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Beyond Compliance: Identifying High-Performance Models and Critical Success Factors for Integrated Management System Effectiveness (A Systematic Review)

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Abstract

Background: Organisations' interest in integrating management systems has emerged as a key strategy for improving organisational performance. Finding a model that fits the organisation's needs and optimises activities with the greatest possible benefit is one of the challenges faced by organisations that implement multiple management systems.

Objective: To identify models of management system integration with greater organisational effectiveness and efficiency in the scientific literature from 2010 to 2025.

Methodology: A systematic review was conducted following the PRISMA methodology and using the PICO framework to formulate the research question. The Scopus and Web of Science databases (n = 591 initial articles) were consulted between 2010 and 2025 for articles that were

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accessible in full text, written in Spanish/English/Portuguese, and focused on management system integration models.
Results: Thirteen studies that met the inclusion criteria were included. The models were classified as: very high (n=3), high (n=5), medium (n=3) and low performance (n=2). Critical factors identified: organisational leadership, process approach (Plan, Do, Check and Act), high-level structure of the International Organisation for Standardisation (ISO) change management and contextual adaptability. Sixty-two per cent of models demonstrated high effectiveness with benefits in cost reduction and operational efficiency.
Conclusions: The models identified in this systematic review, which fall within the 'very high' and 'high performance' ranges, can be successfully implemented in multisectoral contexts through gradual approaches and effective leadership. To objectively select integration models, a multidimensional evaluation framework was developed.
Unique contribution: This study assesses the performance levels of integration models across six key dimensions: applicability, implementability, empirical evidence, regulatory compatibility, comprehensive approach, and transferability.
Key Recommendation: Future studies should conduct additional research to reinforce the findings of this study and thereby develop management models that facilitate improved system integration.
Keywords: systems integration; systematic review; total quality management; safety management; environmental management; efficiency; organisational.

Introduction

In an increasingly competitive global business environment, organisations seek strategies that not only fully satisfy their customers but also enable them to be efficient and effective in all their processes, thus standing out in the market in which they operate (Sampaio et al., 2012). This competitive pressure has led companies with two or more parallel management systems in their operations to adopt an integration strategy as a strategic response to avoid or reduce the costs and expenses generated by duplicate processes, thereby increasing operational, management, and economic performance. However, describing a single model of an integrated management system that fits any organisation is no easy task, as it depends on the type of company, the systems to be integrated and the objective of the integration. Nevertheless, the literature suggests that it is possible to identify some common characteristics, a process facilitated by the fact that these systems have a standardised structure (Otero Mateo, 2013).

A management system can be defined as a set of interrelated organisational processes that share resources to achieve various objectives. In this context, an organisational management system includes planning, the production of goods or services, monitoring and improvement activities (Sampaio et al., 2012). It is considered a viable organisational approach to reducing costs, improving operations, making better use of resources and complying with social obligations and the requirements of different stakeholders, as cited in (Khanna et al., 2010). In other words, a truly integrated system is one that combines management systems with a focus on process vision and a systems approach that allows all relevant management practices and standards to be integrated into

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a single system (Sampaio et al., 2012; Simon et al., 2012; Simon et al., 2014; Rebelo et al., 2014), according to Nunhes et al. (2017).

There are a considerable number of standards that can be integrated: ISO 9001 - Quality management systems, ISO 14001 - Environmental management systems, ISO 45001 - Occupational health and safety management systems, ISO/IEC 27001 - Information security management systems, ISO 50001 Energy management systems, ISO 31000 - Risk management, ISO 22301 - Business continuity management systems, ISO 37001 - Anti-bribery management systems, ISO 26000 - Guidance on social responsibility, ISO 28000 - Security management systems, ISO 20000-1 - IT service management. ISO certifications are not mandatory, but in the business environment, they add value by committing to the quality of their products, the health and safety of their employees, and the protection of the environment, among other aspects. Despite numerous studies focusing on the integrated implementation of occupational health and safety management systems and environmental management systems, and their integration into global strategic documents, there is still no coherent and effective overview of the common requirements, as well as the specific requirements of both standards, in the literature (Pauliková et al., 2022).

Objective of the study

The objective of this study is to identify, through a systematic review of scientific literature from 2010 to 2025, integration models that enhance organisational effectiveness and efficiency and establish a reference framework to facilitate their application across various organisational contexts.

Methods

Study design

The design of this study consists of a systematic review of the literature. The guidelines of the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement and the PICO (population, intervention, comparison, and outcome) framework were followed. Specifically, the PICO question formulated was as follows: What is the most effective and efficient integration model for implementing standardised management systems in various organisational contexts, according to the scientific literature?

Data source

A search was conducted in the Scopus and Web of Science databases for articles published between 2010 and February 2025. These databases were chosen due to their extensive coverage of high-quality scientific literature on organisational management and integrated systems, as well as their rigorous indexing processes, which ensure the relevance and quality of the studies included.

Search strategy

The following keywords were used: ‘integrated management systems’, ‘strategy’, ‘integration’, “implementation”, ‘management practices’, ‘quality management’, ‘environmental management’, ‘occupational health and safety management’, ‘ISO 9001’, ‘ISO 14001’, ‘ISO 45001’, linked by the Boolean operators OR and AND.

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Two experts in the subject area validated the search equation: a psychologist specialising in occupational health and safety, with a master's degree in human talent management, and a nurse specialising in occupational health and safety, with a master's degree in integrated management systems. For greater precision, these terms were concatenated, restricted to the exact words or limited to them, and the sub-disciplines 'BUSI', "ENGI" and 'SOCI' were specified. The search date was 10 February 2025.

To control for selection bias, two researchers independently performed study selection, data extraction, and quality assessment using the Joanna Briggs Institute (JBI) assessment tool for qualitative research. Discrepancies between reviewers were resolved by consensus and, when necessary, a third reviewer was consulted to ensure rigour and minimise bias in the synthesis of evidence.

Eligibility criteria

Inclusion criteria

Studies published between 2010 and 2025.
Original articles discussing the management systems integration model.
Articles in Spanish, English, and Portuguese.

Exclusion criteria

Duplicate articles.
Incomplete or restricted-access articles.
Articles in quartiles below category Q2.

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Selection process / judgement

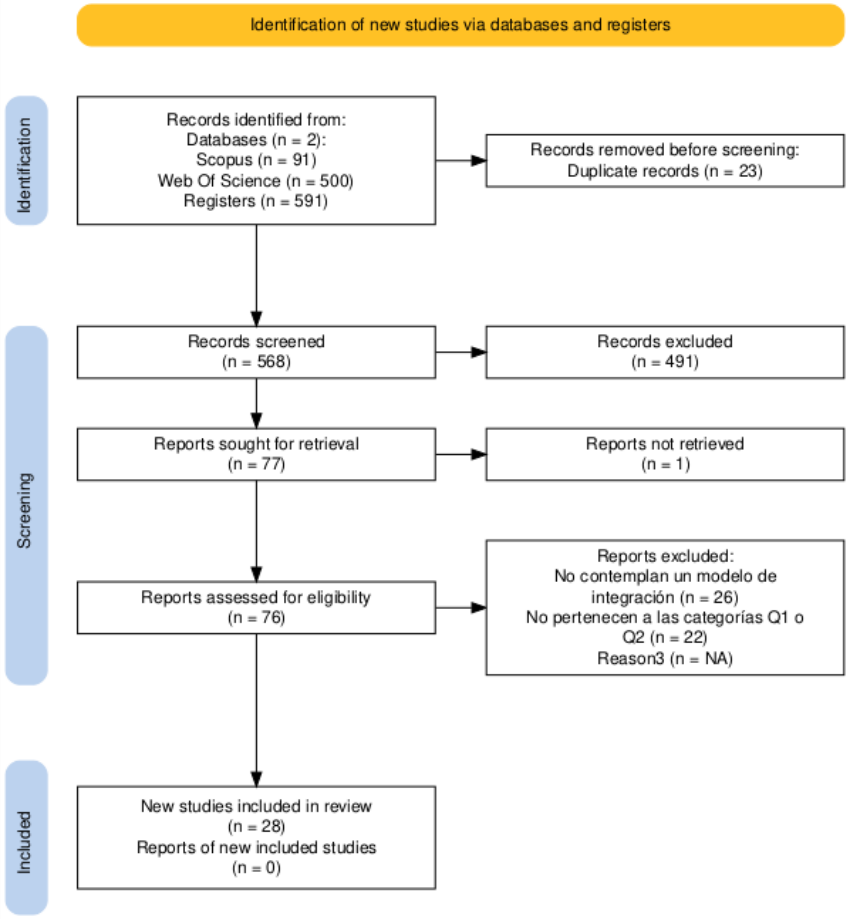

Figure 1. Article selection process in the PRISMA 2020 diagram.

As shown in Figure 1, in the first phase, a total of 591 articles were obtained that matched the search equation description, comprising 91 from Scopus and 500 from WoS. Both databases were reviewed to eliminate those that did not meet the criteria related to management system integration models. Twenty-three duplicate articles were identified between the two databases and removed from the WoS database, resulting in 477 remaining articles. After applying the exclusion criteria, the total number of articles was 568.

In the second phase, of the 91 articles in the Scopus database, 42 were found to meet the criterion of incomplete information, so 49 were excluded. Of the total of 477 articles in the WoS database, 35 were found to meet the criterion, so 442 were excluded. At this point in the review, the total number of articles that met the criteria was 77, and 514 were excluded. After obtaining all the files, one of them was found to have restricted access, resulting in a decrease in the number of articles included to 76 and an increase in the number excluded to 515.

Finally, the 76 articles were evaluated to determine whether they met the criteria for complete articles, 42 from the Scopus database and 34 from WOS. Of the remaining total, six articles from

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Scopus and 20 from WOS were discarded because they did not consider a model for integrating management systems, leaving a total of 50.

Due to the need to establish a systematic review with a high degree of rigour, the research team decided to select articles corresponding to quartiles Q1 and Q2 of the published category. Upon reviewing the 50 articles included, it was identified that only 19 corresponded to quartile Q1 and 9 to quartile Q2. A total of 28 articles moved on to the third phase, a figure determined based on the inclusion/exclusion criteria defined in this article for further analysis and synthesis.

Quality review

To evaluate the quality of the selected articles, a ten-question assessment tool proposed by the Joanna Briggs Institute (JBI) for use in systematic reviews was used. These questions were developed as a critical assessment tool to establish a synthesis in qualitative research. These questions have been carefully selected to enable the interpretation, with a meta-aggregative approach, of the complex nature of interpretative and critical understanding, while ensuring that the synthesised findings are meaningful and practical. Table 1 shows the results of the evaluation of the 28 articles.

Table 1. *Quality of selected articles*

AUTHORS OF Q1 ARTICLES	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	OA
(Sampaio et al., 2012)	Y	Y	Y	Y	Y	U	N	Y	U	Y	I
(Khanna et al., 2010)	U	Y	Y	Y	Y	U	N	Y	N/A	Y	N/I
(Hoy & Foley, 2015)	Y	Y	Y	Y	Y	U	N	Y	N/A	Y	N/I
(Asif et al., 2013)	Y	Y	U	Y	Y	Y	Y	U	N/A	Y	N/I
(Simon et al., 2013)	Y	Y	Y	Y	Y	Y	N	U	N/A	Y	I
(Vrabcova & Urbancova, 2021)	Y	Y	Y	Y	Y	Y	N	Y	U	Y	N/I
(T. C. G. Silva et al., 2022)	Y	Y	Y	Y	Y	Y	N	Y	N/A	Y	I
(Llonch et al., 2018)	Y	Y	Y	Y	Y	Y	U	Y	N/A	Y	I
(Gangolells et al., 2013)	Y	Y	Y	Y	Y	Y	N	Y	N/A	Y	I
(Vulanović et al., 2020)	Y	Y	Y	Y	Y	Y	N	Y	U	Y	N/I
(Souza & Alves, 2018)	Y	Y	Y	Y	Y	Y	U	Y	N/A	Y	I
(Blasco-Torregrosa et al., 2021)	U	Y	Y	Y	Y	Y	N	Y	N/A	Y	N/I
(Bernardo et al., 2017)	Y	Y	Y	Y	Y	Y	N	Y	U	Y	N/I
(Martí-Ballester & Simon, 2017)	U	Y	Y	Y	Y	U	N	Y	N/A	Y	N/I
(Nunhes et al., 2017)	Y	Y	Y	Y	Y	Y	N	Y	U	Y	N/I
(Simon, Karapetrovic, & Casadesús, 2012a)	U	Y	Y	Y	Y	U	N	Y	N/A	Y	N/I

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(Simon, et al.2012b)	Y	Y	Y	Y	Y	U	N	Y	N/A	Y	N/I
(Francisco et al., 2024)	Y	Y	Y	Y	Y	Y	N	Y	U	Y	N/I
(Manninen & Huiskonen, 2022)	Y	Y	Y	Y	Y	Y	N	Y	N/A	Y	N/I
AUTHORS OF Q1 ARTICLES	**P1**	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**	**P8**	**P9**	**P10**	**VG**
(Algheriani et al., 2019)	Y	Y	U	Y	Y	N	N	N/A	N/A	Y	I
(Sarmiento et al., 2024)	Y	Y	Y	Y	Y	U	N	N/A	N/A	Y	I
(Majerník et al., 2017)	Y	Y	Y	Y	Y	N	N	N/A	N/A	Y	I
(Pauliková et al., 2021)	Y	Y	Y	Y	Y	U	N	N/A	N/A	Y	I
(Pauliková et al., 2022)	Y	Y	Y	Y	Y	U	N	N/A	N/A	Y	I
(Ispas & Mironeasa, 2022)	Y	Y	Y	Y	Y	Y	N/A	N/A	N/A	Y	N/I
(Uriarte-Romero et al., 2017)	Y	Y	Y	Y	Y	U	N	N/A	N/A	Y	I
(Silva et al., 2020)	Y	Y	Y	Y	Y	Y	N	Y	U	Y	I
(Dragomir et al., 2017)	Y	Y	Y	Y	Y	U	N	N/A	N/A	Y	N/I

Note: Q1: Is there congruity between the stated philosophical perspective and the research methodology? Q2: Is there congruity between the research methodology and the research question or objectives? Q3: Is there congruity between the research methodology and the methods used to collect data? Q4: Is there congruity between the research methodology and the representation and analysis of data? Q5: Is there congruity between the research methodology and the interpretation of results? Q6: Is there a statement locating the researcher culturally or theoretically? Q7: Is the influence of the researcher on the research, and vice versa, addressed? Q8: Are participants, and their voices, adequately represented? Q9: Is the research ethical according to current criteria, or, for recent studies, is there evidence of ethical approval by an appropriate body? Q10: Do the conclusions drawn in the research report Flow from the analysis or interpretation of the data? Answers: Yes (Y); No (N); Unclear (U/C); Not Applicable (N/A). Analysis: Overall assessment (OA): Included (I); Not included (N/I); Seek further information (M/I); Comments (including reason for exclusion). Comments are omitted, as those that meet any criterion not included will depend on one of the exclusion criteria detailed in the eligibility criteria.

Results

The results of this systematic review are directly related to the current needs of organisations, as they provide a multidimensional evaluation framework that allows for the objective selection of integration models. Unlike previous studies that focus on specific aspects or particular sectors, this study offers a holistic perspective that facilitates strategic decision-making on the implementation of integrated management systems.

The analysis of the study was based on the work of the research team, who reviewed each article in the database for inclusion using the JBI checklist. The results were compared to obtain a final assessment, which is presented in Table 1. After applying the test and reviewing the proposed

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integration model, a total of 15 articles were excluded, as described in the Overall Assessment column, and were excluded according to the eligibility criteria. This is because the excluded articles indicate that, in relation to the methodological quality of their studies. However, they mention integration models, the model and its stages are not clearly defined, or they have not addressed the possibility of bias in their design, execution or analysis. Therefore, they are excluded from the systematic review. Given the above, a total of 13 articles were analysed, and subsequently, based on the integration model and approach used, those that, according to the authors' analysis, are effective and efficient and incorporate best practices for success were identified.

Study description

All the articles reviewed were in English. The years in which they were published were: 2012, 2013, 2017, 2018, 2019, 2020, 2021, 2022 and 2024. No articles were selected from the years 2010, 2011, 2014, 2015, 2016 and 2023. The authors' affiliations are diverse. The articles are the work of researchers from educational institutions in the Americas and Europe: Portugal, Spain, the United Kingdom, Slovakia, Germany, Serbia, Bulgaria, Canada, Mexico, Brazil, Colombia, and Chile. In addition, three studies were conducted in collaboration between researchers from countries on both continents. Regarding journal publications, three studies were published in the same journal by different authors from various countries and in different years. Only two journals published five of the articles, while the rest were published in different journals.

Methodology applied in the studies analysed

Of the 13 studies selected, 2 employed an empirical approach, 6 used a combination of qualitative and quantitative methods, and 5 adopted a conceptual analysis approach.

Study approach: Comparison between the integration models analysed

Once the types of articles had been identified, the results achieved in each were compared according to the criteria of effectiveness, efficiency, good practices, success, and implementation in various organisational contexts, in accordance with the objectives set out in this systematic review. Based on the information gathered on Integrated Management Systems, it was determined that to classify the overall performance of the integration models, a set of determining dimensions must be considered. These dimensions were developed based on the main criteria identified in the selected models, as they constitute a fundamental factor for the development of their classification. Subsequently, the relationship between the articles and each level of performance was established, considering the specific characteristics of each one and their behaviour in the integration of management systems. The results are presented in Table 2.

Table 2. *Results classification table and overall performance of integration models included*

Performance level	Main criteria	Author	Overall performance
Very high	- High implementation effectiveness.	(Souza & Alves, 2018)	Offers operational, sustainable and efficient integration.

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	- Multisectoral (cross-cutting) applicability. - Compatible with international standards (ISO or others). - Comprehensive approach (sustainable, operational, efficient). - Empirically validated or field tested.	(Majerník et al., 2017)	Has a robust, multi-sectoral structure that is compatible with ISO.
		(Algheriani et al., 2019)	Is a risk-based approach with high effectiveness and efficiency.
High	- Effectiveness in specific sectors. - Good level of functional integration. - Proven practical applicability. - Structured methodology, although not universal. - Evidence of success, although with limited scope.	(Sampaio et al., 2012)	Its characteristics make it adaptable, progressive and field-tested.
		(Sarmiento et al., 2024)	It provides clear, efficient and effective guidance for the service sector.
		(Simon et al., 2013)	It has empirical evidence and complete functional integration
		(Gangolells et al., 2013)	It is excellent for the construction sector, with a quantitative approach
		(Llonch et al., 2018)	It is very effective in small businesses without previous management systems
Medium	- Partial effectiveness or in very specific contexts. - Adds value as a support tool, but not as a comprehensive solution. - Limitations for direct implementation. - Requires significant additions or adaptation.	(Uriarte-Romero et al., 2017)	Very effective in manufacturing, but not easily transferable
		(Pauliková et al., 2022)	Excellent in environmental health, not applicable to other sectors.
		(Silva et al., 2020)	A useful framework that requires supplementation for implementation.
Low	- Use restricted to diagnosis or analysis - Difficult to implement or very complex to apply. - Requires high specialisation or advanced technical resources.	(Pauliková et al., 2021)	Quite analytical, not implementable, requires advanced IT (Innovation Technologies)
		(Silva et al., 2022)	Useful as a diagnostic tool, does not guide integration

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	- Does not guide integration processes in a practical way. - Low impact on operational results.	

The table lists the main criteria of the models included in the systematic review based on the following integration dimensions, which the researchers called CARTIE for their initials:
Comprehensive approach: Does it integrate operational, strategic, sustainable and functional aspects?
Applicability: Can it be applied across multiple sectors, or is it limited to a single sector?
Regulatory compatibility: Is it consistent with recognised standards (ISO or others)?
Transferability: Can it be replicated in different contexts, or is it specific?
Implementability: Can it be easily implemented, or does it require many adjustments and resources?
Empirical evidence: Is there field validation or documented success stories?

Discussion

The importance and results of IMSs are undeniable. Over the years, there have been numerous success stories reflecting the benefits of implementing an IMS in companies of different economic sectors, sizes, and geographical locations (Simon et al., 2012). Authors such as Bernardo, Simon and Karapetrovic have conducted studies that contribute to the understanding of management system integration (Bernardo et al., 2017; Simon et al., 2013). However, they point out the scarcity of literature on the impact of the evolution of such integration (Simon et al., 2012b). The selected articles constitute a representative sample of the available literature in the area of study. Although the number of works identified is small, their content provides relevant information for the critical and comparative analysis of various models. This review enables us to identify approaches that have proven their efficiency and effectiveness, as well as to recognise the best practices associated with success in similar contexts, which is essential for substantiating the methodological choice, the objective of this work.

Defining the best model is not easy, but it is concluded that each one contributes positively to the expected results. The articles whose performance level was very high, according to the results of this research, demonstrate their effectiveness, efficiency, and good practices in systems integration by offering approaches that can be replicated in multiple sectors. Those with a high-performance level have proven to be effective and efficient directly in certain sectors. Those with a medium level demonstrate their efficiency, but their effectiveness will depend on certain variables related to integration. Finally, models with a low level of performance offer analytical elements that contribute to strategic decision-making and enhance the effectiveness of systems; however, they have limitations because they do not directly focus on participation in systems integration.

The very high-performance models proposed by Souza and Alves (2018), Majerník et al. (2017) and Algheriani et al. (2019) prove to be the most effective in terms of implementation, as their application is multisectoral and compatible with international standards. The Lean Integrated Management System for Sustainability Improvement (LIMSSI) model performs highly in terms

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of efficiency and effectiveness by integrating management systems under a robust and adaptable lean operating logic that incorporates successful best practices and promotes organisational sustainability, with a proven impact on productive companies focused on continuous improvement. The integrated management system model with the Deming cycle (IMS-PDCA), based on a high-level structure (HLS), performs very well thanks to its clarity, standardisation, efficiency and total integration capacity, as well as its ability to reduce implementation times and costs and improve effectiveness by articulating all management systems under a common framework recognised by ISO, which is ideal for process-oriented and continuous improvement-oriented organisations. Ultimately, the risk model for the integrated management system (RIMS) enables greater efficiency and effectiveness in risk management by consolidating multiple management systems. Its main advantages are cost reduction, a preventive approach, and improved organisational performance. Although its disadvantages lie in its complexity and the need for a mature organisational structure.

The high-performance models proposed by (Sampaio et al., 2012), (Sarmiento et al., 2024), (Simon et al., 2013), (Gangolells et al., 2013), and (Llonch et al., 2018)Reflect their effectiveness in certain sectors through functional integration, and are applicable via structured methodologies, yielding successful results in specific cases. They are practical and efficient in particular contexts; however, although they are not universal in nature, they achieve a high degree of performance, which allows them to be tested in other sectors. Additionally, during implementation, effective leadership, document management, strategies, and rigorous planning are required.

The medium-level performance models proposed by Uriarte-Romero et al. (2017), Pauliková et al., (2022) and Silva et al. (2020) show partial effectiveness in very specific contexts. They have very specific and limited characteristics for application, and their performance guarantees results based on controlled scenarios within the organisation. Their effectiveness and efficiency depend on the organisation's approach, commitment, leadership, and the desired scope.

The low-performance models proposed by Pauliková et al., (2021) Silva et al., (2022), are categorised at this level because they are more analytical and high-performance evaluation tools than integration models. Thanks to their standardisation and structures, they make it possible to identify integration benefits and gaps, improve the strategic effectiveness of the system and guide future decisions, which is why they stand out in the review. However, they are limited to certain sectors and can serve as support in the implementation of management systems, but not as integration models to be followed.

Based on the review, a model can be proposed that, considering the characteristics of effectiveness and efficiency, combines the best practices for success identified and enables the implementation of integrated management systems in various organisational contexts. Based on the above, a proprietary model has been developed with a cyclical, phased approach that compiles the advantages analysed according to the characteristics outlined, which is outlined in Figure 2.

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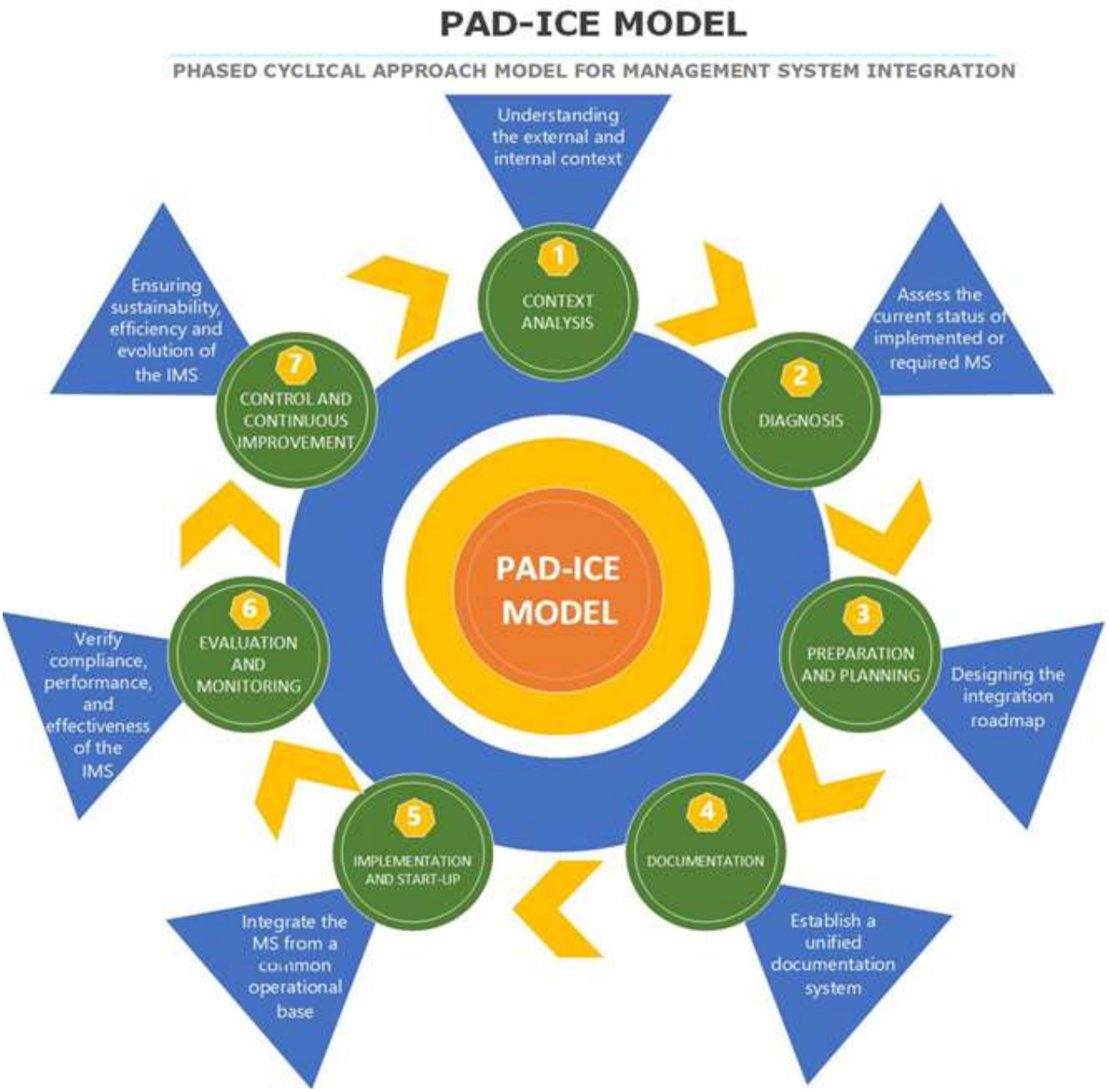

Figure 2. PAD-ICE Management Systems integration model.

Table 3 outlines the actions required in each of the seven phases that comprise the proposed PAD-ICE integration model, along with the tools that can be utilised to implement them.

Table 3. *Description of actions to be taken and strategic tools that strengthen each phase of the PAD-ICE model management system integration process.*

PHASE	Actions to be taken	Tools

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1.Context analysis	- Stakeholder analysis. - Review of external and internal context. - Identification of legal, reputational, environmental, quality, safety and other compliance needs. - Identify opportunities, weaknesses, strengths and threats. - Organisational culture analysis	PESTEL analysis, stakeholder analysis, interviews, benchmarking, SWOT.
2.Diagnosis	- Review of legal and regulatory compliance. - Audit of gaps against ISO standards. - Organisational culture analysis.	ISO checklist, interviews, VSM (Value Stream Mapping).
3.Preparation and planning	- Definition of the scope of integration. - Identification of common key processes. - Design of the action plan and schedule. - Formation of the implementation team.	Maturity matrix, risk matrix, process mapping, HLS structure.
4.Documentation	- Document alignment and consolidation of manuals and processes (policies, procedures, records). - Centralised document control. - Compatibility between standards (9001, 14001, 45001, etc.).	Document management platform, SGI software, ISO structure.
5.Implementation and start-up	- Dissemination of document alignment. - Socialisation of integrated management policies and procedures - Training in Lean tools and process management. - Implementation of integrated management indicators.	PDCA, Kaizen, 5S, HLS ISO standard, Lean tools (VSM - Value Stream Mapping), A3.
6.Evaluation and monitoring	- Integrated internal audits. - Evaluation of organisational performance. - Monitoring of indicators.	Balanced Scorecard, audit reports, management reviews.
7.Control and continuous improvement	- Identification of lessons learned. - Implementation of corrective/preventive actions. - Improvement plans based on root cause analysis. - Culture of continuous improvement and active participation.	PDCA cycle, lessons learned, risk control and management, Kaizen, training.

Note. The advantages and success factors of the PAD-ICE model, named after the principles ('Plan, Analyse, Do-It, Check & Evolve!') important for the integration of management systems, are provided below:

Advantages of the Model

- Adaptable to any type of organisation.

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- Simultaneous improvement in quality, environmental, safety and sustainability management.
- Reduction of duplication, bureaucracy and use of human resources, time and costs.
- Promotes a culture of continuous improvement and organisational learning.
- Risk-based management

Conditions for Success

- Strong commitment from senior management.
- Visible leadership and cultural transformation.
- Adequate resources and technologies.
- Continuous training in Lean standards and tools.
- Specially designed for multiple integration processes.

The results confirm that the integration of management systems is not a linear process, but instead requires flexible and contextualised models. The level of maturity is higher in the case of large companies. Hybrid approaches are viable in organisations with limited resources. Integration is a process that must be carried out step by step, with the support of management tools, which is crucial for success. Senior management will always be in charge of the systems, as it has been proven that leadership in the organisation plays a fundamental role that has an impact on results.

Process simplification remains the greatest need for organisations, especially in standards such as ISO 45001, where the regulations are extensive. Process simplification through technology is essential today; however, the studies analysed lack an in-depth analysis of the impact of artificial intelligence on IMS, which is a significant limitation in the current context of digital transformation.

Strengths and limitations

Among the study's strengths, it is worth highlighting the rigorous application of the PRISMA methodology and the use of the PICO framework, which ensure the systematic nature of the review process. Also noteworthy is the development of a multidimensional evaluation framework that allows for the objective classification of integration models. The inclusion of high-quality studies (Q1 and Q2) guarantees the reliability of the results. Bias was controlled through independent review by multiple researchers and validation by experts.

Among the limitations, it is worth noting the restriction to only two databases (Scopus and Web of Science), which may limit the comprehensiveness of the search. The exclusion of studies in languages other than Spanish, English, and Portuguese. Filtering only Q1 and Q2 articles, potentially excluding relevant lower-ranking studies. No quantitative analysis was performed using meta-analysis due to the heterogeneity of the included studies.

Conclusions y recommendations

This systematic review emphasises the importance of integrating management systems across various contexts and economic sectors, including small, medium-sized, and large industries. The high-level structure favours the integration of management systems and has simplified their

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adoption in standards such as ISO 9001, ISO 14001 and ISO 45001. This standard structure enables requirements to be aligned, redundancies to be eliminated, and facilitates the implementation of Integrated Management Systems.

The process approach and continuous improvement are common pillars; all revised models are based on principles such as the PDCA (Plan-Do-Check-Act) cycle and the process-based approach. This allows organisations to integrate different areas (quality, safety, environment, sustainability, etc.) systematically and coherently.

Integration improves organisational performance and reduces business management shortcomings, demonstrating that companies that have adopted integration models have benefited from cost reductions, improved internal communication, increased operational efficiency, and reduced rework, thereby enhancing their competitiveness in the market.

Despite the benefits of simultaneously implementing management systems, challenges remain in terms of organisational culture, resistance to change, the need for strong leadership, and the availability of adequate resources. System integration, although efficient, requires careful planning, prior diagnosis, and an adaptive approach tailored to the company's size and sector.

Finally, although effective models exist, their application must be adapted to the size, sector, and organisational culture. This analysis revealed a positive relationship between benefits (cost reduction, operational improvement); however, gaps were observed in the measurement of long-term impacts and in solutions for small and medium-sized enterprises (SMEs), which comprise the majority of companies in countries such as Colombia. Identifying the performance levels of integration models will enable organisations to chart a path to becoming more effective and efficient when implementing integrated management systems. Future studies should build upon the findings of this study and conduct additional research to develop new management models that facilitate the better integration of systems.

Recommendations for future studies

It is recommended that longitudinal studies be conducted to assess the sustainability and evolution of integration models in the long term, that the analysis be expanded to different cultural and economic contexts to validate the transferability of the identified models, and that mixed methodologies combining qualitative and quantitative analyses be implemented to understand the factors for success.

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