



Original Research Article

The Impact of Environmental Certification on Internationalisation: A Study in the Portuguese Market

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ABSTRACT

Portuguese industrial companies face increasing pressure to reform environmental strategies due to global climate concerns and market demands. Many adopt ISO 14001 certification to improve efficiency, manage environmental impacts, and signal a commitment to sustainability. However, scientific consensus on certification's operational and reputational impacts is limited. This research examines how certification affects corporate performance and international positioning by exploring two questions: (1) What motivates organisations to pursue environmental certification? (2) How can certification enhance competitive advantage and differentiation in global markets? While prior studies show mixed results, this research clarifies the motivations, processes, and outcomes of ISO 14001 adoption. Through a qualitative, exploratory study with eight companies and five certification support/sectorial organisations, findings support the optimistic view. Adopting ISO 14001 promotes pro-environmental behaviour, enhances pollution control, reduces waste, optimises resources, and improves international image and differentiation.

KEYWORDS

Environmental Certification, Internationalisation, ISO 14001, Environmental Responsibility, Differentiation

INTRODUCTION

Environmental preservation has emerged as a significant variable influencing individual behaviours, given the direct effects these habits have on the environment. This importance arises from the diverse impacts of globalisation – social, economic, technological, cultural, and environmental – necessitating a thorough examination of its effects [1]. This phenomenon intensifies business competition internationally, leading to more dynamic and competitive markets that demand more significant differentiation among enterprises [2].

An essential aspect of companies' internationalisation strategies is shaped by the growing dangers of climate change, which drive ecological harm and environmental degradation [3]

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and are often linked to behaviours focused on short-term profitability and competitiveness [1]. These effects have intensified governmental concerns regarding the overuse of natural resources, raw materials, and non-renewable energy sources [1], [4]. Additionally, disparities in environmental regulations between countries create opportunities for exploiting legal loopholes [5], further heightening public concern for environmental protection [1].

Considering the firms' significant contribution to economic stability and growth, their practices are under intense scrutiny [6], and rising pressure to develop eco-friendly technologies and products [7] related to the consumers' search for ecological products, practices, or processes being a key factor in their purchasing decisions [8].

In this context, corporate certification and compliance with environmental standards are essential for establishing the credibility of ecological practices and fostering trust in a company's image [9]. However, research on the positive impact of certification on business image and performance remains inconclusive [10]. This discrepancy arises from a persistent conflict between studies that identify the standard as a catalyst for lower environmental impact practices, enhanced regulatory compliance, and improved differentiation capabilities [9], [11], [12] and those that emphasise symbolic implementation for reputational purposes without significant performance improvements [13], [14], [15]. Given the lack of consensus, it is essential to understand why organisations adopt environmentally friendly practices and pursue certifications while analysing their impact on international operations regarding image, competitive advantage, and cost-benefit ratios [10]. Additionally, examining the relationship between financial and management objectives – whether driven by voluntary initiatives or regulatory mandates – will help uncover the motivations for adopting the standard.

Furthermore, the scarcity of in-depth and relevant studies within the Portuguese business context – a market predominantly composed of small and medium-sized enterprises [16] that are more sensitive to the impacts of implementing the standard [17], [18] – renders this topic especially significant for this specific market.

In this sense, this study seeks to address this gap in the literature by offering an in-depth understanding of the actual impact of environmental certification on companies' international activities and market expansion efforts. Specifically, it focuses on operational advantages, competitive benefits, and the enhancements in image and reputation companies may leverage within these markets. More broadly, the study aims to assess the extent to which ISO 14001 environmental certification influences companies in meeting both domestic and international market demands, as reflected in the following research questions:

- (1) What factors motivate organisations to pursue environmental certification?
- (2) How can certification enhance competitive advantage and differentiation in global markets?

A qualitative and comparative study was conducted to address these questions through in-depth interviews with eight companies and five certification-support organisations between January and April 2023. A comparative analysis was also performed between existing statistical data and the study's findings. Accordingly, the study is structured as follows: it begins with a review of the literature on the role of corporate responsibility in organisations, focusing on the pressures driving the adoption of new strategies. It then addresses the implementation of the ISO 14001 standard as a response to the demand for sustainable practices, examining motivations, challenges, necessary resources, operational impacts, and the specific influence of ISO 14001 on internationalisation. The subsequent section presents the research methodology, including variables, sampling, and data analysis procedures. It is followed by analysing and comparing the collected data with relevant statistical benchmarks. Finally, the study concludes with a discussion of the results in relation to existing literature and presents the conclusions drawn from the findings.

CORPORATE RESPONSIBILITY, ISO 14001 ADOPTION AND INTERNATIONALISATION

Corporate responsibility motivates the implementation of sustainability strategies. Hence, this section addresses these driving factors and then analyses the implementation of ISO 14001, covering motivations for adoption, barriers, criticisms, and organisational impact, examining its effect on internationalisation.

Corporate responsibility

Increasing globalisation enhances supply chain integration and interdependence, leading to adverse environmental impacts [19], [20]. Consequently, the lack of global-scale regulation directly contributes to increased media coverage, public awareness, and regulatory pressure, prompting increased accountability and adoption of sustainable practices [21], [22]. While the literature on the impacts is not unanimous, crucial drivers for changes in business practices include stakeholder requirements, the search for competitive advantages, a better market reputation, and the managers' ecological perspectives [23], [24], [25].

Stakeholders pressures

Effective stakeholder management maximises profit and drives long-term value creation, so companies extend this approach beyond financial objectives to social responsibility, emerging as a competitive advantage [26]. Therefore, this shift in environmental attitudes can adjust stakeholder views and establish new relationships influenced by stricter legal restrictions, sanctions, and supply chain costs [27], [28]. Firms must adapt to effectively integrate with their stakeholders to meet their diverse expectations [28].

Consumers. The authors of [29] note that the consumers' sustainable beliefs impact their purchases, but their limited knowledge often prevents them from acting positively. As environmental concerns continue to rise, consumers are increasingly perceiving climate change as a shared responsibility [30], [31], which has led to a growing support for ecological policies and sustainable purchasing behaviours [32], [33]. Another influential factor is the perceived cost-benefit and product attributes, which can help companies to effectively target this segment [33], [34]. However, Stern and Valero [7] argue that the higher prices of sustainable options can cause challenging behaviour changes for consumers with lower purchasing power. It is related to the "finite pool of worry" concept, which suggests that ecological concerns are often ignored when immediate problems arise, making it challenging to maintain sustainable behaviours [35]. This environmental awareness requires prioritising ecological business strategies [36], so investing in green assets can bring future benefits, achieve economies of scale, and reduce production/consumption costs, encouraging more investment [7]. Consequently, environmentally conscious firms are perceived to have higher brand value, quality, trust, and credibility, which can impact consumer satisfaction [37], [38].

Suppliers. Organisations adopting eco-friendly actions can motivate suppliers to adapt and maintain cooperation. Hence, international certifications may be an option to confirm their sustainable practices [39]. Incorporating sustainability into the value chain is essential to meet environmental standards, requiring consistent adherence among suppliers and buyers [40], [41]. Thus, establishing cooperative relationships and integrating eco-practices throughout the value chain is essential for effective collaboration with eco-conscious suppliers [40]. While the environmental orientation of suppliers is highly significant in markets sensitive to environmental concerns, companies still tend to prioritise cost as a critical factor alongside product quality when selecting suppliers. This observation remains true despite the growing importance of environmental orientation as a decision-making criterion [42].

Regulators. Through their norms, regulators indirectly influence organisational strategy, impacting transaction costs, market access, flexibility, competitiveness, and investments [43], [44]. However, adapting to regulatory demands may cause efficiency losses while driving innovation, improving product quality, reducing waste, and lowering disposal costs [45]. On an international level, the impact of environmental regulations on strategies is a topic of debate since some organisations adopt regulations to maintain legitimacy across markets and harmonise their internal strategies without compromising new market entry [43], [46]. Yet, Wright and Nyberg [47] note that firms often prioritise regulatory compliance to avoid reputational damage, sometimes at the expense of short-term profits over long-term gains from green investments. The uneven regulatory frameworks and adoption priorities across markets [48], [49], lead some firms to opt for the ones less regulated to minimise compliance resources [50]. In contrast, organisations in unfamiliar legal environments adapt to local legislation to avoid sanctions, reinforcing their environmental standards and legitimacy and avoiding conflicts of conduct and beliefs in the destination country [48]. Additionally, government actions such as funding new clean energy policies, processes, and research [51] incentivise pro-environmental actions by reducing investment costs, providing financial benefits, and improving the reputation of the beneficiaries chosen through the government's rigorous criteria [52].

Employees. Companies, particularly in accident-prone sectors, face pressures to adopt sustainable policies. The pressures often stem from job risks, exacerbated by inadequate hazard awareness and prevention training, leading to a higher likelihood of non-compliance reports, especially when management lacks environmental commitment [53], [54]. To effectively implement sustainable policies, firms need employees who are informed, motivated and aligned with the company's values [55].

ISO 14001 ENVIRONMENTAL CERTIFICATION:

Environmental management systems improve firms' processes and reduce environmental impact through specific actions such as performance indicators, training programs, and process optimisation [56]. However, the systems alone do not guarantee performance advancements or goal achievement [57] but act as a guide for improvements [58]. Companies often seek international environmental certifications, like ISO 14001, to improve market and environmental credibility [10], [59]. These standards foster a more sustainable and unified approach, as they help to improve processes by taking regular audits and inspections while simplifying international trade and eliminating commercial barriers [52], [60].

ISO 14001 integrates quality, internationalisation, and corporate social responsibility [46], providing a set of practices tailored to companies' needs and supporting their search for a sustainable balance between management decisions, financial stability, and environmental impact [61]. The adoption strengthens the firms' image, quality, and legitimacy, influencing stakeholders' perceptions of reduced risk [62]. It also shapes buying decisions by signalling responsibility, transparency, and credibility, establishing long-term performance standards and profitability expectations [9], with firms perceived as more responsible, transparent, and credible [59].

Yet, the effectiveness of international certifications is questioned [63] due to unclear results on how pollution reduction affects profitability [64], [65]. From an optimistic view, companies that adopt ISO 14001 may exhibit improved cost management and reductions, increased competitiveness, enhanced ability to meet regulatory requirements, higher employee motivation and stronger trusting relationships with their stakeholders [11]. Moreover, the standardised approach of the certification fosters more significant sustainable development, particularly in international markets, where it is an indirect source of value that enhances the company's eco-efficient image. Additionally, it aids in harmonising the organisation's environmental strategy across different markets, potentially attracting foreign investment [12].

However, a phenomenon mainly observed in small and medium-sized enterprises relates to symbolic implementation, where an enhancement of the company's environmental image among stakeholders occurs in response to external pressures [13]. It often results from performative measures that have a limited real impact on operational processes [15]. The restricted effectiveness of the standard is frequently attributed to ISO 14001, which indicates that the company has a well-documented environmental management system without auditing its concrete ecological impact and focusing instead on the effectiveness of the implemented processes [66].

Motivations

Companies are prompted to implement ISO 14001 due to internal motivations such as pro-environmental management views, operational efficiency, and improved environmental commitment [64], serving as a tool to boost company reputation and credibility [67], particularly in the global market [60]. Externally, drivers include consumer expectations, international trade requirements, and compliance with environmental and sectorial norms [48], [64]. In pursuing compliance with environmental and sectorial standards, the role of government is essential, acting as both a driver and enforcer of pro-environmental attitudes. This situation leads to the growing demand from the population for a proactive stance from their governments, which in turn influences organisational practices through funding for ecological initiatives, for example [68].

Barriers to implementation

ISO 14001 adoption faces significant barriers, particularly in SMEs. These barriers are often more pronounced due to the complex regulations, limited knowledge, and implementation challenges, usually leading to a reactive stance and underestimating the potential impact [17], [18]. Additionally, SMEs frequently struggle to meet regulatory requirements and understand the benefits of these systems [69], which is even more difficult in the absence of formal structures, even when a strategic plan is in place [70], [71].

Crucial assets

The effective adoption of ISO 14001 relies on employee involvement, company resources, strategic coordination, and the management's vision [72]. Key factors include selecting environmentally oriented employees, providing training, recognising efforts towards environmental goals, and promoting teamwork [73]. Moreover, existing leadership strategies, applied methodologies, and company goals are vital for success [73]. These factors influence the prioritisation of environmental strategy as a long-term investment and determine the whole company's effort and involvement in the implementation process [72].

Organisational culture plays a crucial role in shaping environmental management projects, as it sets priorities, rewards, and learning initiatives related to the implementation, being a major factor in promoting widespread adoption [73].

Impact

Debates on the impact of ISO 14001 on corporate performance suggest that certified environmental management enhances sustainable strategies and organisational performance by sharing valuable information, identifying problematic areas, and involving several departments in recognising and changing practices. Furthermore, continuous process evaluation and independent audits motivate improvements, leading to long-term benefits such as waste elimination, pollution prevention, and more efficient processes [65].

Operationally, the standard's continual focus on pollution prevention can translate into investments in modernising physical equipment. This development and ongoing process evaluations enhance cost optimisation and improve waste management while mitigating adverse environmental impacts. Furthermore, employee training and raising awareness regarding the environmental impacts of processes contribute significantly to effective environmental management. This training not only supports waste control in the production process but also helps identify potential inefficiencies in resource consumption and production methods, extending to the development of the final product [74].

In terms of financial impact, several studies, such as [75], suggest that the implementation of the standard incurs significant short-term financial burdens due to documentation costs, audit expenses, and the costs associated with the implementation process, including staff training, process enhancement, and the acquisition of new equipment. However, Jong *et al.* [76] argue that these benefits are realised primarily in the long term (five years or more after adoption), concluding that the environmental capabilities developed through the new processes take longer to reach an optimal level of optimisation that yields a positive return.

These developments create competitive advantages by deploying distinctive skills in production, distribution, and marketing since more widespread adoption of ISO 14001 promotes a more balanced exchange [13], [77] addressing information gaps on environmental issues between partners [14], improving response to external pressures and legitimacy, enabling premium prices, and increasing sales through social approval and product differentiation [78].

In contrast, other views acknowledge the market credibility of ISO 14001 but offer a more moderate perspective on its impact on performance improvements [79], [80]. These studies and [81] find that while ISO 14001 does enhance performance, specifically in reducing emissions compared to non-certified entities, only a portion of this improvement can be attributed to the standard. It is mainly due to constant audits that compel firms to improve processes [80]. The implementation is especially crucial in industries with significant environmental impacts, as ISO 14001 provides more apparent performance improvements and enhances the reliability of practices through its international recognition [79], [80]. Likewise, it is argued that self-developed environmental systems may be more efficient than ISO 14001, as the standard's uniform approach can lead to homogenised practices and communication disconnected from implementation [79].

Critics also point out that the standard can be used symbolically without tangible improvements [14]. Certification alone does not guarantee clear financial and production improvements; effective and continuous adoption to address inefficiencies is key [82]. To ensure the successful adoption of ISO 14001, Boiral [77] emphasises five crucial factors: management's commitment and support, clearly defined certification goals, employee engagement and knowledge sharing, customisation of the standard, and integration into its core objectives.

Criticisms to implementation

ISO 14001 seeks to improve environmental performance, but its effectiveness and cost-benefit ratio remain inconclusive due to insufficient large-scale studies [83]. Critics note that the exclusive focus on process improvement, enabling firms to set their targets, can cause inefficiencies even in certified companies [76], [84]. Moreover, the standard is often used for reputational gains without actual improvements, further questioning its cost-benefit ratio. The lack of precise environmental performance targets and high costs make the process more accessible to larger companies with more resources, which are more pressured to meet ecological standards [76], [85], [86].

This decision involves considering both direct and indirect costs, complicating the evaluation of implementation conditions compared to the firms' capacity. While increased productivity and reduced costs are positive, they do not guarantee overall implementation success [87]. Major costs stem from maintaining developments, identifying the firm's environmental impacts and risks, and purchasing equipment and materials [88] in the later stages of adoption.

Several authors criticise ISO 14001 for its excessive paperwork, registration costs, and difficulties for smaller companies to obtain accreditation. These criticisms point to the diversion of company resources and efforts towards process improvement, shifting the focus away from the operational aspects of the standard [76], [77], [89].

Furthermore, a prominent criticism of the implementation is linked to the challenge of precisely measuring the impact of the standard on specific variables, given its comprehensive scope across the entire environmental management system [90]. Managers perceive many adoptions as ways to meet customer and stakeholder demands rather than add real value to the companies' performance [77].

The implementation of environmental certification and internationalisation

International certifications are crucial for signalling the reliability and quality of environmental management systems and promoting exports, especially in European markets where these standards are valued [91], [92]. In low-tech sectors, ISO 14001 is a competitive differentiator, whereas, in specialised industries, its value decreases, still reinforcing the firm's regulatory credibility [91]. This eco-efficiency, evident in domestic and especially international markets, highlights the company's genuine commitment to green practices. This commitment builds a strong reputation that is hard to replicate. The company's success stems from its focus on optimising and innovating management and production processes to minimise waste and improve cost efficiency, all in line with established standards [93].

Besides enhancing corporate image, especially in more environmentally conscious markets, ISO 14001 can enable companies to charge higher prices, access government incentives, and encourage consumer preference [92], [94]. Furthermore, the standard reduces information asymmetries, improves the firms' credibility with partners in distant markets, and facilitates internationalisation [81], offering competitive advantages, returns, and differentiation when adopted early [95]. Moreover, in a global market where supply chains are fully interconnected, companies certified to ISO 14001 can exclude certain suppliers from their partnerships, reinforcing the marginalisation of non-certified companies in more environmentally sensitive markets (specifically in developed countries) [96].

Furthermore, this interdependence within global supply chains can also be linked to the relationship between countries with high rates of ISO 14001 adoption and their primary export destinations. Countries with higher adoption rates tend to have significant export markets that demonstrate high levels of environmental standard adoption, reflecting a stronger environmental awareness. This dynamic, in turn, shapes business strategies for penetrating more environmentally sensitive markets [97]. However, given the potential limitations mentioned for adoption and the actual benefit of the standard, analysing the impact of ISO 14001 on corporate and internationalisation strategies is crucial for reaching a more apparent consensus on its true impact.

METHODS

This study explores the adoption of the ISO 14001 standard, focusing on motivations, operational impacts, and environmental performance. It aims to clarify contradictory findings in existing research and examine how companies' environmental certification strategies align with their internationalisation efforts, particularly by exploring the positive impact of this standard on their expansion process.

Given the lack of consensus on the topic, an exploratory orientation was adopted, aiming at a deeper understanding of the subject under study [98]. The effort included collecting qualitative data, mainly from semi-structured interviews conducted with professionals from various sectors of activity in the quality, environment, and human resources departments. Secondary data were also collected for the interviewed companies at a later stage.

In terms of sampling, a non-probabilistic method by judgment was employed [99], ensuring the representation of Portuguese companies with an international presence and ISO 14001 certification. To this end, three specific elements were defined as mandatory for the companies surveyed. The first element is determined by the geographical focus of this study's targets, making the companies' origins essential. The second element examines the impact of certification on internationalisation, viewed as a crucial strategy for maintaining competitiveness and driving growth [100]. Unique competencies allow organisations to differentiate themselves in external markets [101]. The third element – adoption of ISO 14001 certification – is the study's focal point. This valuable certification enhances companies' legitimacy in foreign markets [91].

Thirty-six companies were contacted through e-mail, telephone, and LinkedIn, resulting in eight interviews (six in videoconference and two in written format). Additionally, responses were obtained from five out of eight business support organisations contacted, including one certifying entity and four sector-specific organisations.

Data collection method

Given the study's exploratory nature, the interviews were conducted to gather in-depth insights into the community under study, capturing the participants' perspectives, values, and attitudes [102], [103]. While the limitations of this method are acknowledged, particularly regarding the extrapolation and generalisation of conclusions, it remains a suitable approach for data collection in areas where concrete information and scientific knowledge are limited [104].

A semi-structured approach was adopted, which combines predetermined topics with the flexibility to explore additional relevant information [102], [104], [105]. This method enables participants to share significant insights based on their experiences and the context in which they operate while still focusing on the primary objective of data collection.

Two interview guides based on the literature review were created: one for companies and another for support bodies. The guide for companies focused on motivations for sustainability, associated pressures, measures, and impacts; it further progressed to the motivations behind ISO 14001 adoption and its effects on internationalisation. The interview guide for support entities explored certification request trends and the motivations and impacts of sustainable attitudes and environmental certification on companies. A pre-test in a company allowed us to assess the quality of the script's effectiveness in achieving the desired results. As these initial responses lacked sufficient depth, the questions were revised, particularly those addressing motivations for adopting sustainable practices and the impacts of ISO 14001. This revision aimed to maximise the information gathered from respondents. The interviews were primarily conducted via videoconference between January and April 2023 and averaged one hour each to facilitate in-depth discussion.

The analysis of the presence of the participant companies in international markets was based on interviews, secondary data (including firms' websites), and AICEP's "Buy from Portugal" [106] repository, which registers international activities. Due to the limitations associated with the interviewees' positions, it was necessary to supplement these insights with secondary data to comprehensively understand the companies' international presence, commercial partnerships, and internationalisation patterns with more specific information.

Data analysis

The interviews were transcribed and analysed using thematic analysis to identify key themes within the qualitative data collected, which, given their complexity and extent, require a deeper understanding since the data collected is unstructured. Next, these data were organised by coding and linked to the study's themes and sub-themes using the six-step approach [107]. Initially, the information was transcribed to familiarise researchers with the scope of the collected data, followed by coding and thematic analysis of relevant topics. In the third phase, themes and subthemes were identified to determine which required further exploration. The initially defined themes were then refined, highlighting the most significant ones while reclassifying or eliminating the others. Each theme was examined individually, considering its interrelationships and connections to the broader research context, culminating in a detailed report of the analyses conducted for enhanced clarity.

The methods, data analysed, and analytical process were thoroughly documented to assess the robustness and reliability of the results, following the approach of [102]. This documentation was reviewed by independent researchers to determine whether the conclusions were consistently confirmed or if differing interpretations arose, potentially necessitating further analysis. Ultimately, the verification process revealed consistent conclusions, thereby enhancing the robustness and reliability of the results.

RESULTS

The results are organised into corporate responsibility, ISO 14001 adoption, and internationalisation with environmental certification. Each category addresses the motivations,

implementation processes, and impacts, analysing common perspectives among companies and support entities. Where applicable, individual analyses for each organisational type are included to facilitate comparing the results.

Characterisation of the participants

The eight participating firms vary in size and sector. The support organisations, working closely with companies on ISO 14001, are generally government-supported and focus on training and implementing strategies for innovation, certification, and internationalisation. **Table 1** and **Table 2** provide details on the companies and organisations interviewed.

Table 1. Participant companies and their interviewed employees

No.	Sector	Location	Type	Certifications ISO	Core-Business	Job-Title
C1	Ceramics	Aveiro	SME	9001, 14001	B2B & B2C	Quality, Environment, and HSW Manager
C2	Furniture	Porto	Large Firm	9001, 14001	B2B	People and Culture Manager
C3	Ceramics	Aveiro	Large Firm	9001, 14001	B2B & B2C	Environmental Manager and Senior HSW Technician
C4	Textile	Guimarães	Large Firm	9001, 14001, 45001	B2B & B2C	Environment, Quality, and Safety Technician
C5	Cutlery	Guimarães	SME	9001, 14001	B2B & B2C	Environmental Manager
C6	Natural Stone Quarrying	Alcobaça	SME	9001, 14001	B2B & B2C	Managing Partner
C7	Paints and Varnishes	Porto	Large Firm	9001, 14001, 45001	B2B & B2C	Quality, Environment, Health, and Safety Director
C8	Pharmaceutical	Porto	Large Firm	14001	B2B & B2C	Quality Specialist

Table 2. Support entities and their interviewed employees

Name	Area of Expertise	Location	Job-Title
APCER	Certification, Audit, and Training	Porto	Market Research Manager and Senior HSW Technician and Business Developer
IAPMEI	Innovation and Internationalisation	Porto	Regional Proximity and Licensing Division
AIMMAP	Mechanical and/or Industrial Engineering	Porto	Managing Partner
CATIM	Mechanical and/or Industrial Engineering	Porto	Sustainability, Environment, and Safety Director
CTCP	Footwear	São João da Madeira	Business Organisation and Management Department Leader

Corporate Responsibility

In Corporate Responsibility, the analysis examines companies' actions, including internal motivations, market demands, stakeholder pressures, and their environmental impacts.

Motivations. Respondents identified two types of motivations: internal efficiency and consumption reduction and pressures from customers and stakeholders. The most prominent

drivers include end consumer demands, legal compliance, and social responsibility. However, from the perspective of C1 (ceramics sector), the national market demands mainly depend on where the company operates, with national customers not placing significant value on the product. On the contrary, international customers are more influential in driving these demands. All respondents identified customers as the main drivers of new sustainable actions and strategies due to their environmental concerns, influencing their purchasing intentions. These concerns are highlighted by the companies' awareness of sustainability (C1, C3, C4), social responsibility, regulatory compliance, and health and safety standards (C1), often reflected in the preference for non-toxic products, attention to carbon emissions, and environmentally conscious packaging (C4). Since all participant companies primarily operate in the B2B market, they face additional client demands [108], [109]. These clients, in turn, face intense pressure from their end consumers to ensure ecological compliance across the entire value chain, aligning with commitments made to their respective markets (C5, C7, CTCP, APCER).

The need for compliance throughout the value chain means the demand for greater sustainability is transferred to all upstream agents [108]. For this reason, both support entities and companies stress the importance of supplier selection to convey environmental efforts and meet stakeholders' expectations (C2, C3, C4, CTCP). While ecological orientation is not discriminatory in supplier selection, it has increasingly become a preferential factor (C1, C4). Other variables, such as proximity, flexibility, and speed of response, often overlap with the environmental considerations (C1). Regarding legislation and pressure from government institutions, respondents had conflicting responses. However, some companies do not see regulations as great promoters of sustainable strategies, preferring to highlight their proactive approach and long-term vision (C1, C2). On the other hand, a more dominant perspective acknowledges that regulations are drivers for necessary changes to sustain market activity (C3, C5, C8, CTCP, CATIM, APCER).

Implementation of sustainable measures. ISO 14001 certification defines generic requirements and guidelines for diverse sectors, encouraging organisations to adapt their processes to meet the required legal and environmental performance standards [46], [61], [66]. In this context, the actions adopted across different industries focus mainly on water treatment and reuse in washing processes (C1) and other production processes (C3), as well as wastewater plants and effluent treatment plants (C4, C5). Moreover, actions also include monitoring energy consumption (C1, C7), installing photovoltaic panels (C2, C4, C5, C6, C8), selecting sustainable partners (C2 and C4), and implementing waste management systems to reuse and reduce waste (C3, C4, C6, C7). Additionally, product-level measures involve flexible packaging (C1), returning empties for reuse (C8), and eliminating toxic components in the product (C7). Moreover, it was also mentioned the selection of sustainable partners (C2 and C4) and the implementation of waste management systems to reuse and reduce waste (C3, C4, C6, C7), along with product-level measures like flexible packaging (C1), returning empties for reuse (C8), and eliminating toxic components in the product (C7).

Environmental certification – motivations, implementation and impacts

Concerning the implementation of environmental certification, this study examines the adoption of the ISO 14001 standard among the respondent companies over time, comparing it with the adoption prospects in the Portuguese market, as reported by the support entities.

Temporal adoption and evolution of certification requests. Most companies have well-established environmental management systems, with adoptions between ten to twenty-two years, except for C5 and C6, which only implemented ISO 14001 in 2020 (Table 3).

Table 3. Adoption years of ISO 14001 certification

Companies' years of adoption					
C1 → 2001	C2 → 2010	C3 → 2008	C4 → 2003	C5 → 2020	C6 → 2020
C7 → Information not provided, but does have the 2015 update					C8 → 2001

Support entities report a stable growth in certification requests (CATIM, CTCP), particularly among small and medium-sized enterprises (APCER, CATIM, CTCP) and industrial companies (CTCP). Data collected from APCER and IPAC up to December 31, 2023 [110], see Table 4, indicate a slight increase in certified companies, reinforcing the certification agencies' perspectives of a steady upward trend.

Table 4. Evolution of ISO 9001 and 14001 certifications adoption in Portugal (IPAC, 2023)

Certification	Management system	2019	2020	2021	2022	2023
ISO 9001	Quality	5827	6147	6262	6253	6348
ISO 14001	Environment	1202	1235	1309	1355	1499

Other supporting institutions also point to this increase, which (although requiring further analysis) may be sector-specific. Industries like “metalworking, chemicals, textiles, furniture, and glass processing are some of the main targets in terms of external pressures to take sustainable actions”, as mentioned by IAPMEI. Additionally, most certification applicants are SMEs, reflecting the nature of the Portuguese business environment [16]. Notably, two of the surveyed companies belong to the sectors in Portugal with the highest number of certified firms, highlighting the importance of certification in these industries (Table 5 and Table 6).

Table 5. The five sectors with the most companies certified by ISO 14001 (IPAC, 2023)

Sector	Construction	Trade, repair of motor vehicles, motorcycles, personal & household goods	Food, beverage, & tobacco industries	Metallurgical industry & metal products ^a	Extractive industries ^b
Certified firms	214	182	163	148	118

^a including cutlery companies; ^b including a stone quarrying company

Table 6. Companies certified to ISO 14001 within the sectors of the surveyed firms (IPAC, 2023)

Sector	Other non-metallic mineral products	Pharmaceuticals	Chemical products & synthetic or artificial fibres	Textile industry	Furniture, other processing industries
Certified firms	31	11	42	44	39

Motivations. Considering the main motivations for adopting a sustainable stance, it is crucial to focus on the reasons for choosing ISO 14001 since its impact on organisational management processes [46] leads companies and support entities to emphasise process reorganisation (C3, C5) to reduce consumption and minimise waste, particularly in daily management and non-conformity identification (C4, C2). Other motivations include improving eco-efficiency, meeting market requirements (CTCP) and legal and normative regulations (C2, C4, C7), and gaining international

recognition to enhance credibility abroad (C3, C7, C8). While competition was generally not a motivation, most of the companies that did answer cited a genuine concern for sustainability and a desire to be pioneers in certification (C1, C4, C8). Only C3 mentioned the need for product differentiation, especially in the B2B market, particularly in a less differentiated sector like ceramics [91].

Adoption. Factors such as company size, years of standard implementation, and the current market context were considered when analysing the role of government and EU support (both financial and advisory) in the ISO 14001 adoption process. Generally, in large companies with mature systems, government support has a limited impact on improvements (C1, C2, C4). However, these companies still seek incentives to accelerate future projects, even if such support is not essential (C2, C3, CATIM). Most respondents (except for C2 and C8) indicate that managers act as unifiers and advisors, promoting communication and implementing changes, thereby adding value to the system and influencing the employees' attitudes (C1, C4, C5, C7, APCER, CTCP). Moreover, top managers provide the necessary resources to achieve goals, adapting to the company's context (C3, C4, C5). They even note that the updated standard emphasises management responsibility as a core aspect of ISO (C4, CATIM/AIMMAP). C2 and C8 highlight teamwork, correct communication, and clear responsibilities as key for effective implementation. Additionally, staff communication, training and skills, and the company's culture and methodologies were of great importance in the process (CTCP, APCER, C3, C4, C8).

Implementation obstacles. Respondents mentioned the lack of background information, the bureaucratisation of the process (C1, C5), an absence of similar supporting structures in various markets (C7), the absence of environmental culture, and the inability to monitor processes and ensure legal compliance (C3, C5, AIMMAP/CATIM, APCER, CTCP) as significant obstacles in adoption. Financial barriers also hinder adoption, mainly manifested in the costs of external audits to renew the standard, the necessity and frequency of these audits, and their duration (C1, C4, C8, CTCP). Nevertheless, C4 views audits positively, as they "contribute to improving and implementing new measures and achieving a more mature management system". Other widely mentioned costs include investments in new equipment (C2, C8, APCER). C7, APCER, and CATIM/AIMMAP mention the company's environmental maturity and impact as key factors in determining investment needs, with greater maturity reducing the required expenses. Nonetheless, these financial impacts are considered medium and long-term return investments, offsetting initial costs through benefits like energy savings or efficiency gains over time (C2, C3, C8, APCER).

Impact. Participants generally found it challenging to specify areas that registered improvements due to the broad impact of ISO 14001 in process enhancement and the vast disparity between the pre- and post-certification realities (C1, C7, C8). Among companies that identified specific impacts, they noted better legal compliance (CTCP), reduced waste through improved management (C4), enhanced performance monitoring (C5), and more ability to prevent non-conformities (APCER). Support entities reported, analysing the difficulties in maintaining certification and potential variables affecting renewal, that it was relatively easy due to ongoing process improvements, promotion of environmental awareness, and the standard's flexibility in setting goals based on each firm's genesis.

Environmental certification and internationalisation

Despite their global presence, the firms commonly indicate the European market (particularly the European Union), followed by the American and Asian markets as the main destinations. All the firms underlined international markets as a significant portion of their strategies, representing between 75% and 98% of their business. When questioned about the impact that environmental

certification could add to the internationalisation process, the respondents unanimously noted benefits such as differentiation, improved reputation, guaranteed product quality, safety, and recognition of good practices (C1, C4, C5, C8, APCER, IAPMEI, CTCP) – **Table 7**.

Table 7. Statements on differentiation and international recognition with the standard

Company/Entity	Statement
C5	“The main advantage is the impression given (...) we were the first and only company in the sector to be certified, and this alone has brought added recognition in terms of publicising the brand and marketing. Those who choose us know that we are concerned about the environment.”
C8	"...we demonstrate our environmental management as a banner. It improves our image among the public."
IAPMEI	‘(...) it is a dynamic competitiveness indicator that (...) is crucial from the perspective of differentiation and competitiveness in foreign markets (...) reinforcing its reliability and good image.’

In the context of global competition and the demand for environmentally conscious practices, environmental certification is a distinguishing factor for adopters, especially for firms from emerging economies. It is particularly valued in environmentally sensitive markets, as it enhances the differentiation and reputation of certified companies. Many of these companies supply major brands with stringent environmental requirements, thereby solidifying their role within a sustainable value chain [91], [92], [95].

In addition to fostering differentiation, ISO 14001, like other certification management systems, enhances the quality and safety of a company's products and processes through regular audits. These audits provide a continuous mechanism for ensuring compliance and improvement [78]. Additionally, the improvement of processes also aligns with customer expectations regarding product quality, boosting confidence in new business ventures and in established commercial relationships and strengthening their international credibility (C1, C2, C4, C5, C6, CTCP) – **Table 8**:

Table 8. Statements on international credibility and quality assurance

Company/Entity	Statement
C1	“It gives (...) the guarantee of success. (...) for a company that doesn't have any environmental certification or information, C1 is selected.”
C2	“(…) improving processes so that we can (...) meet customer expectations. (...)’
C5	"(...) greater perception of quality by customers. Being a European company and having certification, there's another stamp of quality, another credibility, another differentiation."
CTCP	"(...) certification has added value for companies because (...) it's a way of highlighting these practices. It ends up giving trust, credibility, and quality. Initial confidence, even, because (...) having ISO 14001 means that the company already has a structure in place, has environmental concerns..."

The respondents noted that government support enables access to external support for internationalisation and the development of environmental strategies. The demonstration of good practices in international markets improves the company's credibility, making it a stronger competitor for the limited incentives granted and serving as a tiebreaker among similar firms (C3, IAPMEI), believing the adoption of the standard has strengthened their competitive role (C1, C2, C3, C5, C6) – **Table 9**.

Table 9. Statements on ISO 14001 impact on external markets

Company / Entity	Statement
APCER	‘Yes, but the most interesting point is to realise that they end up gaining more than just improving their image.’
CATIM/AIMMAP	‘Yes. It's part of the market environment. (...) If I'm competing with another company, I may even have a better price, but it's becoming a differentiating parameter (even with the new European environmental policies) in these circumstances. And some companies are demanding this from the beginning (...)’
C5	"(...) greater perception of quality by customers. Being a European company and having certification, there's another stamp of quality, another credibility, another differentiation." No. (...) Most of the situations are: “I have a client who has audited me and told me about this” and (...) this is a motivation that happens systematically (...) It can also occur with certifications other than ISO 14001 because there are more and more specific certifications, and (...) then there may be some incentive to look at a competitor who has a certain certification and create a need. (...) Companies, as a matter of cost-benefit ratio, are careful (...) they try to focus on what it can bring to the business before going ahead.”
CTCP	

The support entities (except for CTCP) support this vision, stating that positioning with standards improves reputation and is crucial for market sustainability. According to CTCP, while the competitors may imitate practices in specific certifications, ISO 14001 adoption is primarily driven by customer requirements due to its broad recognition and flexibility that often surpass competitive parity, reflected in careful resource and investment decisions.

DISCUSSION OF RESULTS

This research aimed to understand the impact of ISO 14001 on the internationalisation processes of Portuguese companies. Operating within a smaller domestic market and generally more dependent on external markets, these companies face external pressures to meet stringent compliance requirements. The study also aimed to understand this impact comprehensively by examining the motivations behind companies' adoption of this standard and its effects on operational performance, corporate image, and, ultimately, their internationalisation processes.

In this context, following the collection of qualitative data and a comparative analysis of both perspectives obtained, the implementation of ISO 14001 was shown to play a significant role in supporting various aspects of each organisation's internationalisation efforts. At the operational level, the participating companies focus their sustainability efforts on reusing water and waste, enhancing packaging and products, monitoring energy consumption, utilising alternative energy sources, and selecting suppliers. Consumers' pro-environmental awareness, reflected in their buying behaviour and demand for sustainable products, compels businesses to adapt their strategies [33], [34]. This situation is evident when interviewees' actions cite consumer demand as a key driver for adopting sustainable practices. Moreover, respondents aim to opt for environmentally oriented suppliers, as discussed by [39], although economic factors often take precedence. The regulators also play a crucial role in ensuring compliance with the current regulatory framework, as stated by [44], [46].

For ISO 14001, internal motivations primarily include pursuing greater operational efficiency through an environmental management system aligned with the company's environmental goals, consistent with the internal efficiency improvement mentioned by [64]. Externally, and still following, the main drivers are consumer pressure (both business and end consumers), the desire for a better image and international recognition, and lastly, the increasingly restrictive regulatory requirements also stated by [48], with ISO 14001 acting as a preventative measure for legislative changes, due to its need for continuous procedure verification. Competition imitation was not a significant driver for adoption, as the sample comprises companies that are pioneers in their area.

Results also show that government support is not essential for investing in ISO 14001 but serves as a supplementary aid [51], influencing policy approval [26], [27], equipment acquisition and new processes. Proactive management and a strong organisational culture are key to success, as they drive motivation and resource management, supporting [71] and [72]. Nevertheless, adopting the standard faces implementation constraints, such as limited information, inadequate material and human resources, lack of environmental culture, and constant legal compliance, reflecting issues noted by [77] and [88]. Added to this are the implementation costs, especially with audits and the purchase of equipment. Regarding reputational gains mentioned by [76], it did not prove to be a significant focus of the study.

After implementing ISO 14001, as well as more significant savings mentioned by [13], [14], [65] and [78], resource efficiency in production processes has been recognised, together with the anticipation of non-conformities and better legal compliance. Internationally, environmental certification has primarily enhanced image and reputation, establishing companies as responsible players in the value chain, combined with improved quality and safety assurance with partners and in new businesses, following the conclusions of [91], [92], and [95].

The findings indicate that operational and international benefits – such as access to new markets, compliance with client and regulatory demands, and operational optimisation – are evident in the Portuguese market despite its smaller size and greater external dependence. Respondents saw these benefits as essential for building trust with partners. Certification support entities confirmed these factors but emphasised client demands over operational efficiency or proactive adoption as the main drivers of implementation.

CONCLUSION

The results support the growing importance of environmental responsibility in the management strategies of national companies, which are mainly driven by market demands and internal motivations. Companies invest in responsible practices to improve their reputation and differentiate themselves from competitors, while the stakeholders' pressure further induces this need for responsibility. This development also drives pressures for sustainable behaviour across the value chain, from organisations to producers and suppliers.

The mentioned factors influence the creation of stricter regulations, forcing organisations to comply with current standards to stay in the market. So, internally, companies focus on waste reduction and efficiency, improving working conditions and social responsibility through reusing and treating water, monitoring energy consumption, and investing in renewable sources. Moreover, recycling, reusing waste, and improving packaging and products reinforce sustainability.

The study has found that ISO 14001 certification effectively addresses analysed requirements, encouraging firms to reorganise their processes for optimisation of resources, waste reduction, and cut costs in the medium to long term by helping companies to identify organisational inefficiencies, maintain regulatory compliance, and improve their international reputation and image.

In most cases, this implementation process has not been backed by government aid due to the scarcity of funds and rigorous selection. For this reason, adoption is often marked by difficulties such as a lack of information and capacity to monitor the tasks and human resources available for the environmental area, aggravated by the high costs of certification audits and investments in new equipment/processes. However, despite these obstacles, the results suggest the impact on the company's performance is clear, mainly reflected in better compliance with the law and improved resource management of the waste and processes, leading to more innovation and prevention of areas for improvement.

Finally, in internationalisation, the EU is the primary market of interest for participants. In these markets, ISO 14001 reinforces the quality, image, and reputation, resulting in an enhanced ability to meet the requirements of international clients, strengthening the organisations'

competitiveness. This credibility strengthens current commercial relations, supports international expansion efforts, and fosters confidence in creating new partnerships, showcasing the company's global viability.

Thus, this study provides greater clarity and consensus on the positive impact of standard implementation, extending beyond the commonly highlighted operational and financial benefits to emphasise effects on international presence. While acknowledging the symbolic value noted in prior research, it presents a perspective highlighting companies' proactive approach.

LIMITATIONS OF THE RESEARCH AND CONSIDERATIONS FOR FUTURE WORK

The limitations of this research arise primarily from its exploratory nature, which, while providing valuable insights, means that the results cannot be generalised to all companies or industries. The small sample size limits the broader applicability of the findings. As such, the conclusions drawn should be viewed as indicative rather than definitive, suggesting areas for further investigation rather than offering conclusive, universally applicable results.

This limitation also applies to the results regarding certification support entities. Future studies could benefit from including additional certifying bodies to corroborate insights from the single Portuguese certifying entities surveyed. Expanding the research to include support organisations from other sectors would further enrich the findings and help determine whether similar results are observed across different industries.

Conducting quantitative studies assessing waste reduction or specific improvements in production processes would also be valuable, particularly given respondents' difficulties in identifying concrete areas of enhancement. Moreover, it would be relevant to explore whether the impact of ISO 14001 adoption varies depending on different modes of internationalisation beyond exporting (the predominant method among the surveyed companies) and how these alternative approaches influence the standard's impact in international markets.

NOMENCLATURE

Abbreviations

AICEP	Portuguese Investment and Foreign Trade Agency
AIMMAP	Portuguese Association of Metallurgical, Metal-Mechanical and Related Industries
APCER	Portuguese Association of Certification and Accreditation
CATIM	Technological Support Centre for the Metalworking Industry
CTCP	Portuguese Footwear Technological Centre
HSW	Health and Safety at Work
IAPMEI	Portuguese Agency for Competitiveness and Innovation
SME	Small and Medium Enterprise

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