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## METHODOLOGICAL APPROACH TO THE IMPLEMENTATION OF INTEGRATED MANAGEMENT SYSTEMS FOR SMALL AND MEDIUM-SIZED ENTERPRISES

**Abstract:** *Today's business environment infers organizational competitiveness that encourages organizations to adopt standardized systems that facilitate effective business management. Small and medium-sized enterprises (SMEs) promote economic growth and equitable development; however, few works offer approaches that include the dynamics and resource constraints of SMEs. Hence, this paper proposes a method for integrating management systems in SMEs that articulates the continuous management cycle of Plan, Do, Check, Act (PDCA), with a four-phase implementation sequence: (1) Direction, (2) Structuration, (3) Application, (4) Evaluation and Improvement. It also discusses how SMEs can integrate their management systems with the knowledge necessary to reduce or mitigate risks arising from the organization's interactions with its stakeholders. This research advances the proposal of a practical sequence for building and implementing the integrated management system and presents the key strategic, operational and human factors as an innovative element to facilitate the understanding, implementation, evaluation and improvement of the IMS in SMEs.*

**Keywords:** *management system; strategic approach, integrated management system, SMEs.*

### 1. Introduction

The current business environment requires a certain degree of organizational competitiveness to meet the needs of global solutions. This fact encourages organizations to adopt management systems based on international technical standards and standardized tools to help in the pursuit of excellence in efficient business management. Decisions made by the organization's top management will not only affect revenue and profits in the short term but also have environmental and social consequences, thereby affecting medium and long-term

sustainability (Bernardo et al., 2017).

The implementation of management systems reduces organizational risk and balances the impact of decisions on stakeholders, including customers, communities, workers, the environment, and regulators (Gianni et al., 2017; Nunhes et al., 2016).

Several authors and studies have pointed out the importance of management systems for companies, generating the need for integration: configuring a single structure that responds to the requirements of the various stakeholders by unifying criteria for action, processes, and resources from the

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various existing systems. Instead of having independent management systems, companies feel the need to integrate them, which could be perceived as an opportunity to take advantage of all those benefits that these had as a whole, contributing to the improvement of these organizations and being part of what in the literature has been described as a competitive advantage that contributes along with other factors to the increase of productivity and competitiveness of companies (Abad et al., 2016; Bernardo et al., 2012; Gianni et al., 2017).

Organizations usually implement management systems sequentially, to respond to specific needs; however, several authors have pointed out the importance of integrating the management systems implemented to take advantage of benefits such as: having unified criteria for action, improving the efficiency of processes, increasing the capabilities of people and unifying the objectives of the organization (Abad et al., 2016; Bernardo et al., 2012; Gianni et al., 2017).

Several studies and international organizations have emphasized that small and medium-sized enterprises (SMEs) are fundamental to achieving economic growth while maintaining equitable development (Jewalikar & Shelke, 2017). In most countries, SMEs make up the majority of companies, accounting for more than 95% of the total number of companies, and making a significant contribution to job and wealth creation; SMEs focus on meeting market demand, which is not in the interest of large companies (Jewalikar & Shelke, 2017; Rajković et al., 2008; G. Santos et al., 2011), according to the (OECD, 2017).

Small and medium enterprises employ between 60 and 70% of the labor force in the countries, but face great difficulties in terms of sustainability due to the limitations in their financial and human resources; the implementation of management systems can help SMEs mitigate risks to their sustainability (Ferreira et al., 2020).

SMEs must constantly update their business performance and pay more attention to the market and competitors. Therefore, an integrated management system must demonstrate its functions and create favorable aspects to enhance competitiveness. It is not only about meeting requirements demanded by international standards, but about real development of the components that an integrated management system must have, implementing and improving it according to the reality that these small and medium-sized companies live, and being able to obtain the external validation of the efforts made (Maier et al., 2015). In general, the models or methods of developing an integrated management system IMS have little regard for the needs of SMEs and the resource constraints of these organizations.

Several authors (Abad et al., 2016; Rajković et al., 2008; G. Santos et al., 2011) identified the main barriers to IMS implementation in SMEs from both internal and external perspectives; these main barriers are:

- Internal barriers:
  - Slight financial resources
  - Lack of management and/or staff knowledge, skills, and training
  - More activities/processes for an employee
  - Greater fluctuation of employees
  - Low awareness of the benefits
  - Short-term, orientation
- External barriers
  - Lack of support schemes
  - Lack of experienced consultants to assist SMEs
  - Low-quality information on the integrated management system (IMS) and conflicting guidance.

IMS can be considered an efficacious method to meet the requirements of companies, customers, and other stakeholders. However, the process is not so easy to carry out, especially in small and medium-sized companies, due to the costs, time, and resources required. There is a negative correlation between the perceived

difficulty of management system integration and the size of the company. Managers of small companies perceive more difficulties, and the degree of perceived difficulty decreases systematically as the size of the company increases (Abad et al., 2016).

Furthermore, according to (Santos et al., 2011), the situation of SMEs stems not only from the lack of financial resources but also from managerial weaknesses related to deficiencies in executive skills that lead to low levels of flexibility and unwillingness to delegate tasks. What's more, compared with large organizations whose structures and employment contracts are considered more reliable, small companies have difficulty attracting qualified and skilled labor.

It is not only a matter of integrating all the components of a company into a coherent system but also about directing the system towards achieving objectives aligned with the mission of the companies and contributing to their sustainability and success in the market, which reduces costs, risks, adds market value and translates into more efficient, productive and competitive companies (Maier et al., 2015).

Several integration methodologies have been proposed by both, academic and standardization bodies. Standardization agencies have introduced national integration specifications based on the common elements or requirements of the management system. Academics have elaborated their methodologies based either on the integration of MSs elements, i.e., objectives, resources, and processes, or on composed models proposed four different methodologies: process map, PDCA, common elements, and organizations' models (Bernardo et al., 2017). However, the models developed by academics, and the standardization bodies, are generic, that is, they do not differentiate the nature of the organizations, they do not discriminate the sector of applications, nor do they take into account their size.

On the other hand, SMEs are subject to compliance with the various requirements of large companies as part of their supply chain when they assume their role as suppliers and on the other hand to the demands of the state or government in their purchases or contract awards, in both cases, having implemented management systems or integrated management systems are part of those requirements that can place them in the role of suppliers or executors of contracts. It is, therefore, necessary to have models and methodological contributions that facilitate these integration processes and are adapted to the particular characteristics of SMEs (Jewalikar, 2017). SMEs lack experience and knowledge in IMS and have little capacity to achieve this knowledge, so they must have a simple and didactic methodology to facilitate the application, maintenance, and improvement of the IMS. They must compete with large domestic and foreign companies that possess strong financial, technical and human talent capabilities.

Given the special characteristics of SMEs mentioned earlier, the focus of this work is to establish a methodological approach to integrate management systems in these types of organizations and help SMEs benefit from the integration of management systems in aspects such as:

- Simplicity, so that it is easily understood by management and employees with little knowledge on the subject.
- Easy to implement, maintain and improve, by employees who have more activities/processes in charge and that change frequently.

Likewise, the methodological approach to be proposed must be self-sufficient to compensate for the lack of experienced consultants and its high cost for SMEs, and it must provide reliable information.

## 2. Method

### 2.1. Step 1: literature overview about IMS related to SMEs

With the aim to identify the level of advancement of integration methodologies of management systems based on international standards for health and safety, environment, and quality, in the context of small and medium enterprises, this study provides a general review of key antecedents that suggest methods, or models about the problem.

### 2.2. Step 2: documents selection

To limit bias and perform an exhaustive search of all relevant articles, a series of reproducible and explicit selection criteria are defined.

Criterion 1: articles published between 2000 – 2020, and the most recent version of the international management system standards related to occupational health and safety, environment, and quality to ensure their compatibility. The definition of the period of the analysis is because the year in which the ISO 9001 standard was updated with a process approach, which includes the Plan - Do - Check - Act (PDCA) cycle and risk-based thinking (ISO, 2015b), and it can be an axis of "ascension" of the Integrated Management System - IMS (Rocha et al., 2007).

Criterion 2: The following databases were consulted: Scopus, ScienceDirect, Springer, Google Academics, and ProQuest; as well as the databases of the ISO, AENOR and BS as they are both subscription and open-access databases, as well as searchable in both English and Spanish.

Criterion 3: keyword definition: The keywords were selected for their relevance to the focus of this work, which is to establish a methodological approach to integrate management systems in SMEs. The keywords included are "integrated" "management system", "management",

"SME's", "implementation", "model", which were articulated using Boolean operators in titles, keywords, and abstracts: (ALL(integrated AND management AND systems) AND ALL (small AND medium-sized AND enterprise) OR ALL (SMEs) OR ALL (small AND medium AND enterprise OR small AND medium AND enterprises) AND ALL (implementation AND model OR implementation)).

Criterion 4: articles and documents published in the databases defined in criterion 2, which consider case studies in which results are reached that provide gaps, difficulties, keys to success or challenges in the integration of management systems in small and medium-sized companies, as well as works that includes tools, methodologies, or models for the integration of management systems based on international standards.

After applying the first three criteria, an initial number of 42 documents was obtained. From these documents, criterion 4 was applied, resulting in 30 documents that contribute to the study of integrated management systems and their use in SMEs from theoretical and case studies approaches, for which they have a significant impact on IMS development.

### 2.3. Step 3: read and critically analyze selected documents.

The authors of this work carried out the reading of each of the documents. Subsequently, a critical analysis was carried out to identify (1) theoretical contributions; (2) methodological contributions; (3) theoretic or methodological gaps; (3) keys to success, difficulties, or challenges for small and medium-sized companies in management systems integration processes. After identifying the previously mentioned aspects, the present work continues with the consolidation of the relationships between the theoretical, methodological and experiences reported by the studies. The identification of such relationships is carried out in the next step.

#### **2.4. Step 4: Use the mapping of VOS viewer and co-occurrence data analysis**

Based on reading and critical analysis of documents selected in the previous step, the map and analysis helped to identify the topic clusters most relevant to the components of the SME integration approach from the 30 most contributing articles and documents. The VOS viewer constructs a map in three stages; first, it calculates a similarity matrix, second, it constructs a map, and third, it translates, rotates, and mirrors the map; the software is capable of distinguishing two types of bibliographic maps, one related to the items under investigation, and the other facilitates the identification of groups of related items (Eck & Waltman, 2010). VOSviewer provides text mining capabilities that can be used to build and visualize co-occurrence networks of important terms extracted from large volumes of literature. A map built with VOSviewer is a network of keywords whose elements are connected by co-occurrence links, i.e. the number of times a keyword is repeated in the title, keyword, abstract or text of a document.

It is worth mentioning that, two documents in Spanish were selected for their relevance to the integrated management system; to include them in the VOSviewer, there were translated into English (A practical guide for the integration of management systems. ISO 9001, ISO 14001, and ISO 45001 (Chapter 1 p. 17-35) (Calso & Pardo, 2018); The Impact of Integrated HSEQ Management Systems in Latin American Organizations: A Systematic Review (Ortiz-González, 2018)).

#### **2.5. Step 5: Methodological approach to IMS in SMEs**

Based on step 3 read and critically analyse selected documents, step 4 uses the mapping of VOS viewer and co-occurrence data analysis, and the author's experiences as consultants and researchers in management systems, allow to identify the elements and activities for the implementation of

integrated management systems in small and medium enterprises.

### **3. Results and discussion**

#### **3.1. Literature overview about IMS**

In order to establish a methodology for the integration of ISO management systems for SMEs, it is necessary to start with a review of the different definitions of an integrated system, first of all by reviewing the definition given by the International Organization for Standardization: “It is the unique management in the organization to integrate the standard requirements of the management systems” (ISO, 2018), that emphasizes integrating the different requirements of management systems; then considered the concept given in a practical guide published by the Spanish Association for Standardization, frequently used by consultants in Latin America and written by (Calso & Pardo, 2018) that define an integrated management system as “the set of interrelated elements used to satisfy the requirements of the clients, with a minimum environmental impact of the processes developed and with the least possible risk for the safety and health of the workers”, definition that relates concepts such as satisfaction, processes and risks and is still limited to compliance with the requirements established in the same ISO management system standards (ISO 9001, ISO 14001 e ISO 45.001).

Other authors (Bernardo et al., 2016; Nunhes et al., 2019) define the Integrated Management System as “a set of interconnected processes that share the same resources (human resources, information, materials, infrastructure, and finance) to achieve goals related to the satisfaction of various stakeholders” which broadens the concept to include interconnections, shared resources and stakeholders, and therefore goes beyond simple compliance with the requirements of the standards to be integrated. The British Standard Institution

states that an IMS is a “management system that integrates all the systems and processes of an organization in a complete framework, to mitigate risks” (BSI, 2012), pointing out the important preventive function of management systems, as indicated by (Gianni et al., 2017) “a management system based on international technical standards aims to protect specific risks related to stakeholders”. In these last two definitions, relevance is given to the concept of “risk,” which, as is well known, is related to uncertainty, i.e., uncertainty that may have an impact on the achievement of goals. Hence, its knowledge contributes to generate certainty, which helps to mitigate risk. According to (Ferreira et al., 2020) management systems can act as a link that articulates organizational knowledge to reduce risks; thus, integrated management systems can focus on managing specific knowledge to mitigate risks in the organization's interactions with its stakeholders. In general, from the literature review, it can be considered that risk is one of the most relevant aspects to consider when referring to the integration of systems and at the level of SMEs, it is beneficial to have an integrated view of risk in a single system, saving efforts in resources and knowledge for an effective risk management and reducing the risk of negatively affecting the achievement of the agreed goals (Petrescu et al., 2021).

The review of the numerous definitions of integrated management system in the literature, considering not only the articles resulting from research work but also the definitions given in documents of standardizing organizations, and in a broad context, give a vision of integration as a given articulation among requirements and processes of the different standards, under a single system that allows defining common strategies and sharing resources and information; prove that there is no single definition of what an integrated management system is, and it applies equally to large, medium and small companies.

The literature on management systems integration can be divided into three broad categories: theoretical studies, case studies, and methodological proposals from standardization bodies. Theoretical studies start from a literature review to identify relevant aspects or gaps and, with the support of other disciplines, contribute to propose a methodology or explore patterns, similarities, and differences between IMS: (L. C. Barbosa et al., 2018) point out the difficulties encountered by organizations to align IMS with their strategy and emphasize that there is a bidirectional interaction that should be considered when approaching ISO systems integration. Other authors propose methodologies drawn from other disciplines to overcome the obstacles encountered in the integration of management systems, such as the use of Design Thinking, (Karapetrovic, 2002) or (Maier et al., 2013) who propose an integrated model according to the plan-do-check-act (PDCA) management cycle. Some authors find that the implementation of a management system reduces risks and the impact of decisions on various stakeholders (including customers, communities, workers, the environment and regulatory agencies), and helps business organizations to benefit from opportunities that arise in their context (Jewalikar, 2015; Karapetrovic et al., 2010; Malagón-Medina, 2018; Wilkinson & Dale, 1999; Zimon et al., 2021).

Other theoretic studies have advanced the identification of advantages, drivers and barriers in IMS construction (Abad et al., 2016; Jewalikar & Shelke, 2017; Vashishth et al., 2021); some have focused on the different levels of maturity of an IMS as it evolves (Domingues et al., 2016; Â. R. S. Santos et al., 2021). The relationship between IMS and sustainable development has also been studied (Ikram et al., 2021; Petrescu et al., 2021; Rahman et al., 2022; Rocha et al., 2007); (A. de S. Barbosa et al., 2021; Liew & Luetge, 2016) consider IMS and its stakeholder approach as a basis for corporate social responsibility (CSR); while (Gianni et al., 2017) are interested in how

IMS and Corporate Sustainability can interact through metrics. Other theoretical work has focused on proposing general principles for the integration of management systems that serve as a unified starting point for future research, (Nunhes et al., 2019) proposed an IMS model guided by six principles; these principles are systemic management of the organization; standardization of processes to achieve that stakeholder expectations are met efficiently; integration of management systems at the strategic, tactical and operational levels; organizational learning capacity; debureaucratization to reduce and simplify processes and continuous improvement through the identification, analysis and definition of actions for problem solving, and the use of the PDCA cycle. Theoretical studies also identify topics and trends for future research (Cabrera et al., 2015; Karapetrovic et al., 2010; Thaís Vieira Nunhes & Oliveira, 2020).

From this work, it is observed that these studies reflect the continual search for theoretical foundations for the establishment of integrated management systems, however, they consider this system integration process in a general way for all organizations, emphasizing aspects such as human talent, risks, economic and infrastructure resources, information, techniques, technology and organizational culture, required to achieve integration, focusing on the theoretical and practical aspects of the IMS that can help to understand the complexity and difficulties encountered in the implementation of the IMS, and offering guidance to overcome them; however they are not observed to have the level of detail required for SMEs to implement IMS, i.e. a specific approach that facilitates the implementation and integration of management systems such as the one proposed in this work.

On the other hand, case studies, both cross-sectional and longitudinal, structure the practical knowledge of organizations that have integrated their management systems; each integrated system varies from one

organization to another and numerous internal and external factors modulate its performance; however, these studies allow comparing different IMSs, extracting common knowledge and sharing it, thus enriching the understanding of the subject. Specific validated instruments (Abad et al., 2016; Domingues et al., 2017; Vashishth et al., 2021), case studies (Bernardo et al., 2017; Lopez-Fresno, 2010; D. Santos et al., 2017), interviews or on-site observation (Domingues et al., 2017) are generally used. Some studies have been carried out on the implementation of IMS in a country or an economic sector, or comparing the integration of management systems in different countries (Bernardo et al., 2017; Zeng et al., 2007; Santos et al., 2011). Some of these studies provide guidance and advice for organizations seeking to implement and integrate management systems, but the findings are not conclusive and their applicability is limited to specific situations; however, case study research complements the knowledge generated by theoretical research and gives indications of how to perform integration in SMEs

On the other hand, some standards bodies have proposed methodologies for carrying out the integration of management systems. Standards Australia (AS/NZS4581, 1999) proposes management systems integration guidelines for business, government and community organizations. This International Standard is intended to help organizations implement the general requirements for systems at their organization or organizational level. In addition, in 2005, the Spanish Association for Standardization (the name of the organization in Spanish is Asociación Española de Normalización) - AENOR has developed the technical standard UNE 66177, which guides the development of management system integration projects, taking into account the requirements of each system and using as support a process approach, and the PHVA cycle (AENOR, 2005) and which is later updated by the practical guide sponsored by

this standardization body and written by (Calso & Pardo, 2018).

The International Organization for Standardization (ISO) proposed in 2008 the first edition of the handbook for the integration of management system standards for organizations seeking guidance on how to integrate the requirements of various ISO standards. From the first edition of the manual on the integrated use of management system standards to its latest version (IUMSS) (ISO, 2018); the consolidation of the high-level structure arises (or occurs), based on the requirements, in Section SL.9, of the ISO/IEC Directive (ISO, 2021) since this, the main aspect to highlight during this time at the level of ISO documents on management systems. It should also be noted that this ISO manual proposes an application process, which is divided into four steps: preparation, connection, merging of MS requirements into IMS and maintenance. The new edition of PAS 99 published by the British Standards Institution (BSI, 2012) defines IMS in terms of high-level structure and its requirements, top management's commitment to integration, understanding of the environment, risk management and stakeholder needs.

As we can be noticed, documents issued by standardization bodies emphasize the integration of management systems based on the requirements of each system, whether these are common, specific or equivalents requirements (Calso & Pardo, 2018), this focuses integration efforts at a higher level of abstraction (Asif et al., 2009), drives integration towards compliance and control and away from strategy (Jewalikar & Shelke, 2017; Vashishth et al., 2021); even though these "technical" documents are general guidance for integrating management systems in any organization, regardless of size, studies evidence that they are more easily adopted by robust or large organizations, which have the facilities to achieve integration under a single management system. In general, it can be noted that the method for integrating

management systems should be easy to understand for most people in SMEs who are not experts in the subject and do not understand the technical language used in management system standards.

Based on the review of the different definitions and approaches to systems integration found in the technical and scientific literature, this paper proposes: "an integrated management system as a set of interrelated processes and requirements that share resources, create value for the relevant stakeholders and achieve established objectives." The definition used in this research enriches the methodological approach in two aspects: an expanded definition to include "the integration of processes and requirements," as well as the terms "value generation" for the stakeholders.

### **3.2. Documents identification**

Using the inclusion and exclusion criteria detailed in Methods, the following results were obtained. Concerning the most recent version of the international management system standards related to occupational health and safety, the environment, and quality, 4 documents were selected: (International Organization for Standardization - ISO, 2018, 2021; International Organization for Standardization, 2015a, 2015b).

Related to practical guides and empirical studies that provide elements for the integration of management systems based on international standards, 7 documents were found: (Bernardo et al., 2016, 2017; Calso & Pardo, 2018; ISO, 2018a; Moumen & Aoufir, 2017; D. Santos et al., 2017; Zeng et al., 2007).

Four papers were selected regarding the tools, methodologies, or models used to manage system integration in this study: (L. C. Barbosa et al., 2018; Domingues et al., 2016; Kopia et al., 2016; Majernik et al., 2017). About the study includes evaluations



that reveal gaps, difficulties, keys to success, or challenges for the integration of management systems, 12 documents were selected: (Abad et al., 2016; Domingues et al., 2017; Ferreira et al., 2020; Jewalika, 2015; Jewalika & Shelke, 2017; Maier et al., 2015; T. Nunhes et al., 2019; Thaís Vieira Nunhes et al., 2016; Thaís Vieira Nunhes et al., 2017; Thaís Vieira Nunhes &

Oliveira, 2020; Ortiz-González, 2018; Rebelo et al., 2016). And finally, the study to consider aspects related to sustainability, organizational culture, risk management, and corporate social responsibility, 3 documents were selected: (Gianni et al., 2017; Liew & Luetge, 2016; Siva et al., 2016). As a result, 30 documents were identified, as shown in Table 1.

**Table 1.** Literature identified

Authors	Title
(Zeng et al., 2007)	A synergetic model for implementing an integrated management system: an empirical study in China
(Maier et al., 2015)	Innovation as a part of an existing integrated management system
(Jewalika, 2015)	Analysis of Integrated QEHS Management System in MSME Tool Rooms
(International Organization for Standardization, 2015b)	Quality management systems — Requirements
(International Organization for Standardization, 2015a)	Environmental management systems. Requirements with guidance for use
(Nunhes et al., 2016)	Evolution of integrated management systems research on the Journal of Cleaner Production: Identification of contributions and gaps in the literature
(Liew & Luetge, 2016)	Integrated Management System Frameworks for Corporate Social Responsibility and Related Concepts
(Domingues et al., 2016)	Integrated management systems assessment: A maturity model proposal.
(Abad et al., 2016)	An analysis of the perceived difficulties arising during the process of integrating management systems.
(Kopia et al., 2016)	Theory and practice of integrating management systems with high-level structure.
(Rebelo et al., 2016)	Integrated management systems: critical success factors.
(Bernardo et al., 2016)	A qualitative study on integrated management systems in a non-leading country in certifications.
(Siva et al., 2016)	The support of Quality Management to sustainable development: a literature review.
(Nunhes et al., 2017)	Identification and analysis of the elements and functions integrable in integrated management systems
(Majernik et al., 2017)	Design of integrated management systems according to the revised ISO standards.
(Jewalika & Shelke, 2017)	Lean Integrated Management Systems in MSME Reasons, Advantages and Barriers on Implementation.
(International Organization for Standardization - ISO, 2018)	Occupational health and safety management systems. Requirements with guidance for use
(Gianni et al., 2017)	Multiple perspectives on integrated management systems and corporate sustainability performance
(Bernardo et al., 2017)	Is there a common pattern to integrate multiple management systems? A comparative analysis between organizations in Greece and Spain.
(Domingues et al., 2017)	Management systems integration: survey results.

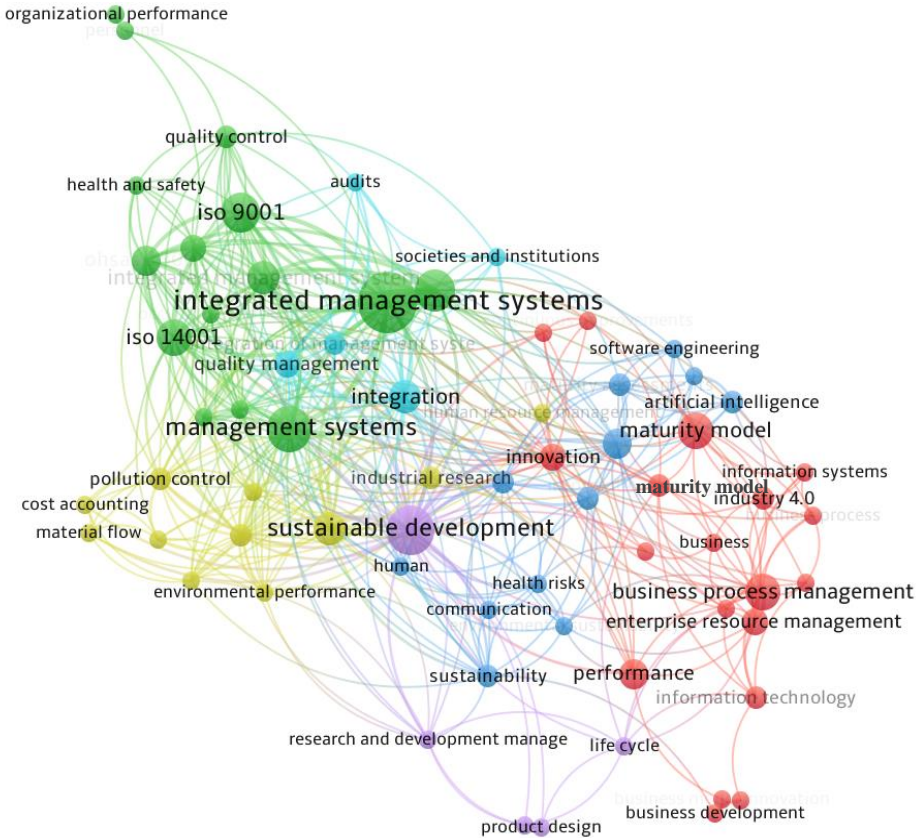
**Table 1.** Literature identified (continued)

Authors	Title
(Moumen & Aoufir, 2017)	Quality, safety, and environment management systems (QSE): analysis of empirical studies on integrated management systems
(D. Santos et al., 2017)	The integration of certified Management Systems. Case study - organizations located in the district of Braga, Portugal.
(L. C. Barbosa et al., 2018)	Proposition for the alignment of the integrated management system (quality, environmental, and safety) with the business strategy
(ISO, 2018a)	The Integrated Use of Management System Standards (IUMSS)
(Calso & Pardo, 2018)	A practical guide for the integration of management systems. ISO 9001, ISO 14001, and ISO 45001 (Chapter 1 p. 17-35)
(Ortiz-González, 2018)	The Impact of Integrated HSEQ Management Systems in Latin American Organizations: A Systematic Review
(Nunhes & Oliveira, 2018)	Analysis of Integrated Management Systems research: identifying core themes and trends for future studies.
(Nunhes et al., 2019)	Guiding principles of sis: Towards unifying a starting point for researchers and practitioners
(Ferreira et al., 2020)	Risk management in SMEs: A systematic literature review and future directions
(International Organization for Standardization - ISO, 2021)	ISO/IEC Directives, Part 1 Consolidated ISO Supplement — Procedures for the technical work. Procedures specific to ISO

After defining the 30 documents, we use VOS viewer and co-occurrence data analysis to identify the most relevant terms worked on by the authors, the relationships that develop between the terms (terms can be related to concepts, theories, actions); the clusters that are generated around key themes, and the level of relevance with which the terms are considered in the studies (Eck & Waltman, 2010). The relevance of a term can be visually observed through the expected size associated with it; a larger size indicates that the term is used in research at a higher rate. A general bibliometric map is shown in Figure 1.

By applying the bibliometric analysis, it can be seen that the integrated management system articulates several aspects, which can be evidenced in the clusters shown in Figure 1; the main topics are the terms related to integrated management systems (green cluster), sustainable development (violet and blue clusters), and business process management (red cluster). These three clusters reflect the fundamental concepts

involved, according to the selected literature, in the integration of management systems and how they are related. The Integrated Management Systems cluster includes general management systems, as well as the most commonly used systems such as ISO 9001, ISO 14001 and specific topics such as auditing and quality control. The business process management cluster is very broad and includes aspects related to performance, resources, innovation, maturity models and innovation. The Sustainability Cluster includes aspects related to environmental performance, product design, health risks, sustainability and other issues such as communication and human factors. It is remarkable the strong relationship between management systems and sustainable development shown in Figure 1, which points to a growing trend in organizations as stated by (Nunhes et al., 2018), it is possibly due to the holistic and systemic vision of Integrated Management Systems (IMS) that have emerged as an effective way to meet the requirements of stakeholders.



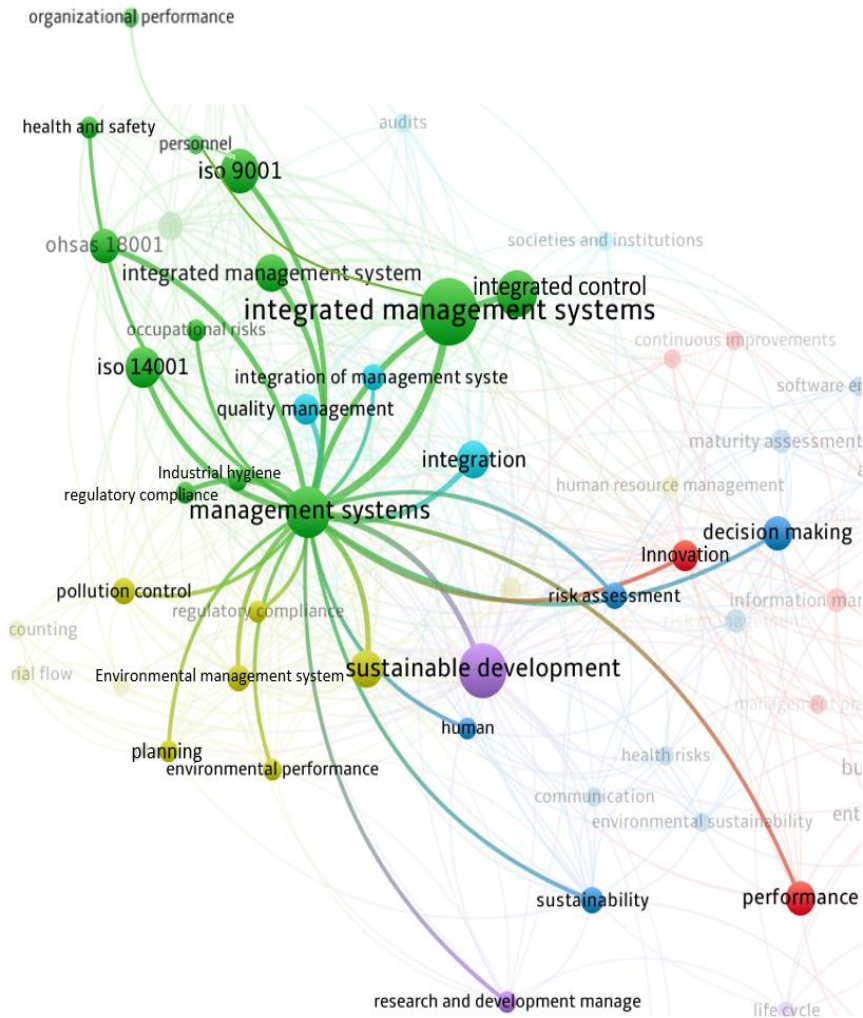
**Figure 1.** General mapping using VOS viewer and Co-occurrence data

Figure 2 details the clusters associated with the integrated management system. The linkages between decision making, risk management, and management systems are important because they show the coherence that exists between management systems and the issues addressed at the level of organizational strategy (Zeng et al., 2007).

On the other hand, Barbosa et al. (2018) have pointed out the importance of concisely and coherently aligning the MIS with the business strategy, which can have a positive impact on their innovative abilities, as well as on the satisfaction of their customers. The map shows the close relationship between the terms integrated management system, management system, ISO 9001, ISO 14001, quality management, integration, integrated

control, and performance.

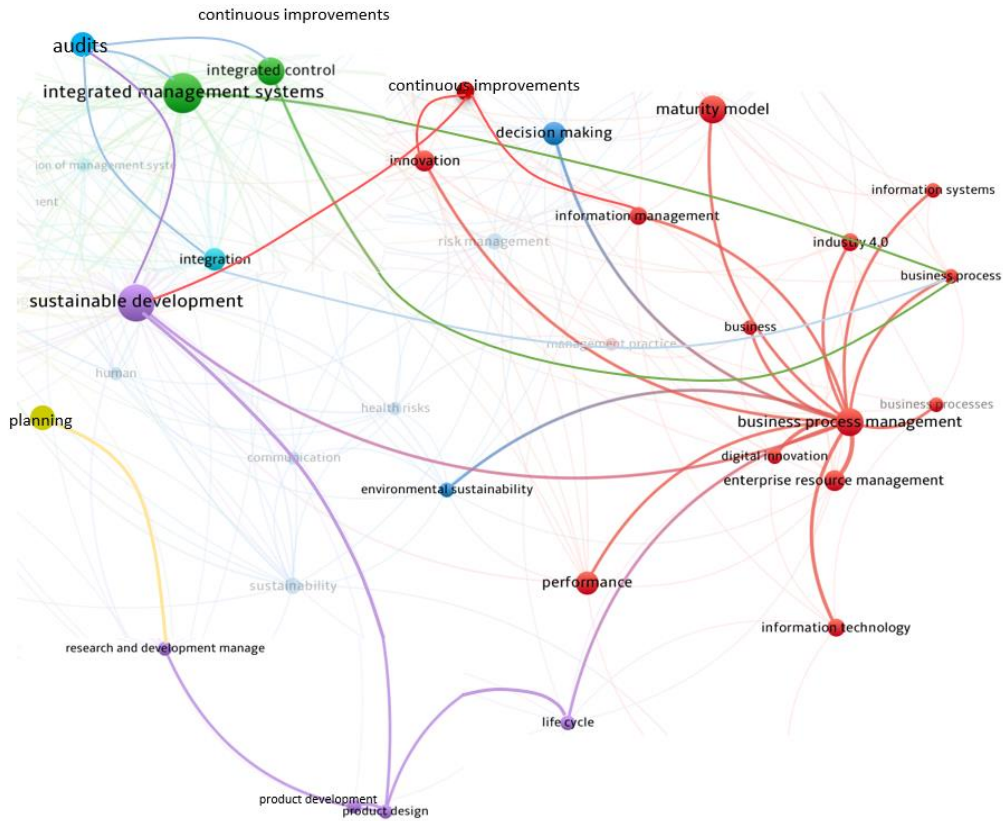
The influence between the integrated management system and the strategy has been proposed by (L. C. Barbosa et al., 2018), and the relationship shown by the cluster with performance confirms what (Bernardo et al., 2017) expressed in the sense that integration should lead to better performance; therefore, this cluster points to an aspect that is decided to be called a Strategic Factor for the integration of management systems (L. C. Barbosa et al., 2018). This factor includes the activities and processes related to the general direction and governance of the organization, the definition of strategies, policies, resource allocation, objectives, management indicators, and their monitoring.



**Figure 2.** Strategic factors identified

Figure 3 shows a cluster in which stands out business process management linked to factors such as sustainable development, product design, business process, planning, auditing, innovation, and continuous improvement, which have to do with operational aspects in the organization (Ferreira et al., 2020). Many organizations feel the need for integration due to the operational complexities involved in managing multiple systems at once and increased documentation (Jewalikar and Shelke, 2015), this may be because each

management system comes from a different discipline and it is in the organization's processes where they converge. It is decided to name this as an Operational Factor which includes the activities and processes related to the design, development, supply, and implementation of products and services, as well as the mechanisms for monitoring, measurement, and analysis that allow evidence of compliance with the expected results by all stakeholders of the organization.



**Figure 3.** Operational factors identified

Several authors have pointed out that one of the main difficulties encountered for the integration of management systems has to do with the culture of the company (Zeng et al, 2007) and the changes that the implementation of IMS produces on it (Barbosa et al, 2015); Abad et al. (2016) point out as a difficulty for IMS implementation the resistance to change and it is indicated that one of the great challenges of organizations for IMS is the need for planning and action in the field of knowledge management (Nunhes et al., 2018). The results of the analysis show another cluster (Figure 1) that points to the interaction between human aspects, communication and research and development management, which are aspects of organizational culture and people's

contribution to the organization (Maier et al., 2015; Rebelo et al., 2016). These aspects of the cluster can be referred to as the Human Factor that affects the integration of management systems, and include those activities and processes related to the development of organizational culture, competencies, and motivation to increase the commitment, awareness, knowledge and creativity of the people in the organization. Furthermore, ISO developed the Directives, Part 1 Consolidated ISO Supplement which includes Annex SL, Appendix 2 Harmonized structure for MSS with guidance for use (ISO, 2021) in an effort to formalize and unify all management system standards by providing a uniform structure to help improve the integration of different management systems. The high-level

structure described in Annex SL is a harmonized approach to the development of management system standards that comprises a standardized structure for drafting ISO management standards, with clause numbers that follow the same sequence, clause headings, text, common terms and basic definitions common to all management systems. This so-called "high-level structure" (HSL) improves integration by structuring common terms and requirements in a similar way (Kopia et al., 2016; Majernik et al., 2017).

The key factors for the integration of management systems, which have been deduced from the literature analysis: Strategic, Operational and Human, can be related to the requirements of the high-level structure (HLS) for management systems, which is made up of ten common chapters, with chapters 4 to 10 containing the requirements to be met by any ISO management system and corresponding to the numbers placed at the end of the description of each requirement, as shown in Figure 4.

Strategic factors include 10 requirements established in the management system high-level structure: 4.1, 4.2, 4.3, 4.4, 4.4, 5.2, 6.2, 7.1.2 (ISO 9001), 7.1.3 (ISO 9001), 8.2 (ISO 9001) and 9.3. These requirements are related to the definition of the organizational context and relevant stakeholders, policies, objectives, resource allocation, as well as the follow-up to the integrated system. The quality management system based on ISO 9001 supports organizational sustainability by serving as a basis for the integration of management systems (Siva et al., 2016) and therefore, some specific quality management requirements should be considered for the integration of the management system.

In the Human Factor, the relationship with the high-level structure can be determined in

six requirements: 5.1, 5.3, 7.1.6 (ISO 9001), 7.2, 7.3 and 7.4 (Figure 4), these requirements support the development of organizational culture, are associated with competencies and motivation to increase commitment, awareness and organizational knowledge.

Finally, the other requirements of the high-level structure correspond to the Operational Factor, associated with the organization's mission aspects such as the design, development, supply, and implementation of products and services, as well as the monitoring, measurement and analysis necessary to demonstrate the fulfillment of the expected results by the interested parties. These requirements are: 6.1, 6.1.2 (ISO 14001 and ISO 45001), 6.1.3, 6.3 (ISO 9001), 7.5, 8.1, 8.2, 8.3 (ISO 9001), 8.4 (ISO 9001), 8.5 (ISO 9001), 8.6 (ISO 9001), 8.7 (ISO 9001), 9.1, 9.2, 10.2 and 10.3 (Figure 4).

The use of the key factors Strategic, Operational and Human to categorize the requirements of the high-level structure, simplifies its interpretation because all the requirements to be integrated are in one of these three categories; the concept of the "strategic" relates to the tasks associated with top management, the "human" to the people that make up the organization, and the "operational" to the processes necessary to fulfill the Mission. This issue is particularly important for SMEs, which lack the knowledge, skills, and training necessary for the integration of management systems (Abad et al., 2016) and people generally have more activities (Santos et al., 2011).

On the other hand, focusing on the three key factors helps SMEs to perform the integration of management systems based on their own needs and not only with the requirements of the standards.

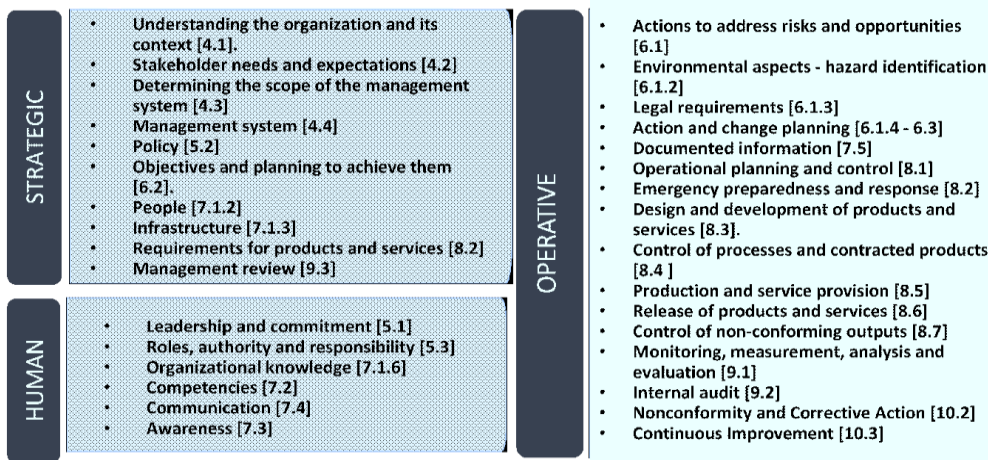


Figure 4. Factors for integration in the high-level structure

### 3.3. Methodological approach to IMS proposed to SMEs

Taking into account the three key factors for integration (Strategic, Operational and Human) and the methodologies for management system integration, which some authors base on four different methodologies: process mapping, PDCA, common elements and organizational models (Bernardo et al., 2017; Majernik et al., 2017; Moumen & Aoufir, 2017), as well as the concept of continuous improvement of IMS, needed to gradually increase the level of integration maturity (Domingues et al., 2016; Kopia et al., 2016), a methodology is proposed to carry out management systems integration, which can serve as a guide for SMEs, taking advantage of its benefits such as better control and monitoring of processes, shorter lines of communication and less resistance to change and also self-sufficient to compensate for the lack of experienced consultants and their high cost for SMEs (Jewalikar et al., 2015).

According to (Ferreira et al., 2020) the strategic perspective of risk management (RM) is evident and justifies the need to manage strategic risk, which requires a more integrated approach to risk management in SMEs. On the other hand, (Maier et al., 2015) propose that an integrated

management system model must have innovation as a part of it, and knowledge management is an essential element for innovation. The above aspects, i.e. organizational risks and the knowledge needed to mitigate them, guide the development of the following proposal.

#### 3.3.1. Methodological phases for the integration of management systems

A methodology for the integration of management systems in SMEs is proposed, based on the PHVA cycle, as well as the high-level structure (HLS) for the integration of management systems, which, as previously analyzed, can be described in terms of strategic, operational and human factors, this methodology is shown in Figure 5.

The proposed method has four phases or stages, the first two Direction and Structuration correspond to the Planning phase of the PDCA cycle, the third stage Application is equivalent to the Doing phase, and Evaluation and Improvement correspond to the Verification and Acting stages of the PDCA cycle.

(Maier et al., 2015) pointed out the importance of knowledge management for an integrated management system. An

organization's understanding of its strengths, weaknesses, threats, and opportunities (i.e., risks) can help mitigate threats and exploit opportunities (Ferreira et al., 2020). In the model, risk can be defined as the impact of uncertainty on organizational goals.

Knowledge about the risks allows an organization to determine the factors that could cause its management system to deviate from the expected results to put in place preventive measures that minimize the negative effects and maximize the use of the arising opportunities (International Organization for Standardization, 2015b). The methodology in Figure 5 shows that an integrated management system generates organizational knowledge to reduce risk and

capitalize on opportunities by developing its four phases in a continuous improvement cycle.

The stages or phases of the proposed method for the integrated management system are Direction, which must be developed only with top management and is intended to achieve their commitment, without which the integrated management system is not viable (L. C. Barbosa et al., 2018); the Structuration phase has the purpose of articulating the SIG to the processes and is developed with the process leaders; the Application phase seeks to generate awareness in all people and finally, the Evaluation and Improvement phase allows capitalizing on the results of the integration.

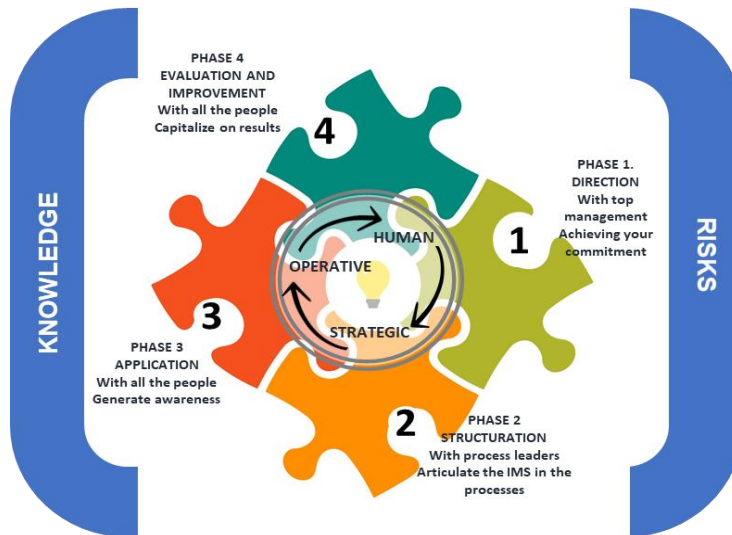


Figure 5. Methodological phases for the integration of management systems

### 3.3.2. The activities for IMS implementation

The proposed methodology for the integration of management systems in SMEs should lead to a simple, flexible, and durable integrated system, with emphasis on training and awareness, to generate culture and commitment. Each phase is made up of a series of sequential activities, related to the requirements of the high-level structure, but

following a different order, so that strategic, operational, and human aspects are taken into account simultaneously (Figure 6). The activities described arise from the literature review that was carried out, from the high-level structure and from the work of (Nunhes et al., 2019) who identified 28 main elements for the integration of management systems; some of these elements are included in this proposal in the different phases. These stages are generally explained in Figure 6.



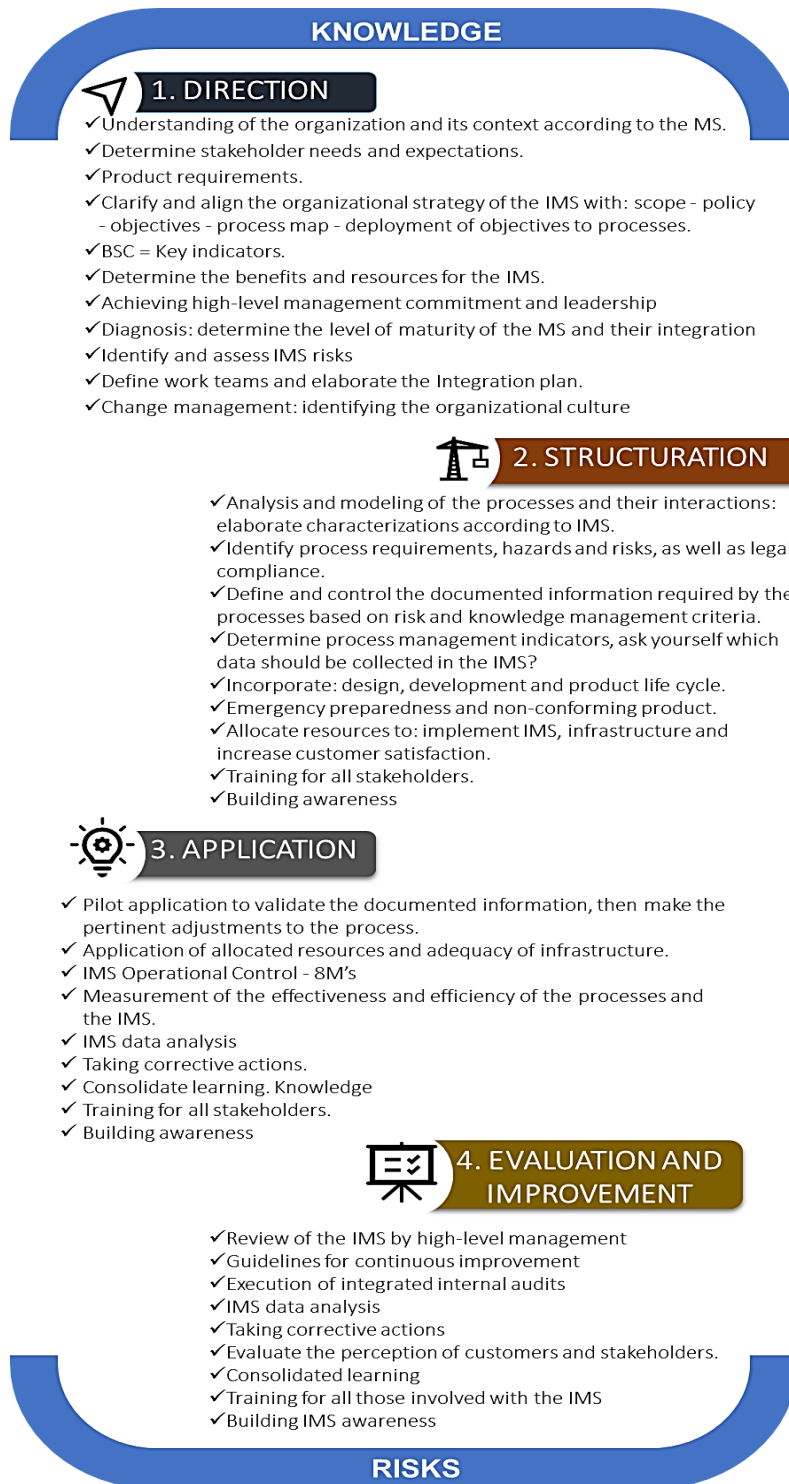


Figure 6. Stages and activities for IMS implementation.

The top management's commitment is achieved when, through participation, they understand the responsibilities they must assume. For this reason, activities such as understanding the context, defining policies and objectives, risk management, and resource allocation are included in the Direction stage.

The Structuration stage is complex because it has operational aspects that require the simultaneous participation of the leaders of the different processes, since it is in the processes where the articulation of the different management systems is carried out, and this must be reflected in the documentation, which condenses the relevant knowledge of the organization and helps mitigate risks. It also includes the operational control activities required to integrate the system to meet the requirements of different stakeholders.

In the third stage of Application, the integrated documentation is applied, through the analysis and evaluation of the results, new knowledge is generated and combined with the previous knowledge to improve the performance of the organization.

In the latter stage, Evaluation and Improvement, a general evaluation of the integrated system is made through internal audits and management review; a panorama of the integration process is obtained and decisions are made to correct problems and to advance in the performance improvement and people's awareness.

The sequence of stages and their activities is a general guide that is of great help to SMEs looking to integrate their management systems, as they indicate the route they must follow.

#### **4. Discussion**

The results of the literature review show that the selection of 30 documents related to the integration of management systems and their particularities for SMEs was performed (Jewalikar, 2015; Jewalikar & Shelke, 2017;

Ferreira et al., 2020), likewise their analysis was carried out through the application of VOSviewer and three clusters were identified which were named as Strategic Factor, Operational Factor and Human Factor. Integrated strategic factors include activities and processes related to the overall direction and governance of the organization, strategies, policies, resource allocation, objectives, management metrics, and their monitoring. According to (Barbosa et al., 2018), few companies are aware of the difficulties in developing a management system that aligns, in a coherent manner, the MIS with the business strategy, and that if they do so, they can promote that the integration of management systems is fully achieved, which can have a positive impact on their innovative abilities, as well as on the satisfaction of their employees and customers. The Strategic Factor incorporates the requirements of the high-level structure that are the responsibility of top management such as: determining the external and internal context of the organization; identifying relevant stakeholders and defining their priorities; setting the policy and objectives of the integrated management system, as well as monitoring its performance, in line with (Bernardo et al., 2017) who state that integration should lead to higher performance.

The development of an MIS, led by the top management, must ensure the commitment of all the people involved in the process and must be consistent with the culture and strategy of the organization (Barbosa et al., 2018), the Human Factor identified in the literature reviewed, refers to that commitment needed to go modeling the organizational culture; the organizational culture according to (Schein, 2010), supports all members of the organization to guide their behaviors and mentalities and is composed of practices, symbols, habits, ethical and moral values, principles, beliefs, ceremonies, internal and external policies, systems, jargon, in addition to the organizational climate. From the

requirements of the high-level structure, the Human Factor is oriented to generate awareness in people through internal and external communication, development of competencies, leadership, clear definition of authority and responsibility and of the necessary knowledge to achieve the expected results; which implies a gradual change in the organizational culture to overcome people's resistance (Nunhes & Oliveira, 2018).

The IMS should be extended to the design of goods and services, production and service delivery, supply chain management and customer management, aspects that are considered *missional*, i.e., directly related to the *raison d'être* of the organization, and are therefore considered part of the day-to-day operation. The management of operational risks has acquired a wide range of dimensions, and the integration of management systems helps mitigate these risks (Ferreira et al., 2020). The Operational Factor is related to the design, development, supply and implementation of products and services, as well as the monitoring, measurement and analysis mechanisms that allow evidencing the fulfillment of the expected results by all the stakeholders of the organization. Specific operational aspects related to the high-level structure include, among others: Document management, planning and operational control of task processes, compliance with legal requirements, internal auditing and continuous improvement.

With the purpose of contributing to the integration of management systems in SMEs, to help them overcome some internal and external barriers that limit their capabilities, such as lack of knowledge, skills, and training of management and/or staff, lack of consultants to assist SMEs and poor quality of information and contradictory guidance, (Abad et al., 2016; Rajković et al., 2008; G. Santos et al., 2011), a methodology is proposed based on key strategic, operational and human factors, which are easily understood by the different

levels of SMEs, and which are articulated with the requirements of the high-level structure.

The four stages proposed for the integration of management systems follow the PHVA cycle, which is a frequently used method for integration (Bernardo et al., 2017) to create a cycle of continuous improvement (Domingues et al., 2016; Kopia et al., 2016). But these stages have specific interpretations and specific purposes to guide SMEs, identify the purpose of each stage and its interlocutors, and allow IMS to develop in a balanced way.

On the other hand, (Nunhes et al., 2019) defines six principles for managing systems integration and recommends that future research develop an integrated approach that takes these principles into account. The method suggests addressing these issues in the following ways:

For pillar 1 Systemic management, in the Direction stage, the commitment of top management and the identification of the needs of the interested parties are taken into account; In the Structuration phase, the interrelationships between processes and systems and the management of the necessary resources are considered. Pillar 2. Standardization is developed in the Structuration phase, through the identification of the dangers, aspects, legal requirements, and risks of the processes; the process analysis and modeling; define and development documented information; formation and awareness construction.

The authors propose Pillar 3 of Integration, from the strategic, operational, and tactical aspects; This methodological proposal considers integration from the strategic, operational, and human aspects, which arise from the analysis of the literature, and in this sense, an important contribution is made by placing people in the integration focus. The proposal has in the Direction stage the alignment of the IMS with the organization's strategy, in the Structuration stage the integration at the level of processes and

procedures, and in the Evaluation and improvement stage the performance of integrated audits.

In Pillar 4. Organizational learning, activities such as awareness building, training, measures of effectiveness and efficiency of processes and IMS, and integrated learning as a result of assessment are presented. The de-bureaucratization, pillar 5, is taken into account during the structuring phase, with documented information required for activity definition, development and control processes, as well as risk and knowledge standards.

Finally, in pillar 6 Continuous improvement, the construction of awareness, which is transversal in this proposal and is developed through communication and training, as well as the sequential way in which the four stages are developed, makes it easier for the organization to develop continuous improvement.

Therefore, this proposal is highly consistent with the pillars proposed by (T. Nunhes et al., 2019), but goes a step further and proposes a more mature approach that SMEs can understand.

The proposed methodology is developed in a PHVA cycle sequence, which has been widely proposed by various authors for the implementation of the IMS (Majermik et al., 2017) and which is easy to understand for SMEs.

The proposed methodological approach takes into account the advantages that SMEs can have, such as better control and oversight of their processes, they can more easily adapt to changes, and more agile human-to-human communication (Ferreira et al., 2020; Jewalikar, 2015).

## **5. Conclusion**

This study proposes a methodological proposal to establish and put into operation an integrated management system that is easy for SMEs to understand, apply, evaluate and improve. This proposal took into

account the differences among SMEs, specifically the lack of training and specialized skills of management and employees, high rotation of people, limited access to expert consultants who can advise them, and conflicts in the information and guides found on this subject.

After a literature review and general mapping using the VOS viewer and co-occurrence data, three factors related to the structure of organizations were determined; these factors include strategic aspects, which have to do with the general orientation and purposes of the organization; operational aspects that allow the achieving of the proposed mission goal, and human aspects because organizations work through human work.

The requirements of the international technical standards on management systems that are based on the high-level structure (HLS) were related to these three factors, which were called key factors. The focus on the three key factors not only uses SME-friendly language but also avoids focusing on the standard's requirements, which creates confusion and discourages its application, due to a large number of requirements and their complexity.

Taking into account the PDCA management cycle, four stages of IMS construction, operation and improvement have been identified: Direction, structure, application, and evaluation and improvement, when applied sequentially and repeatedly, can lead to continuous improvement in IMS performance.

The proposed method is a starting point for future research, which can be practically applied in SME organizations to verify the agility and practicality of the model and thus adjust implementation activities. The proposed method can be subject to empirical validation in the future to confirm its validity. It is also advisable to work with experts to verify the proposed phases and activities and thus strengthen the model.

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