new global jungle. Environ. Qual. Manag.
Jørgensen, T.H., 2008. Towards more sustainable management systems: through life cycle management and integration. J. Clean. Prod. 16, 1071–1080.
Jørgensen, T.H., Remmen, A., Mellado, M.D., 2006. Integrated Management Systems-three different levels of integration. J. Clean. Prod. 14, 713–722.
Karapetrovic, S., Willborn, W., 1998. Integration of quality and environmental management systems. TQM Mag. 10 (3), 204–213.
Karapetrovic, S., 2002. Strategies for the integration of management systems and standards. TQM Mag. 14 (1), 61–67.
Karapetrovic, S., 2003. Musings on integrated management systems. Meas. Bus. Excell. 7 (1), 4–13.
Karapetrovic, S., Casadesús, M., 2009. Implementing environmental with other standardized management systems: scope, sequence, time and integration. J. Clean. Prod. 17, 533–540.
Karapetrovic, S., Willborn, W., 2000. Generic audit of management systems: fundamentals. Manag. Audit. J. 15 (6), 279–294.
Kim, D.Y., Kumar, V., Kumar, U., 2011. A performance realization framework for implementing ISO 9000. Int. J. Qual. Reliab. Manag. 28 (4), 383–404.
Kurdve, M., Zackrisson, M., Wiktorsson, M., Harlin, U., 2016. Lean and green integration into production system models – experiences from Swedish industry. J. Clean. Prod. 85, 180–190.
Labodová, A., 2004. Implementing integrated management systems using a risk analysis based approach. J. Clean. Prod. 12, 571–580.
Llach, J., Perramon, J., Alonso-Almeida, M.M., Bagur-Femenías, L., 2013. Joint impact of quality and environmental practices on firm performance in small service businesses: an empiric al study of restaurants. J. Clean. Prod. 44, 96–104.
Lo, C.K.Y., Pagell, M., Fan, Di, Wiengarten, F., Yeung, A.C.L., 2014. OHSAS 18001 certification and operating performance: the role of complexity and coupling. J. Operat. Manag. 32, 268–280.
Magd, D., Nabulsi, F., 2012. The effectiveness of ISO 9000 in an emerging market as a business process management tool: the case of the UAE. Procedia Econ. Finance 3, 158–165.
OHSAS Standards and Certificates Survey results data, 2011. Available in: www.jisc.go.jp (accessed 04.10.16.).
Oliveira, O.J., Serra, J.R., Salgado, M.H., 2010. Does ISO 14001 work in Brazil? J. Clean. Prod. 18, 1797–1806. http://dx.doi.org/10.1016/j.jclepro.2010.08.004.
Oliveira, O.J., 2013. Guidelines for the integration of certifiable management systems in industrial companies. J. Clean. Prod. 57, 124–133.
Pereira-Moliner, J.M., Claver-Cortés, E., Molina Azorín, J.F., Tarí, J.J., 2012. Quality management, environmental management and firm performance: direct and mediating effects in the hotel industry. J. Clean. Prod. 37, 82–92.
Pojasek, R., 2006. Quality toolbox: is your integrated management system really integrated? Environ. Qual. Manag. http://dx.doi.org/10.1002/tqem.20071. Published online in Wiley InterScience. www.interscience.wiley.com.
Prajogo, D., Tang, A.K.Y., Lai, K., 2012. Do firms get what they want from ISO 14001 adoption?: an Australian perspective. J. Clean. Prod. 33, 117–126.
Puri, S., 1996. Stepping up to ISO 14000: Integrating Environmental Quality with ISO 9000 and TQM. Productivity Press, Portland, USA.
Rebelo, M.F., Santos, G., Silva, R., 2016. Integration of management systems: towards a sustained success and development of organizations. J. Clean. Prod. 127, 96–111. http://dx.doi.org/10.1016/j.jclepro.2016.04.011.
Rodríguez-Antón, J.M., Alonso-Almeida, M.M., Celemín, M.S., Rubio, L., 2012. Use of different sustainability management systems in the hospitality industry. The case of Spanish hotels. J. Clean. Prod. 22, 76–84.
Sai Global, 1999. Management System Integration. Guidance to Business, Government and Community Organizations, Sydney, Australia. AS/NZS 4581.
Salomone, R., 2008. Integrated management systems: experiences in Italian organizations. J. Clean. Prod. 16, 1786–1806.
Sampaio, P., Saraiva, P., Rodrigues, A.G., 2009. ISO 9001 certification research: questions, answers and approaches. Int. J. Qual. Reliab. Manag. 26 (1), 38–58.
Santos, G., Mendes, F., Barbosa, J., 2011. Certification and integration of management systems: the experience of Portuguese small and medium enterprises. J. Clean. Prod. 19, 1965–1974. http://dx.doi.org/10.1016/j.jclepro.2011.06.017.
Santos, G., Síria, B., Mendes, F., Lopes, N., 2013. The main benefits associated with health and safety management systems certification in Portuguese small and medium enterprises post quality management system certification. Saf. Sci. 51, 29–36.
Savino, M.M., Batbaatar, E., 2015. Investigating on the resources for integrated management systems within resource-based and contingency perspective in manufacturing firms. J. Clean. Prod. 104, 392–402.
Seghezzi, H., 1997. Business concept redesign. Total Qual. Manag. 8 (2–3), 36–43.
Simon, A., Bernardo, M., Karapetrovic, S., Casadesús, M., 2011. Integration of standardized environmental and quality management systems audits. J. Clean. Prod. 19, 2057–2065 (accessed 04.10.16.).
Simon, A., Karapetrovic, S., Casadesus, M., 2012. Evolution of integrated management systems in Spanish firms. J. Clean. Prod. 23, 8–19.
Siva, V., Gremyr, I., Bergquist, B., Garvare, R., Zobel, T., Isaksson, R., 2016. The support of quality management to sustainable development: a literature review. J. Clean. Prod. http://dx.doi.org/10.1016/j.jclepro.2016.01.020.
Tarí, J.J., Molina-Azorín, J.F., 2010. Integration of quality management and environmental management systems. TQM J. 22 (6), 687–701.
Thomson Reuters Journal Citation Reports, 2015. Available in: www.thomsonreuters.com (accessed 04.01.16.).
To, W.M., Lee, P.K.C., 2014. Diffusion of ISO 14001 environmental management system: global, regional and country-level analyses. J. Clean. Prod. 66, 489–498.
Vinodkumar, M.N., Bhasi, M., 2011. A study on the impact of management system certification on safety management. Saf. Sci. 49, 498–507.
Williams, J.A., 2004. The impact of motivating factors on implementation of ISO 9001:2000 registration process. Manag. Res. News 27 (1/2), 74–84.
Witjes, S., Vermeulen, W.J.V., Cramer, J.M., 2016. Exploring corporate sustainability integration into business activities. Experiences from 18 small and medium sized enterprises in The Netherlands. J. Clean. Prod. 1–11.
Wright, T., 2000. IMS: three into one will go!: the advantages of a single integrated quality, health and safety, and environmental management system. Qual. Assur. J. 4 (3), 137–142.
Yin, R.K., 2009. Case Study Research: Design and Method, fourth ed. SAGE Publications.
Zeng, S.X., Tam, C.M., Tam, V.W.Y., Deng, Z.M., 2005. Towards implementation of ISO 14001 environmental management systems in selected industries in China. J. Clean. Prod. 13, 645–656.
Zeng, S.X., Shi, J.J., Lou, G.X., 2007. A synergetic model for implementing an integrated management system: an empirical study in China. J. Clean. Prod. 15, 1760–1767.
Zutshi, A., Sohal, A.S., 2005. Integrated management systems: the experiences of three Australian organizations. J. Manuf. Technol. Manag. 16 (2), 211–232.
Zwetsloot, G.I.J.M., 1995. Improving Cleaner Production by integration into the management of quality, environment and working conditions. J. Clean. Prod. 3, 61–66.