IBIMA Publishing
IBIMA Business Review
https://ibimapublishing.com/articles/IBIMABR/2025/747480/
Vol. 2025 (2025), Article ID 747480, 11 pages, ISSEN: 1947-3788
https://doi.org/10.5171/2025.747480

Research Article

Integrating Sustainability and Certification Requirements in Management Control Systems: Insights from the Construction Sector in Portugal

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Received date:23 October 2024; Accepted date:16 January 2025; Published date: 18 March 2025

Abstract

The objective of this study was to investigate the integration of sustainability and certification within management control systems (MCS) in construction companies. This exploration addressed the need to align corporate practices with sustainability goals and certifications. A thorough literature review covered key concepts of certification, sustainability, and MCS. The research adopted a qualitative approach, centering on a case study of a Portuguese construction company. The methodology involved analyzing qualitative data from two primary sources: the company's website and an interview with its sustainability manager. Findings highlighted several innovative practices aimed at sustainability, including the implementation of key certifications, development of eco-friendly products, utilization of green and recycled materials, and the adoption of advanced techniques like eco-concrete and rainwater harvesting. Additionally, the company emphasized monitoring water and energy consumption as part of its sustainable strategy. This study not only demonstrated how these practices are implemented but also explained their purpose in achieving broader sustainability goals. The research findings provide valuable insights for other construction companies seeking to incorporate sustainability into their MCS. By outlining practical methods and certifications, this study offers a roadmap for businesses to enhance their environmental and operational performance. Ultimately, the research underscores the importance of integrating sustainability and certification into MCS as a strategic imperative for the construction sector, paving the way for more eco-conscious and efficient business practices.

Keywords: management control systems, sustainability certifications, sustainability manager, key performance indicators, KPI.

Cite this Article as: João GOMES, Joaquim LEITE and Cecília CARMO (2025)," Integrating Sustainability and Certification Requirements in Management Control Systems: Insights from the Construction Sector in Portugal", IBIMA Business Review, Vol. 2025 (2025), Article ID 747480, https://doi.org/10.5171/2025.747480

Introduction

Over the past decades, the awareness of people and companies regarding environmental and social issues, as well as the need to adopt sustainable practices, has increased. Governments around the world have also implemented policies and regulations to promote sustainability through various measures, such as enacting stricter environmental laws, offering tax incentives for sustainable companies, and setting goals for reducing greenhouse gas emissions (Villamil and Hallstedt, 2021). The transition and market orientation toward a green economy is a key step in implementing sustainability in businesses (Habib et al., 2020). The demand for sustainable energy drives innovation in the production of energy from renewable sources (Arsad et al., 2023).

Although in recent years there has been a proliferation of studies on sustainable entrepreneurship or sustainability in business, the measurement and prediction of the impact of sustainability on new ventures remains inadequate (Fichter et al., 2020). However, it is now clear that sustainability is a useful criterion to add to others such as cost, quality, risk, revenue, time, and market share to evaluate a company's product portfolio and develop new products (Villamil and Hallstedt, 2021).

The certification of sustainability standards is an important governance strategy aimed at improving human welfare and value chains (Oberlack et al., 2023). Certification has the power to act as a showcase for a product or company, although not everyone has access to it, as it requires essential prerequisites such as compliance with environmental standards in terms of quality, types of materials and methods used. Certification of a product or service is therefore valued by the most demanding customers. Certifications play several essential roles in different sectors of activity, including construction, education, professions, safety, and compliance. These certifications enable standardization, quality, recognition, competitiveness in the labor market, assurance of professional competence and the establishment of ethical standards.

In the construction sector, certification plays a crucial role, as it ensures that projects and buildings meet specific standards of quality, safety, sustainability, and regulatory compliance (Bischof et al., 2022). The construction economy can benefit from the use of greener materials and more efficient technologies. Local authorities can promote sustainable design in construction to prevent the effects of climate change. If all types of new constructions are encouraged to pursue building certification and existing buildings are given the means to adapt and achieve similar efficiency in the use of energy and water, urban sustainability and emission reduction targets can be met (Lamy et al., 2021).

The concepts of sustainability, energy efficiency, and social and environmental responsibility are increasingly becoming an integral part of the strategy for companies in the construction sector, both in new buildings and in the rehabilitation and maintenance of older buildings (Bureau Veritas Portugal, 2022a, 2022b). Management control systems are responsible for measuring the performance of construction companies with Green Building procedures, and sustainability measures (indicators) can lead to building certification (Bureau Veritas Portugal, 2022b). Various entities provide auditing and certification services to companies aiming to become more efficient and sustainable, with Bureau Veritas standing out as a global leader (Bureau Veritas Portugal, 2022a).

The integration of certification and sustainability into management control systems can be essential for modern organizations seeking to operate responsibly and sustainably, meeting the expectations of all social stakeholders, and contributing to a more sustainable world. In this context, this work aims to address the research question of how and why to integrate certification and sustainability

into management control systems in construction companies, while also providing evidence of the positive effects that can arise from this integration for businesses.

Literature Review

Sustainable construction involves reducing the ecological footprint, notably through the use of reusable and/or recyclable materials that reduce the consumption of natural resources and pollution, providing financial gains and resource savings (Fan et al., 2022; Shashi et al., 2022). The use of prefabricated and modular materials, with lightweight steel structures and wood composites, as well as the reuse of materials, can minimize issues related to resource scarcity, waste production, and workplace accidents, contributing to sustainability in construction (Pan and Zhang, 2023; Shashi et al., 2022).

The green economy and product/company certifications are strategic innovations that companies implement to keep up with new market trends (Appolloni et al., 2022; Fan et al., 2022). Construction companies looking to shift toward a green economy tend to be more innovative, with their managers using various sustainability control tools (Habib et al., 2020; Ligonie, 2021). Their designers and engineers are encouraged to incorporate innovative design solutions and sustainable materials into their projects (Al-Hamrani et al., 2021; Ligonie, 2021). The adoption of a sustainability culture should span all stages of planning, architecture, construction, and project management, and involve aspects such as technical innovation, energy savings, material durability, product dynamism, and final pricing (Ershadi and Goodarzi, 2021; Ligonie, 2021).

The implementation of sustainability in project management is a collaborative process that should involve all departments within the company (Ershadi and Goodarzi, 2021). However, within the context of a project, factors such as technical expertise, investment volume, surrounding community, and business strategy may present barriers to the transition to sustainability-focused management (Fathalizadeh et al., 2021; Ligonie, 2021). The unique context of each project can hinder the adoption of sustainable practices, whether due to location, deadlines, type of client, or materials selected, which individually or collectively can negatively impact water conservation, energy control, or material recycling (Stanitsas et al., 2021).

Companies also incorporate sustainability into their green marketing communications to promote their differentiation as green companies offering environmentally friendly products and services (Kinnunen et al., 2022). This type of strategic marketing aims to highlight the benefits of purchasing sustainable and innovative products. The green marketing campaigns and eco-innovation efforts undertaken by these companies help to increase the visibility of their products, services, or brand, thereby enabling them to differentiate themselves from their competitors. However, the credibility of these actions depends on their being backed up by performance indicators provided by management control systems.

In the construction sector, building certification is a key tool for aligning corporate governance with sustainability (Aristizábal-Monsalve et al., 2021). Certification standards as ISO 50001 – Energy Management Systems help organizations to establish processes to improve energy performance (El Majaty et al., 2022). The implementation of these standards aims to reduce energy costs, greenhouse gas emissions and other negative environmental impacts. ISO 50001 sets international parameters for the supply, use and consumption of energy in industrial, commercial, and institutional organizations.

Companies certified under ISO 9001 are required to provide training in quality management methods and tools, collect company data on services and products, and measure customer satisfaction (Budayan and Okudan, 2022). The implementation of quality control systems in companies, particularly the Total Quality

Management (TQM) system, facilitates the ISO 9001 certification process, as both aim for economic, social, and environmental improvements. Environmental sustainability indices can highlight the carbon dioxide emissions and waste produced by each project. Social sustainability indices show the use of human resources and the overall accident rate on construction sites. Finally, economic sustainability indices analyze the cost and time required to complete a project.

The Building Research Establishment Environmental Assessment Method (BREEAM), developed by the Building Research Establishment (BRE) in the UK in 1990, is an international certification that assesses the performance of measures to reduce environmental impacts in the construction industry (Pedro et al., 2019). The implementation of BREEAM in cities has attracted new businesses, promoted new efficiency strategies, developed green spaces, and improved public transport interconnections (Pedro et al., 2019). The certification has contributed to the promotion of more sustainable construction, generating economic, social and environmental benefits for owners, tenants and other users. For investors and owners of sustainable spaces and buildings, BREEAM certification offers several benefits: increased rental value, new customers, faster occupancy, longer lease terms, greater operational efficiency, enhanced brand reputation and trust. Similarly, tenants and occupiers of these spaces benefit from reduced service charges, a reputation for corporate social responsibility on the part of developers, the communication of a corporate vision, and the promotion of employee health, wellbeing, and productivity.

Leadership in Energy and Environmental Design (LEED) is a certification created in 1993 by the United States Green Building Council (USGBC) that aims to measure the environmental performance of a building and encourages the design and use of sustainable building practices (Suzer, 2019; Vosoughkhosravi et al., 2022). Both BREEAM and LEED certification encourage the installation of rainwater harvesting technologies, photovoltaic panels, and smart building management systems. These are the two most widely used green building rating systems in the world. The development of the recycling industry, the adoption of a sustainable culture by populations, and the development of new sustainability-focused technologies have increased as more building projects are constructed and certified by LEED (Chi et al., 2020). The use of green technologies, such as photovoltaic panels, water reuse systems and biodegradable waste recycling, helps to reduce carbon dioxide emissions and contributes to sustainability (Mishra et al., 2021). In addition, tax incentives for investment in these technologies have a positive impact on companies' financial performance.

Green product certificates have been created to develop policies that support renewable energy and sustainable development measures (Zhang et al., 2022). In order to achieve the Sustainable Development Goals (SDGs) (United Nations [UN] 2024) and reduce the environmental impact of human activities on the planet, it is important to increase the efficiency of resource use. The use of environmentally friendly materials preserves biodiversity and the balance of ecosystems. Cork, for example, is 100% natural, renewable, recyclable and reusable, making it an excellent alternative to reduce the world's dependence on non-renewable products. Bamboo is also a versatile natural resource that has been recognized for centuries for its qualities as a building material, known for its environmental benefits in terms of sustainability (Mohan et al., 2022). Bamboo can be adapted to new technologies and construction methods worldwide, as it is a readily available resource in tropical environments.

Management control systems are essential tools used by organizations to observe, control and optimize operations and performance (Jordan et al., 2015). These systems enable management to make informed and strategic decisions to achieve organizational goals effectively and efficiently. While traditional management

control systems focus on economic and financial development, sustainability practices require a management control approach that emphasizes not only production efficiency, but also minimizing environmental impacts and improving sustainable performance (Mellado and Lou, 2020). Management control systems can use various indicators (Key Performance Indicators - KPIs) to monitor sustainability measures, including water consumption, green area coverage, storm water management, lighting energy consumption, construction waste generation, use of local materials, and recycling and reuse of materials (Rajabi et al., 2022). Sustainability and management control are crucial aspects for the construction sector as they can help to ensure that construction activities are carried out responsibly, minimizing environmental and social impacts while promoting operational and financial efficiency (Ashtiani and Muench, 2022). These two aspects are interrelated and applied in the construction industry.

Methodology

The aim of this study is to understand how and why certification and sustainability are integrated into the management control systems of construction companies. The chosen research method is a case study, which is considered suitable for exploring descriptive and exploratory questions based on "how" and "why", allowing the collection of clear and objective information, while emphasizing the study of social phenomena in contemporary real-world contexts (Martins, 2008; Yin, 2017).

The case under study is the DST Group, which operates in six business areas (engineering and construction, environment, renewable energy, telecommunications, real estate, and ventures) and employs 1,869 people, making it one of the largest construction companies in Portugal. The group has published a sustainability report since 2018, built the first LEED-certified building in Portugal and owns a BREEAM-certified building (DST Group ,2021b).

The choice of a case from the construction sector is justified by its environmental impact. This sector has contributed significantly to the increase in greenhouse gas emissions through the use of materials such as concrete and steel, deforestation, demolition, combustion and the use of hazardous chemicals such as tar (Abed et al., 2022; Labaran et al., 2022). In the European Union, buildings are responsible for about 40% of carbon dioxide emissions and 35% of material consumption (Bureau Veritas Portugal, 2022b). The construction sector is also one of the largest consumers of energy (El Majaty et al., 2022). In addition, waste recycling is a key aspect of the sector (Tafesse et al., 2022).

Data were collected through document analysis and an interview with the sustainability manager of the DST Group. The data were treated and interpreted qualitatively. The documents used included the DST Group's own website (DST Group, 2021a, 2021b and 2021c) and the published sustainability report. The interview took place in 2023, lasted 30 minutes and was not recorded, only notes were taken by the interviewer.

Results

An analysis of the DST Group's sustainability report reveals the company's commitment to respecting the environment while ensuring a return on investment. This commitment is immediately apparent in the Mission, Strategic Challenge and Values chapter, where "harmony with nature" serves as the basis for market-oriented activities and value creation (DST Group, 2021b). Its mission includes the decarbonization of the energy sector and urban mobility (DST Group, 2021a), the continuous search for ways to minimize the environmental impact of construction activities, and the exploration of circular economy and sustainability solutions.

In terms of corporate values, the Group defines: (i) market orientation, promoting customer satisfaction and loyalty; (ii) value creation, continuously improving

performance through research and innovation; (iii) responsibility, adhering to principles of sustainable economic, social and environmental development; and (iv) human resources motivation, creating conditions for organizational success.

Innovation is evident in several research and development projects currently underway within the Group (DST Group, 2021c), such as:

Renew – Development and implementation of innovative structural and bituminous concretes made from waste or industrial by-products.

CirMat – Recovery of construction and demolition waste (CDW).

Baterias 2030 – An integrated and structured response to the challenges of decarbonization and the spread of sustainable energy communities.

Building Hope – A platform for optimizing energy management to reduce operating costs.

GeoCrit – Development of a cost-controlled technology based on Internet of Things (IoT) sensors to monitor geotechnical assets.

Smart PV – A photovoltaic asset management platform.

SmartGlow – A flexible solution for power supply in situations where interconnected grid solutions are not feasible.

The sustainability manager addressed this issue in the interview as follows: "(...) the company will continue to invest heavily in research as it is the solution to almost all our problems (...) we will focus on hiring more people and building new laboratories to address increasingly challenging environmental issues".

Integrating certification and sustainability into management control systems is essential for modern organizations that want to operate responsibly and sustainably, meet the expectations of all social stakeholders and contribute to a more sustainable world. In line with what has already been said, the interviewee shares the idea that concern for sustainability is intrinsic to the development of the business: "(...) for us, certification and sustainability are becoming increasingly important, as we are fully aware of the environmental impact of construction. In order to mitigate this impact, we have developed tools to minimize it as much as possible (...) we actively want certification and sustainability to play a fundamental role in management control, particularly in terms of operational and financial benefits, such as recycling CDW, using rainwater, using green materials and striving to implement the Lean philosophy as much as possible - that is, to eliminate waste through continuous daily improvement".

The integration of certification and sustainability into the management control system of the DST Group is based on the existence of an environmental department and a sustainability manager. The environmental department is responsible for certifications, the development of new products, the use of green and recycled products, the monitoring of water and energy consumption on site, the verification of the rate of use of recycled products, the rate of use of eco-concrete and the rate of use of rainwater or recycled water, among other sustainability initiatives implemented (DST Group, 2021c). An example of a sustainability initiative implemented on site is the installation of photovoltaic panels on a construction tool container, allowing the energy produced to be fed back into the site for use by workers in their machines, air conditioning in the clothing containers and site lighting (DST Group, 2021c).

The sustainability manager must ensure that all information reaches the management to support decision making regarding operational and financial gains, but also to persuade the management not to forgo the necessary investments to continue the implementation of

sustainability efforts. In particular, it is the responsibility of the sustainability manager to present the level of energy production and the corresponding financial gains for each project on a monthly basis (DST Group, 2021c). The manager should also be present at production meetings for all projects and at board meetings to represent the group's sustainability, emphasize its importance and ensure continued investment in sustainability.

The responsibilities of the sustainability manager include (DST Group, 2021c): (i) implementing certifications for the group's processes; (ii) promoting research; (iii) collecting and processing sustainability data related to projects; (iv) obtaining performance indicators; (v) evaluating performance alerts; (vi) preparing sustainability management maps; (vii) communicating the collected data to the administration; (viii) presenting continuous improvement solutions; and (ix) assisting the administration in decision-making.

The sustainability manager plays a crucial role in the implementation of the company's sustainability plan, especially in mobilizing other departments to participate. Table 1 summarizes the procedures/systems (how?) and motivations/objectives (why?) underlying the whole process of integrating certification and sustainability into the management control system (DST Group, 2021c).

Table 1: Summary of how and why the company integrates sustainability and certification in the management control system

How (procedures)	Why (motivation)
Environmental certification: ISO 9001, ISSO 50001, BREEM, LEED	Improvement and registration of new products; modernity; innovation
Product/Project certification: CirMat; Renew; Baterias 2030; Geocrit; SmartPV	Improvement and registration of new products; modernity
Environmental management system (Identification and monitoring of various environmental aspects)	Improvement of environmental performance; important tool in management control
Use of green/recycled/recyclable products and materials	Improvement of environmental performance; promotes sustainability
Carsharing	Reduces carbon dioxide emissions
Power generation from photovoltaic panels	Avoids carbon dioxide emissions and expenses with conventional energy

Source: Authors' own elaboration

By analyzing the evidence collected, it can be concluded that the company is at the forefront of sustainability, undertaking several pioneering and innovative sustainability projects in Portugal. It can also be concluded that the company is seeking to reduce its environmental footprint while increasing differentiation, innovation, and operational efficiency. For the sustainability manager, this strategy serves to differentiate the company from its competitors and aims to enhance the institutional image and the credibility of the organization.

Discussion and Conclusion

The results of this study show that the integration of certification and sustainability into the management control systems of a construction sector company requires a strategic approach to ensure that practices and objectives related to quality, certification and sustainability are aligned with the company's overall management objectives (Oberlack et al., 2002). Certifications, new product development, the use of green and recycled products, the monitoring of water and energy consumption on site, and the use of

eco-concrete and rainwater are some of the practices adopted (how) to achieve sustainability goals (why). This finding is in line with the literature (Fan et al., 2022; Habib et al., 2020), which suggests that the promotion of a green economy has an environmental impact, not only through the reuse and recycling of resources, but also through the conservation of natural resources and the reduction of pollution.

On the one hand, eco-innovative companies are more likely to show better operational, financial and sustainability results (Ashtiani and Muench, 2022; Kinnunen et al., 2022). On the other hand, companies' sustainability efforts also respond to market demands (Habib et al., 2020; Villamil and Hallstedt, 2021), as assessing and managing the risk of green product certification can contribute to stability and trust in sustainable consumption and production/construction (Aristizábal-Monsalve et al., 2021; Fan et al., 2022; Al-Hamrani et al., 2021; Shashi et al., 2022).
The integration of certification and sustainability into management control systems is reflected in the performance indicators that companies implement to monitor sustainability objectives (Jordan et al., 2015; Ligonie, 2021). Consequently, management control tools include sustainability indicators that combine financial viability with the implementation of new production/construction methods through sustainable projects and environmentally friendly new products. In other words, it supports the theory that the performance of organizations depends on the value of their products/services, and the success of new projects is related to the degree of sustainability perceived by consumers (Fichter et al., 2020).

The results also demonstrate the active role of the sustainability manager, who proves to be a key element in the whole process of integrating sustainability into the management of the company. Thus, this study can serve as a starting point for other companies to implement the procedures adopted here.

As this is a case study, the results cannot be generalized to other organizations. Consequently, the conclusions are limited to the analyzed company, as organizational culture and availability of resources are factors that may influence the results of the study in other companies and sectors. For future research, it is suggested to study other sectors and/or companies in the same sector but of different sizes, comparing the types of tools used and the respective results obtained. It is also recommended to use other research methods, including quantitative research, and to investigate other governance challenges/objectives of organizations.

Acknowledgment

This work was financially supported by the research unit on Governance, Competitiveness and Public Policy (UIDB/04058/2020) + (UIDP/04058/2020), funded by national funds through FCT - Fundação para a Ciência e a Tecnologia.

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