

When Sustainability Meets Profit: A Systematic and Bibliometric Review of ISO 14001 and Financial Performance

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ABSTRACT: This study examines the relationship between ISO 14001 and financial performance through a Systematic Literature Review (SLR) and bibliometric analysis using the Scopus database for the period 2015-2025. After the PRISMA selection process, 21 articles were obtained for further analysis. Bibliometric results show an increase in publications since 2019, with dominant contributions from Europe and Asia, and most published in high-reputation journals. The synthesis of empirical findings reveals that ISO 14001 generally has a positive impact on financial performance, both directly and through indirect mechanisms such as environmental performance, eco-efficiency, green innovation, and ESG. However, some studies found insignificant or negative results, especially in small companies or shallow implementations. Overall, these findings confirm that the effectiveness of ISO 14001 is influenced by the company's internal context, regulatory pressures, and the depth of standard integration into operational processes.

KEYWORDS: ISO 14001, financial performance, systematic literature review, bibliometric

I. INTRODUCTION

Environmental sustainability has become one of the main strategic issues in modern management, along with increasing pressure from governments, investors, and society toward responsible business practices. Companies are required not only to achieve operational efficiency but also to systematically manage environmental impacts to maintain social legitimacy and long-term competitiveness (Sawitri & Setiawan, 2017). In this context, the Environmental Management System (EMS) based on the international standard ISO 14001 has become one of the most widely adopted instruments globally (Ermaya & Mashuri, 2020). EMS is defined as part of an organization's management system that includes structure, responsibilities, processes, and resources to implement environmental policies effectively and sustainably (Voinea et al., 2020).

ISO 14001 provides a standardized framework for implementing the Plan-Do-Check-Act (PDCA) cycle, identifying environmental risks, and formulating measurable mitigation strategies integrated into business processes (Fonseca, 2018). Many studies state that ISO 14001 plays an important role in improving company environmental performance. This standard helps companies improve resource use, reduce waste and emissions, and increase compliance with environmental regulations (Ermaya & Mashuri, 2020). From the Natural Resource-Based View (NRBV) perspective, environmental capabilities such as EMS and green innovation are viewed as sources of competitive advantage that can improve company performance through operational efficiency, increased productivity, and positive reputation among stakeholders (Ong et al., 2019).

In line with this theory, various studies show that improved environmental performance can be a mediation mechanism bridging the relationship between ISO 14001 adoption and improved company financial performance. For example, research shows that improvements in eco-efficiency, profitability (ROA), and leverage can strengthen company value as a response to good environmental practices (Rahardian et al., 2022).

On the other hand, the influence of ISO 14001 on financial performance is not uniform. Several empirical studies show positive impacts, where ISO 14001 can increase productivity, process efficiency, and company economic results as part of a sustainability strategy (Miroshnichenko et al., 2017). However, there are studies that found inconsistent results, especially in the context of significant implementation costs, administrative complexity, and large resource requirements (Riaz et al., 2019). Very comprehensive EMS can improve environmental performance but put pressure on profitability due to high operational costs incurred by companies (Voinea et al., 2020).

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These variations in findings indicate that the relationship between ISO 14001 adoption and financial performance is complex and influenced by various factors. Differences in industry context, company characteristics, regulatory intensity, innovation capacity, and motivation in adopting environmental standards become important aspects determining whether ISO 14001 can provide financial benefits. In some studies, financial benefits are only visible when companies integrate ISO 14001 into core business strategy, consistently adopt green innovation, or combine ISO 14001 with other management standards (de Jong et al., 2014). However, in other conditions companies do not obtain financial benefits due to ineffective implementation, compliance-driven orientation, or merely meeting stakeholder demands without substantial internal changes (Riaz et al., 2019).

From an academic perspective, literature on the relationship between ISO 14001 and financial performance shows fragmentation. Most research only examines direct relationships, while other research highlights indirect paths through mediating variables such as environmental performance, green innovation, eco-efficiency, and management system integration. In addition, there is no convergence of findings regarding conditions that make ISO 14001 have positive, neutral, or negative impacts on financial performance. This fragmentation of findings indicates the need for comprehensive synthesis that not only reviews empirical results but also maps knowledge structure, research trends, and conceptual developments in this field. Although there are several literature reviews on sustainability and EMS, very few studies combine Systematic Literature Review (SLR) approaches with bibliometric analysis to understand global research developments on the relationship between ISO 14001 and financial performance. Thematic mapping is produced through a density-centrality approach based on the model (Cobo et al., 2011), thus resulting in identification of core themes, developing themes, and emerging themes in the literature. The search process follows PRISMA guidelines to ensure transparency in article selection, while the choice of Scopus as a database is based on multidisciplinary coverage and high-reputation journal indexing. The limitation of the 2015-2025 period was done to capture research dynamics after ISO 14001 implementation.

Based on these arguments, this study aims to: (1) map the development of scientific publications on ISO 14001 and financial performance using a bibliometric approach; (2) synthesize empirical findings from previous research to identify patterns of direct and indirect relationships between ISO 14001 and financial performance; and (3) explain factors that strengthen or weaken the impact of ISO 14001 on financial performance. This study is expected to provide theoretical contributions to the development of environmental management literature, as well as provide practical implications for companies in designing effective and economically valuable sustainability strategies.

II. METHOD

This study uses a Systematic Literature Review (SLR) approach combined with bibliometric analysis to obtain a comprehensive picture of the relationship between ISO 14001 and financial performance. The selection of this design aims to integrate quality assessment and empirical findings content with quantitative mapping of research developments globally. The SLR approach allows researchers to assess the consistency of previous study results systematically, while bibliometrics provides understanding of trends, thematic focus, and intellectual networks developing in this field. The SLR process follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, so that all stages of article search, selection, and evaluation are conducted transparently and structurally.

The Scopus database was chosen as the main research source because it has extensive coverage of international scientific journals and high curation quality in the fields of management, business, accounting, and social sciences. The search process used a combination of keywords reflecting research focus, namely "ISO 14001", "environmental management system", "EMS" and "financial performance", "firm performance", "profitability", "return on assets", "return on equity" "ROA", and "ROE" for the period 2015 to 2025.

The literature selection process was based on inclusion and exclusion criteria formulated to ensure that the articles analyzed were relevant to the research objectives. These criteria include topic, document type, language, publication time range, accessibility, and methodological suitability. A summary of the criteria is shown in Table 1.

Table I. Inclusion and Exclusion Criteria in Article Selection

Category	Inclusion Criteria	Exclusion Criteria
Topic	Studies examining ISO 14001 or EMS and its relationship with financial performance, company value, profitability, or related financial indicators	Studies not testing relationships with financial performance or only discussing environmental aspects
Document Type	Journal articles (peer-reviewed)	Proceedings, book chapters, reviews, editorials, technical reports
Language	English	Other than English
Publication Period	2015-2025 (period after ISO 14001:2015 took effect)	Articles before 2015
Accessibility	Full text available	Full text not available
Methodological Suitability	Empirical studies (quantitative or analytical)	Conceptual studies without financial analysis

The entire research process was visualized in a PRISMA diagram illustrating the flow of article selection, from the identification stage to the inclusion stage. This output ensures that research is conducted transparently, replication can be done, and SLR quality is maintained according to international standards.

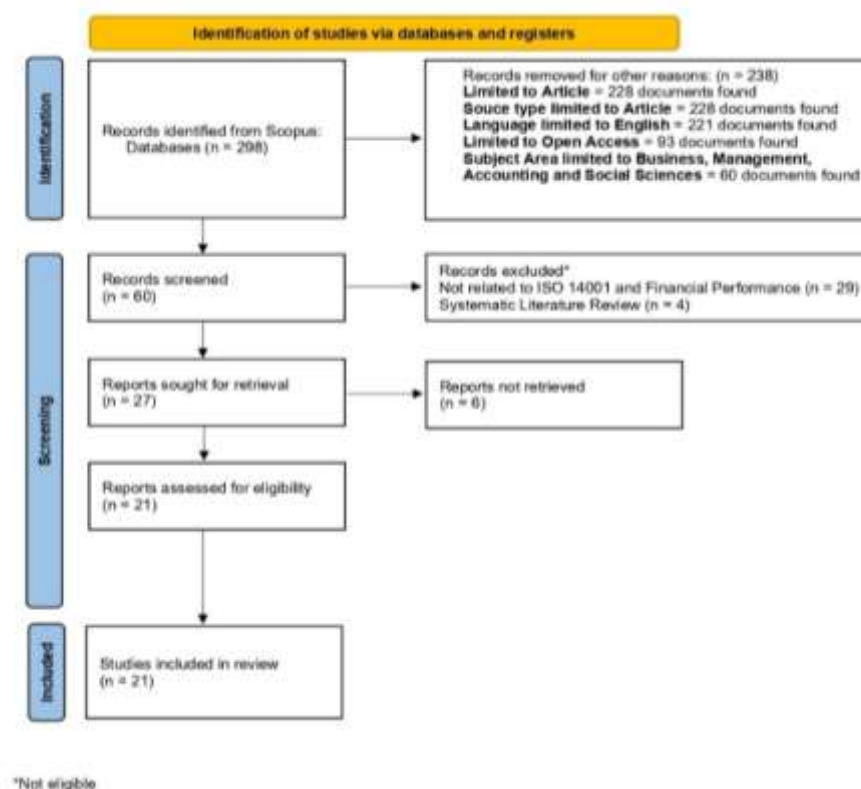


Figure 1. PRISMA Flow Diagram of Article Selection

The time range 2015-2025 was chosen to ensure that the studies analyzed reflect recent developments in literature on ISO 14001. The initial search yielded 298 articles. A filtering process was then conducted to ensure only relevant and high-quality articles were included. Articles were limited to journal document types (article), scientific journal sources, English language, and Business, Management and Accounting as well as Social Sciences subject categories, so the number of articles decreased to 60. A total of 33 records were excluded, consisting of 29 studies that were not related to ISO 14001 and financial performance and 4 systematic literature reviews. Consequently, 27 reports were considered potentially relevant and were sought for retrieval.

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During the retrieval and eligibility assessment stage, 6 reports could not be retrieved, leaving 21 reports available for full-text assessment of eligibility. Further evaluation was conducted by examining study focus suitability, namely whether articles explicitly discussed ISO 14001 or EMS and measured its impact on financial performance or related indicators such as ROA, ROE, profitability, or company value. Based on these criteria, only 21 articles met final eligibility and were included in the analysis.

The analysis stage was conducted through two approaches. First, bibliometric analysis was used to map publication trends, country of research origin, most productive journals, most productive authors, most reputable journals, and themes related to ISO 14001 and financial performance. This analysis provides understanding of intellectual structure and direction of ISO 14001 research development globally. Second, systematic analysis was conducted by examining relationship directions in empirical studies, statistical significance levels, mediation mechanisms used (for example, environmental performance, eco-efficiency, or green innovation), and country and industry contexts. This approach allows identification of mixed findings, including positive significant, negative significant, and insignificant relationship findings.

III. BIBLIOMETRIC ANALYSIS RESULTS

Bibliometric analysis was conducted to provide a comprehensive picture of research developments related to ISO 14001 and financial performance. The results of this mapping show how research in this area has developed over time, its geographical distribution, most influential publication sources, and thematic structure of existing research. This section presents four main bibliometric elements relevant to research objectives, namely publication trends, geographical distribution, most influential journals, and research theme mapping through thematic maps.

A. Publication Trends & Author Productivity

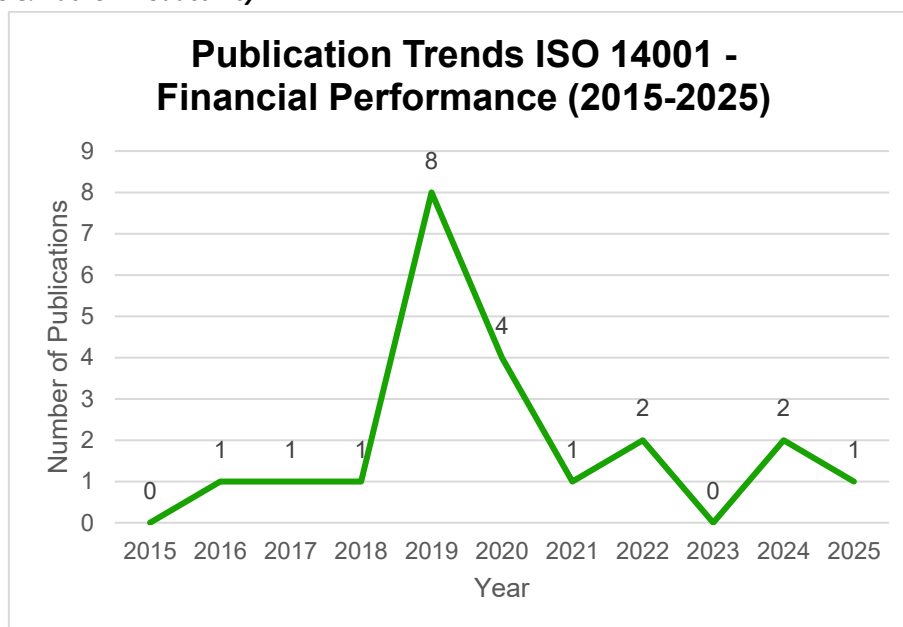


Figure 2. Publication Trends ISO 14001 - Financial Performance

Publication trends show fluctuating dynamics in research related to ISO 14001 and financial performance throughout the 2015-2025 period. Scientific activity began to increase in 2016-2018, but the most significant surge occurred in 2019, when the number of publications reached eight articles, marking the period with the highest academic interest. After that, trends experienced a gradual decline, with four publications in 2020 and only one to two publications per year in 2021-2025. The absence of publications in 2023 reflects the possibility of research focus shifts or gaps in scientific output on this topic. Overall, this pattern indicates that although interest in ISO 14001 remains, research intensity appears concentrated in certain periods and does not increase consistently from year to year.

In line with this pattern, bibliometric analysis also shows that there are no authors who consistently dominate this field. All authors in the 21-article sample only contributed one publication each, so no prominent individual productivity pattern was formed. This indicates that research on ISO 14001 and financial performance develops distributedly, with contributions spread among various researchers and institutions in various countries, without any dominant research center.

B. Geographical Distribution of Research

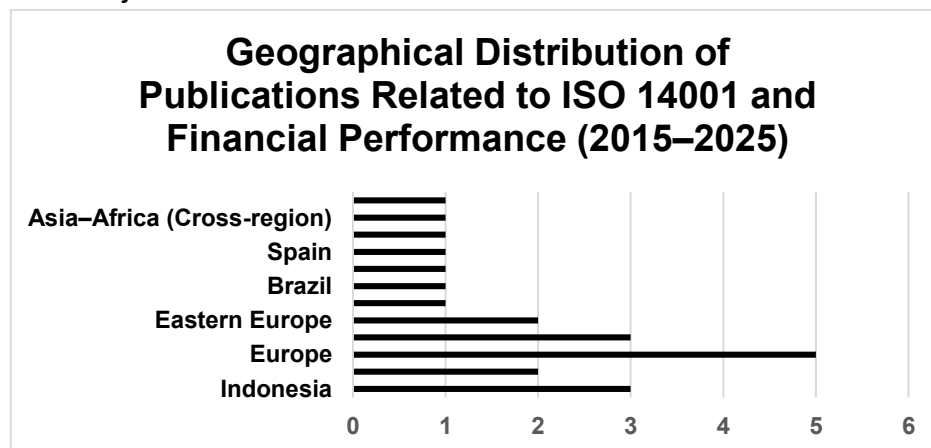


Figure 3. Geographical Distribution of Publications ISO 14001 - Financial Performance

Geographical distribution shows that scientific publications on ISO 14001 are dominated by research from Europe and Asia, two regions that have a combination of regulatory pressure and strong industrial dynamics. Europe is the region with the most research, reflecting the high level of environmental standard adoption and the role of strict European Union regulations in encouraging standardized environmental management practices.

Meanwhile, Asia, especially countries like China, Japan, South Korea, and Indonesia, also shows significant contributions to this research. Publication growth in Asia can be linked to increasingly strong encouragement to improve global competitiveness, operational efficiency, and sustainability integration in international supply chains. Indonesia and other Southeast Asian countries emerge as new contributors who are increasingly active, reflecting the development of awareness of environmental impacts and ISO 14001 adoption in the manufacturing sector. This wide geographical distribution shows that the relationship between ISO 14001 and financial performance is a relevant global issue, influenced by economic context, regulations, and environmental management system maturity levels in various countries.

C. Most Influential Journals

Publication source analysis shows that articles on ISO 14001 and financial performance are mostly published in high-reputation journals, especially journals focusing on sustainability, environment, and operations management. Sustainability Switzerland dominates with the most publications, followed by the Journal of Cleaner Production and several other Q1 journals such as Business Strategy and the Environment and Management Decision.

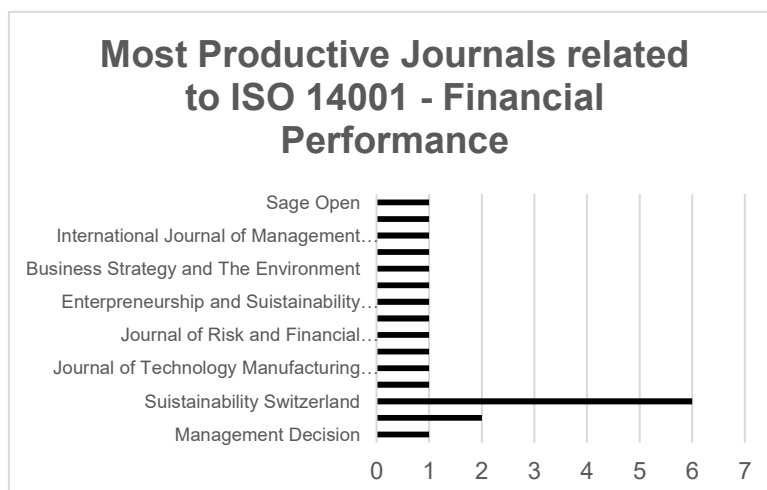


Figure 4. Most Productive Journals related to ISO 14001 - Financial Performance

The dominance of these high-reputation journals indicates that research on ISO 14001 and financial performance has a high level of relevance in sustainability and strategic management issues. Publications in these journals show that this topic is not only technical but also strategic, related to value creation, competitive advantage, and integration of environmental practices into business processes. The presence of articles in Q1 and Q2 journals shows strong credibility of the analyzed literature and strengthens the academic foundation for synthesis and discussion in subsequent sections.

D. Most Cited Articles

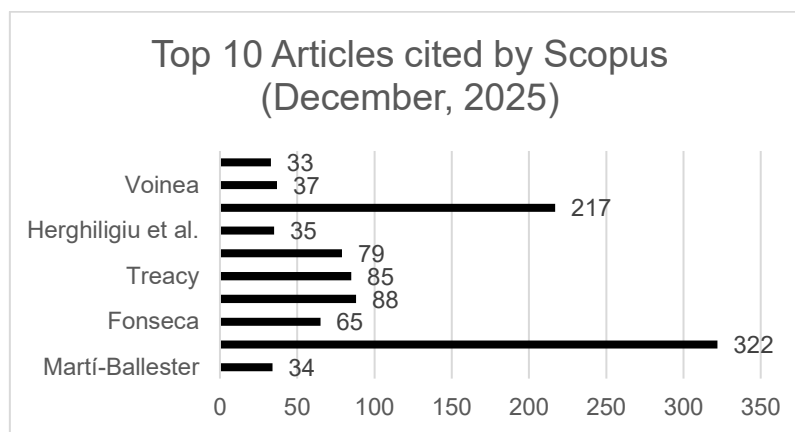


Figure 5. Most Cited Articles

Citation analysis shows that research on ISO 14001 and financial performance is dominated by several articles with high scientific impact. Miroshnychenko et al. (2017) became the most influential work with 322 citations, followed by Scarpellini et al. (2025) with 217 citations. Both articles emphasize the importance of environmental practices, dynamic capabilities, and sustainability strategies in improving financial performance. Other articles such as Khan & Johl (2019), Treacy et al. (2019), and Ong et al. (2019) also show significant influence and strengthen evidence that ISO 14001 contributes to innovation, operational efficiency, and profitability. Meanwhile, works with medium citations, for example Fonseca et al. (2018) and Voinea et al. (2020) add understanding regarding ISO 14001 implementation in various industry and country contexts.

Overall, this citation pattern indicates that articles combining ISO 14001 with strategic and multidimensional perspectives, such as green innovation, strengthening organizational capabilities, and circular economy are the most cited contributions in the literature. This pattern also shows that influential literature on this topic is still dominated by research from developed countries and large-scale companies, thus opening space for research in developing countries to expand empirical representation. Thus, citation findings not only highlight the most influential works but also show the direction of literature development and identify areas that still require further exploration.

E. Research Theme Mapping

Thematic maps are used to identify main themes developing in ISO 14001-financial performance research, based on two dimensions: centrality (theme importance in the domain) and density (strength of theme development) (Cobo et al., 2011).

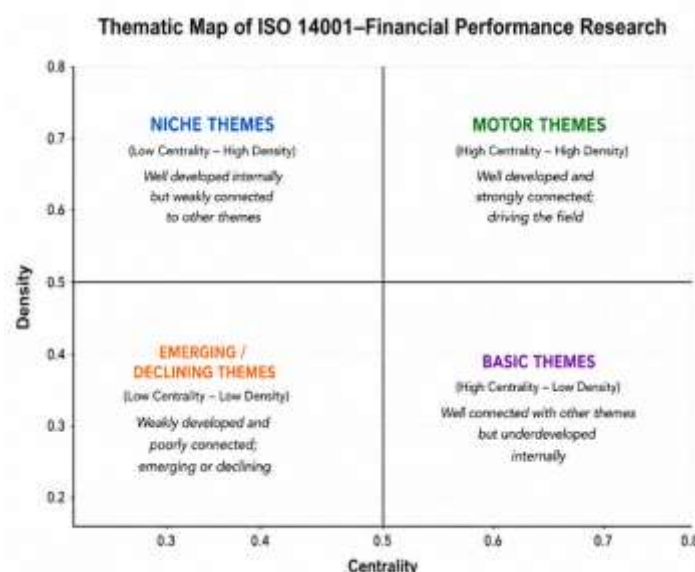


Figure 6. Thematic Mapping ISO 14001 - Financial Performance (Cobo et al., 2011)

Motor Themes

Motor themes are characterized by high centrality and high density, indicating that they are both well developed internally and strongly connected with other themes in the research field. In this study, ISO 14001–Financial Performance and Environmental

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Performance/Eco-efficiency are positioned within the motor themes quadrant. Their position indicates that environmental sustainability and its relationship with financial performance constitute highly developed and well-connected areas of research. In particular, the strong position of ISO 14001–financial performance suggests that the relationship between environmental management certification and corporate financial outcomes has become an important and mature research stream, while environmental performance and eco-efficiency remain closely connected to the broader development of the field (Burbano et al., 2022).

Basic Themes

Basic themes have high centrality but relatively low density. This means that they are strongly connected to other themes and therefore play an important role in the overall conceptual structure, although their internal development is comparatively limited. Integrated Management Systems (IMS) is positioned in this quadrant. The finding indicates that IMS has strong connections with the broader ISO 14001 research domain, particularly through the integration of environmental management with other management systems such as ISO 9001 and OHSAS 18001. However, its relatively low density suggests that the topic has not developed as a highly specialized research stream within the ISO 14001–financial performance literature (Nadae & Carvalho, 2025; Noh, 2019).

Niche Themes

Niche themes are characterized by low centrality and high density. These themes are internally well developed but have relatively limited connections with the broader research structure. No prominent theme is identified in the niche quadrant in the present thematic map. This absence suggests that the literature does not currently contain a strongly specialized theme that is simultaneously well developed internally but relatively isolated from the main research structure.

Emerging/Declining Themes

Emerging or declining themes have both low centrality and low density, indicating that they are relatively weakly developed and poorly connected to the main research structure. In the present mapping, Green Innovation–ESG and Disclosure/Adoption Drivers are positioned in this quadrant. Their position suggests that these topics remain peripheral within the ISO 14001–financial performance literature. Nevertheless, their relatively underdeveloped position does not necessarily mean that they are declining. Rather, they may represent emerging research opportunities, particularly because green innovation, ESG, disclosure, and adoption drivers are increasingly influenced by regulatory developments, stakeholder expectations, and market pressures (Fajarini et al., 2020; Petrov & Šolt, 2021). The findings of Ali et al. (2020), for example, indicate that green consumer behavior can have implications for financial performance, suggesting potential for further integration between environmental-related behavioral factors and corporate outcomes.

Overall Interpretation

Overall, the thematic map provides a clear representation of the conceptual structure of the ISO 14001–financial performance research field. The presence of ISO 14001–Financial Performance and Environmental Performance/Eco-efficiency as motor themes indicates that these topics constitute the most developed and interconnected areas of the literature. Meanwhile, Integrated Management Systems functions as a basic theme because of its strong connection with other research topics despite relatively limited internal development. The absence of niche themes indicates that no highly specialized but isolated research stream is dominant in the current literature. Finally, Green Innovation–ESG and Disclosure/Adoption Drivers occupy the emerging/declining quadrant, highlighting potential areas for further investigation. Thus, the thematic map not only illustrates the current conceptual structure of ISO 14001 research but also helps identify research gaps and opportunities for future study development.

IV. EMPIRICAL FINDINGS AND FACTORS AFFECTING THE RELATIONSHIP BETWEEN ISO 14001 AND FINANCIAL PERFORMANCE

Findings from 21 empirical studies show that the relationship between ISO 14001 and financial performance is complex and influenced by various direct and indirect mechanisms as well as internal and external company contexts. In general, most studies find that ISO 14001 provides a positive and significant impact on financial performance, although there are variations based on industry, country, and implementation strategy.

Many studies report that ISO 14001 increases profitability through operational efficiency and reputation improvement. Studies such as (Martí-ballester & Simon, 2025), (Miroshnychenko et al., 2017), (Riaz et al., 2019), and (Fajarini et al., 2020) show that ISO 14001 certification contributes to increases in ROA, ROE, and company market value. However, these results are not always consistent. Some studies found no significant effect, especially when implementation is not mature or only done for administrative compliance, as noted by (Fonseca, 2018) and (Treacy et al., 2019). In some cases, ISO 14001 even causes short-term negative impacts due to high certification costs, as found by (Petrov & Šolt, 2021).

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Besides direct relationships, several studies highlight indirect relationship mechanisms through improved environmental performance. Studies such as (Rahardian et al., 2022), (Herghiligi et al., 2019), and (Voinea et al., 2020) show that waste reduction, energy efficiency, and improved eco-efficiency are important paths bridging the relationship between ISO 14001 and financial results. This opinion is reinforced by findings from (Nadae & Carvalho, 2025) and (Yulias & Poulus, 2024) who emphasize that operational improvements and cost efficiency contribute to increased profitability although not directly visible in the short term.

A number of studies also identify green innovation and ESG as strategic mediators that strengthen the impact of ISO 14001. Scarpellini et al. (2025) show that environmentally friendly innovation increases energy efficiency and company profit. Khan & Johl (2019) underscore how EMS increases company value through sustainability governance mechanisms, while Li et al. (2025) found that ESG factors strengthen the relationship path of ISO 14001 to financial performance.

In addition, research on Integrated Management Systems (IMS) shows that combining ISO 14001 with other management standards (for example ISO 9001 or OHSAS 18001) can improve process efficiency and consistency. Nadae & Carvalho (2025) and Fonseca (2018) found that management system integration provides additional economic value especially for large companies that have adequate technical and managerial capacity.

The effectiveness of ISO 14001 is also greatly influenced by external factors, especially regulatory pressure and international market demands. Herghiligi et al. (2019) noted that companies in Europe obtain more benefits due to strict environmental regulations, while Khan & Johl (2019) emphasized the role of global supply chain pressure in strengthening its impact. In the context of developing countries, such as Indonesia, improved financial performance often emerges through increased legitimacy and stakeholder trust (Fajarini et al., 2020; Jell-ojobor & Raha, 2022).

Conversely, several factors can weaken the impact of ISO 14001, including high implementation costs, resource limitations in small companies, internal resistance, and implementation that is only symbolic or not strategically integrated (Petrov & Šolt, 2021). This condition shows that the benefits of ISO 14001 are very dependent on the depth of internalization, organizational readiness, and managerial support.

Overall, the synthesis of empirical findings shows that the relationship between ISO 14001 and financial performance tends to be positive, both through direct relationships and through mediation of environmental performance and innovation. However, this relationship is not universal and is greatly influenced by a combination of internal factors, implementation strategy, institutional pressure, and industry and country context. These findings confirm that the effectiveness of ISO 14001 in improving financial performance is contextual, and stronger when the standard is strategically integrated into business processes and company sustainability capabilities.

CONCLUSIONS AND RESEARCH LIMITATIONS

This study shows that ISO 14001 generally has a positive impact on financial performance, especially through improved operational efficiency and environmental reputation. Studies such as Martí-ballester & Simon (2025), Miroshnychenko et al. (2017), Riaz et al. (2019), and Fajarini et al. (2020) found that this certification contributes to increases in ROA, ROE, and profitability. Nevertheless, some studies reported insignificant or even negative results, especially in small companies facing high certification costs and shallow implementation (Petrov & Šolt, 2021).

The influence of ISO 14001 also emerges through indirect paths, such as improved environmental performance, eco-efficiency, green innovation, and ESG (Li et al., 2025; Rahardian et al., 2022; Scarpellini et al., 2025). Integration with other standards such as ISO 9001 or OHSAS 18001 also strengthens financial results, especially for large companies that have better managerial capacity (Nadae & Carvalho, 2025; Noh, 2019).

Theoretically, these findings support NRBV which emphasizes environmental capabilities as sources of competitive advantage, as well as institutional theory that highlights the role of regulatory and market pressures. Practically, companies need to integrate ISO 14001 strategically for optimal financial benefits, while MSMEs must carefully manage implementation costs. Government regulations and incentives can strengthen the impact of this standard, and these research findings are also relevant for investors considering environmental performance in risk assessment.

This study has limitations, including the use of one database (Scopus), publication period 2015-2025, and the absence of meta-quantitative analysis. In addition, research results are contextual so generalization needs to be done carefully. Future research can expand databases, extend analysis periods, or apply meta-analysis approaches to strengthen findings.

Future research needs to expand coverage by using meta-analysis approaches to measure the effect size of ISO 14001 on financial performance more accurately. Subsequent studies can also explore new mediation or moderation variables, such as ESG, digitalization, or institutional pressure to understand conditions that make ISO 14001 impacts different across companies and

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countries. In addition, longitudinal research and studies in developing country contexts are still greatly needed to provide a more comprehensive picture of ISO 14001 effectiveness in the long term.

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