

SUSTAINABILITY, RISK, AND SOCIAL RESPONSIBILITY: THE NEW TRIAD IN REAL ESTATE MANAGEMENT

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Abstract. The increasing importance of sustainability, risk, and social responsibility in real estate management reflects evolving societal demands, regulatory pressures, and market dynamics. Motivated by the need to align real estate practices with environmental goals and social equity, this study explores how these three pillars can be systematically integrated into property management. The aim is to develop a holistic framework that transforms risks into opportunities and promotes long-term value creation. Using a mixed-methods approach, including literature analysis and semi-structured expert interviews conducted within the Romanian real estate sector, this study investigates how ESG criteria and digital technologies are currently applied in practice. Key findings reveal that tools such as BIM, digital twins, and ESG reporting enhance transparency, operational efficiency, and stakeholder engagement. The research concludes that integrating the sustainability–risk–responsibility triad provides strategic advantages, enhances resilience, and strengthens the role of real estate management in advancing sustainable development.

Keywords: management, sustainability, ESG, real estate, risk, opportunities, technology.

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1. Introduction

The real estate sector faces increasing pressure to address environmental sustainability, manage systemic risks, such as impacts from climate change, and fulfill its social responsibilities (Ige et al., 2024; Ullah & Al-Turjman, 2023). As global urbanization accelerates and climate concerns intensify, traditional real estate management approaches have become insufficient to meet evolving regulatory expectations and societal needs. Despite growing awareness of sustainability and environmental, social, and governance (ESG) imperatives, the urgent need for a standardized and operational framework to integrate these dimensions into real estate practice remains underdeveloped, especially in emerging European markets such as Romania (Riratanaphong & Pewklieng, 2025; Warren-Myers, 2012).

The real estate industry contributes to nearly 30% of global CO₂ emissions and consumes significant natural resources, placing it at the center of decarbonization efforts (Ige et al., 2024; Lin et al., 2021). However, sustainability is often treated as a secondary concern rather than a strategic imperative. Without systematic tools and metrics to guide decision-making, ESG goals risk remaining aspirational instead of actionable. Furthermore, the sector's

fragmented efforts to balance financial returns with social inclusion—such as affordable housing and equitable urban planning—reveal the lack of integration between risk management, community well-being, and environmental impact (Adabanya et al., 2023; Barauskaite & Streimikiene, 2021).

The growing urgency of environmental degradation, social inequality, and regulatory complexity has placed the real estate sector at the intersection of sustainability, risk governance, and corporate responsibility. Despite global momentum toward ESG integration, there remains a critical gap between high-level sustainability discourse and the practical implementation of measurable standardized frameworks within the built environment (Morgante et al., 2023; Warren-Myers, 2012). This gap is particularly pronounced in emerging markets such as Romania, where real estate development often occurs in regulatory systems that still adapt to EU sustainability directives and market-based valuation standards (McAllister & Nase, 2023; Riratanaphong & Pewklieng, 2025). Compounding this challenge is the fragmented understanding of what constitutes “value” in real estate. Traditional financial metrics, such as net operating income (NOI) or rental yield, fail to account for development projects’ long-term economic,

environmental, and social externalities (Barauskaite & Streimikiene, 2021; MacAskill et al., 2021). When we refer to value in real estate, we consider not only the financial returns but also the long-term economic, environmental, and social impacts of a project. As a result, investors and practitioners struggle to evaluate the actual performance of sustainable real estate assets or compare them in different regulatory and cultural contexts. Furthermore, the potential of advanced technologies, such as building information modeling (BIM), the Internet of Things (IoT), and artificial intelligence (AI), in integrating ESG metrics into everyday real estate decision-making processes has not been fully explored. These technologies can play a crucial role in collecting and analyzing data related to environmental impact, social inclusion, and governance practices, thus facilitating the integration of ESG principles into real estate management (Pinti et al., 2022; Starr et al., 2021). The sector also faces limitations in stakeholder engagement, where communities, tenants, and civil society actors are often excluded from processes that determine the spatial and social impact of built environments (Glatte, 2021; Jewett et al., 2021). Given these limitations, there is a clear and immediate need for a holistic, standardized, and technology-enabled framework that defines, measures, and manages long-term value creation in real estate. Such a framework must address environmental and financial performance and integrate social responsibility and inclusive governance to align with global sustainability targets (Ige et al., 2024; Luo & Tang, 2023).

This study addresses this gap by proposing a holistic ESG-based framework that aligns long-term value creation with measurable sustainability goals. Building on principal-agent theory and recent advances in digital innovation (Anglin & Arnott, 1991; Borrmann et al., 2018; Kimmerle, 2019), it explores how technologies such as BIM, IoT, and AI can support ESG integration and facilitate strategic alignment among stakeholders.

This study aims to develop a comprehensive and context-sensitive framework for integrating sustainability, risk management, and social responsibility into real estate management practices. In response to increasing demands for environmentally and socially responsible urban development, the research focuses on how ESG principles, supported by technological innovation, can be operationalized to create long-term value, strengthen stakeholder participation, and ensure regulatory alignment, particularly within emerging markets such as Romania. The Romanian real estate sector serves as a case context due to its transitional regulatory landscape, growing investor interest in green assets, and emerging efforts to institutionalize sustainability standards (McAllister & Nase, 2023; Newell et al., 2023). Romania represents a transitional European real estate market that increasingly engages with ESG principles while developing its regulatory and institutional frameworks. Its evolving alignment with EU sustainability standards and shared challenges with other central and eastern European countries make it a relevant context for examining how ESG frameworks can be operationalized

in emerging markets. This allows the findings to offer insights both specific to Romania and broadly applicable across similar EU regions (McAllister & Nase, 2023; Morgante et al., 2023; Riratanaphong & Pewklieng, 2025). This aligns with previous calls for methodological advancement in the sustainability assessment and valuation standardization of the real estate sector (Morgante et al., 2023; Riratanaphong & Pewklieng, 2025; Warren-Myers, 2012).

The following specific objectives guide the study:

- To investigate how the intersection of sustainability, risk, and social responsibility influences decision-making in real estate projects. This response to recent work emphasizes the growing importance of integrated ESG strategies in navigating urban complexity and stakeholder pressures (Barauskaite & Streimikiene, 2021; Ullah & Al-Turjman, 2023).
- To examine the potential of ESG frameworks to mitigate and transform sustainability-related risks into strategic opportunities, particularly in the context of real estate valuation and asset performance. It follows the argument that ESG adoption is not only about compliance but also about innovation and value creation (Kimmerle, 2019; McAllister & Nase, 2023).
- To analyze the role of emerging digital tools—such as BIM, IoT, digital twins, and AI—in facilitating the integration of ESG criteria across the building life cycle. This draws on evidence from studies highlighting the transformative potential of proptech and intelligent systems in building sustainability (Attaran & Celik, 2023; Pinti et al., 2022; Starr et al., 2021).
- To identify effective stakeholder engagement strategies that foster inclusive, socially responsive, and community-aligned development practices. Previous research suggests that social cohesion, participatory governance, and transparency are central to the long-term success of sustainable development (Glatte, 2021; Jewett et al., 2021; Luo & Tang, 2023).
- To develop a replicable and adaptable ESG-based framework tailored to real estate professionals and policymakers to align long-term sustainability objectives with quantifiable performance indicators. This objective is consistent with calls for more precise sustainability metrics and standardized assessment tools (Dobrovolskienė et al., 2021; Ige et al., 2024; Larsen et al., 2022).

In this context, value creation must be framed as a central multidimensional construct linking these themes. Rather than appearing abruptly, it should be introduced early as the key theoretical and practical objective of sustainability-driven real estate strategies. It refers not only to financial performance, such as rental yields and asset appreciation (MacAskill et al., 2021), but also to social inclusivity, ecological resilience, and risk-adjusted investor confidence (Barauskaite & Streimikiene, 2021; Morgante et al., 2023).

By analyzing how risk, sustainability, and social responsibility intersect in practice, the research seeks to answer three critical questions:

- RQ1: How can real estate management systematically identify risks and turn them into opportunities to develop sustainable and socially responsible strategies?
- RQ2: What role do social responsibility and environmental sustainability play in the long-term value creation of real estate?
- RQ3: What measures and tools can be used to integrate the triad of sustainability, risk, and social responsibility into existing management processes?

These research questions are grounded in prior studies that emphasize the strategic benefits of ESG alignment (Ige et al., 2024; Kimmerle, 2019), the role of proptech in performance optimization (Starr et al., 2021), and the impact of socially inclusive projects on market stability (Barauskaite & Streimikiene, 2021; Mai et al., 2021).

In answering these questions, the paper contributes to both theory and practice by offering a data-driven, stakeholder-inclusive, and technologically enhanced model for sustainable property development. The structure of the paper is as follows: The next section presents a review of the literature on ESG integration and digital transformation in real estate, followed by an outline of the methodological approach. The empirical findings, derived from expert interviews and thematic analysis, are then presented, culminating in a set of actionable recommendations and directions for future research.

2. Sustainable real estate development in the literature

Real estate management is a discipline that goes far beyond real estate management. It includes strategic and operational processes that focus on creating value, sustainability, and risk management of real estate portfolios. Given the growing challenges of sustainability, risk management, and social responsibility, a holistic approach is crucial (Mai et al., 2021; Riratanaphong & Pewklieng, 2025). This review draws on both theoretical foundations and practical applications from the literature and critically analyzes emerging trends in real estate management, such as the increasing emphasis on green building certifications (Ferreira et al., 2023; Pietocha, 2024), the integration of ESG criteria into investment decision-making processes (Ige et al., 2024; Riratanaphong & Pewklieng, 2025), and the growing focus on practice-oriented approaches that align strategic real estate management with sustainability and long-term value creation (Dobrovolskienė et al., 2021; Mai et al., 2021).

2.1. Agency theory in real estate management

The principal-agent theory provides a valuable basis for analyzing goal conflicts and informational asymmetries between owners (principals) and managers (agents) (Bernhold & Wiesweg, 2021). Anglin and Arnott (1991) describe how divergent interests can be reduced through clear contractual structures and transparent communication

processes. Agency theory originated in the field of economics and organizational studies. It explores the relationship between principals (e.g., investors or stakeholders) and agents (e.g., real estate managers or developers), particularly under conditions of information asymmetry, goal misalignment, and risk allocation (Harris & Raviv, 1978; Jensen & Meckling, 1976). The theory posits that when agents are entrusted with decision-making authority on behalf of principals, conflicts of interest may arise, especially if agents prioritize short-term financial performance over long-term strategic value (Eisenhardt, 1989).

When applied to sustainable real estate, agency theory offers a valuable framework for understanding the behavioral and structural barriers that hinder the integration of ESG criteria into property investment and development decisions. These ESG-aligned objectives, such as carbon neutrality, social inclusion, and ethical governance, often require longer investment horizons and broader stakeholder accountability. However, these priorities may conflict with traditional managerial incentives that focus on short-term cost minimization and return maximization. By understanding these conflicts through the lens of agency theory, we can better appreciate the theory's relevance to sustainable real estate.

BIM and digital twin technologies play an increasingly pivotal role in advancing sustainability goals within real estate management. BIM enables the detailed visualization and simulation of building performance across the life cycle—from design and construction to operation and renovation—allowing stakeholders to optimize energy efficiency, reduce material waste, and plan for long-term maintenance. Digital twins extend this capability by creating real-time, data-driven replicas of physical assets, enabling continuous monitoring of environmental performance and predictive maintenance through IoT integrations.

The integration of these technologies into real estate practices supports a more proactive approach to ESG compliance by facilitating transparency, traceability, and informed decision-making. However, implementation is not without challenges. High initial investment costs, data interoperability issues, and the need for skilled personnel often hinder widespread adoption. Additionally, legacy systems and data security remain critical concerns. Despite these barriers, the strategic use of BIM and digital twins offers significant potential for reducing operational carbon footprints and aligning real estate operations with EU sustainability directives. Embedding these tools into ESG reporting frameworks can further strengthen governance and stakeholder engagement efforts.

By applying agency theory in this study, we can assess how performance metrics, reporting standards, and digital transparency tools (such as BIM, IoT, and ESG dashboards) can help mitigate agency problems by aligning incentives and improving accountability (Ige et al., 2024; McAllister & Nase, 2023). This aids in the understanding of stakeholder engagement, regulatory frameworks, and certification schemes (e.g., GRESB, LEED) in shifting behavior

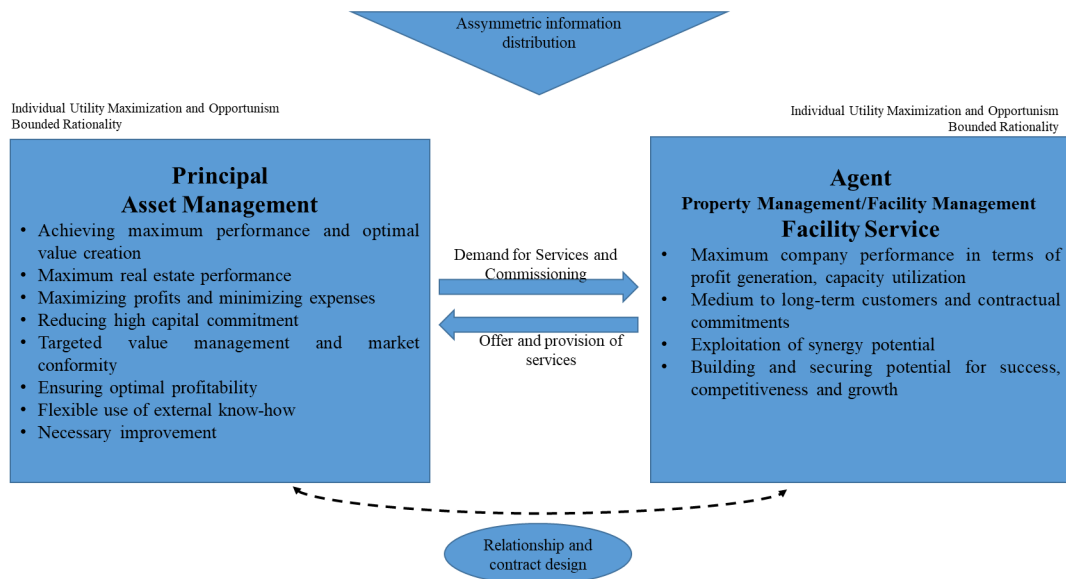


Figure 1. A schematic representation of the relationships and trade-offs between owners and managers, with a focus on sustainability goals and operational priorities

toward long-term value creation. In addition, this theoretical perspective can provide practical insights and serve as a diagnostic and prescriptive tool used to propose governance mechanisms and valuation models that enhance principal–agent alignment in sustainability-focused real estate management.

Figure 1, a novel synthesis based on the theoretical foundation of agency theory as applied to real estate management, summarizes the correlation between agency theory and sustainability aspects. It draws upon the foundational model by Jensen and Meckling (1976), who defined the principal–agent problem as arising from conflicts of interest and information asymmetry between owners (principals) and managers (agents). In this context, the figure represents how goal conflicts, especially around short-term profit versus long-term sustainability, can be navigated through aligned incentive systems, as emphasized by Anglin and Arnott (1991), Thieking (2016), and Bernhold and Wiesweg (2021). The relationships and trade-offs depicted in the figure reflect these dynamics, grounded in the real estate sustainability context, as explored by Kimmerle (2019) and Ige et al. (2024).

Through an extension of principal–agent theory to include incentive systems, we find that these systems play a crucial role in motivating managers to act sustainably. By strengthening the link between long-term environmental goals and individual performance metrics, effective incentive systems can drive sustainable actions (Thieking, 2016). The definition of performance indicators that encompass economic, ecological, and social dimensions allows for a comprehensive assessment of agents' performance (Ige et al., 2024). These incentive mechanisms not only create transparency but also facilitate the inclusion of long-term sustainability goals into operational practice. Moreover, the use of BIM and data-driven reporting can help

bridge information gaps between executives and agents, thereby enhancing transparency and managerial accountability (Borrmann et al., 2018). Ige et al. (2024) underscore that digital tools enable seamless project data tracking, which in turn simplifies decision-making for owners and improves managerial accountability.

Another aspect of the principal–agent theory is the need to systematically analyze and address the conflicting objectives between parties. These conflicts can arise, for example, when balancing short-term cost savings and long-term investments in sustainable technologies. Newell et al. (2023) stress the importance of a continuous review of target compliance and transparent reporting requirements. This approach empowers both parties to identify deviations at an early stage and initiate countermeasures, making them feel proactive and in control (Măgdaş, 2023).

2.2. Sustainability models and evaluation standards: Integrating sustainability into corporate strategy

Stricter regulatory requirements, such as the EU Taxonomy for Sustainable Finance, may present companies with new challenges but also empower them with significant opportunities. By defining clear criteria for classifying economic activities as sustainable, this taxonomy guides companies to align their business strategies and operational processes with these standards. The central objective is to direct capital flows toward sustainable projects while preventing greenwashing. Real estate companies that meet these requirements can benefit from increased transparency and improved market position, opening new avenues for growth and success (Ige et al., 2024; Riratanaphong & Pewklieng, 2025).

ESG criteria are not just guidelines but powerful tools that play a central role in the systematic integration of



Figure 2. Sustainability criteria

sustainability goals into corporate strategy. Figure 2 provides a visual summary of ESG criteria as operational dimensions within sustainable real estate strategy. It is rooted in the frameworks outlined by Ige et al. (2024), Riratanaphong and Pewklieng (2025), and McAllister and Nase (2023), who highlight ESG as both a regulatory compliance framework and a strategic value-creation tool. The structure depicted in the figure was conceptualized by integrating EU Taxonomy principles, GRI sustainability standards, and real estate performance indicators (transparency scores, emissions disclosure, and affordability metrics). This figure visually represents the alignment between ESG indicators and organizational strategic goals in the property sector, thereby enhancing the understanding of ESG integration in real estate for stakeholders.

This strategic alignment, facilitated by ESG criteria, is key to meeting regulatory requirements and enhancing market position. By incorporating ESG criteria into their corporate strategy, companies can ensure regulatory compliance and improve their market position, thereby reaping the benefits of sustainability (Ige et al., 2024; Riratanaphong & Pewklieng, 2025).

- **Environment:** ESG criteria help companies analyze and improve environmental aspects such as energy efficiency, water consumption, and waste management. The EU Taxonomy calls for concrete measures to reduce CO₂ emissions caused by real estate exploitation (Riratanaphong & Pewklieng, 2025). Goldstein et al. (2022) emphasize that the disclosure of emissions and energy efficiency indicators meets regulatory requirements and serves as a basis for decision-making for investors who increasingly favor sustainable projects.
- **Social:** The social dimension of ESG criteria requires real estate companies to contribute to improving

quality of life and social justice. Examples of this include providing affordable housing and designing inclusive neighborhoods. Regulatory requirements, as set out in national building regulations or urban development plans, ensure that social objectives are considered in real estate projects. Barauskaite and Streimikiene (2021) emphasize that social responsibility not only fulfills regulatory requirements but also brings long-term economic benefits, which increases the stability and attractiveness of real estate markets, ensures the sustainability of investments, and provides a sense of reassurance and confidence.

- **Governance (corporate management):** The governance dimension of ESG criteria is of utmost importance, emphasizing the need for transparency and ethical business management. Real estate companies must implement precise mechanisms for monitoring and reporting their ESG performance (Riratanaphong & Pewklieng, 2025). This includes setting up ESG teams, setting specific sustainability goals, and regularly disclosing progress. A specific example of regulatory requirements is the obligation to disclose carbon emissions and energy efficiency in real estate portfolios. These transparency requirements force companies to take proactive steps to reduce emissions (McAllister & Nase, 2023). Such measures include investing in energy-efficient technologies, switching to renewable energy, and renovating existing buildings. By adhering to the governance dimension of ESG criteria, companies can ensure ethical business practices and regulatory compliance, thereby enhancing their reputations and attracting sustainable investors (Ige et al., 2024; Riratanaphong & Pewklieng, 2025).

Connecting ESG criteria with regulatory requirements creates synergy between compliance and competitive

advantage. Companies implementing ESG-compliant real estate projects benefit from better risk assessment, access to sustainable capital, and a positive image among stakeholders and customers. Additionally, research shows that companies that comply with ESG criteria achieve more stable long-term profits by proactively addressing risks such as stricter environmental laws or changing customer requirements (Riratanaphong & Pewklieng, 2025).

Sustainability models in real estate management are based on the three dimensions of sustainability: economics, ecology, and social issues. Figure 3 represents the three-pillar sustainability model—economic, ecological, and social—and holds significant importance in sustainability science, particularly in the context of real estate. The incorporation of the terms “viable,” “bearable,” and “equitable” aligns with the classical sustainability Venn diagram model, a concept initially popularized by Giddings et al. (2002) and subsequently adapted in various industry frameworks (e.g., DGNB certification; Braune et al., 2019). This figure illustrates the intersection of these pillars, as discussed by Lieser and Peter Groh (2011) on economic value, Ige et al. (2024) on environmental performance, and Barauskaite and Streimikiene (2021) on social impact. The integration of these terms underscores that sustainability can only be achieved when these dimensions are both present and mutually supportive for a more sustainable future.

These dimensions are closely linked and contribute to the sustainable development of real estate projects:

- **Economy:** The economic dimension is about stability and prosperity. It aims to ensure long-term financial stability and appreciation. This includes minimizing operating costs through energy-efficient technologies, optimizing space utilization, and extending the lifespan of properties. According to Lieser and Peter Groh (2011), sustainable real estate contributes to better market attractiveness, as reflected in increased rental and sales revenues. In addition, investing in sustainable technologies creates the potential for long-term savings and increased profitability.

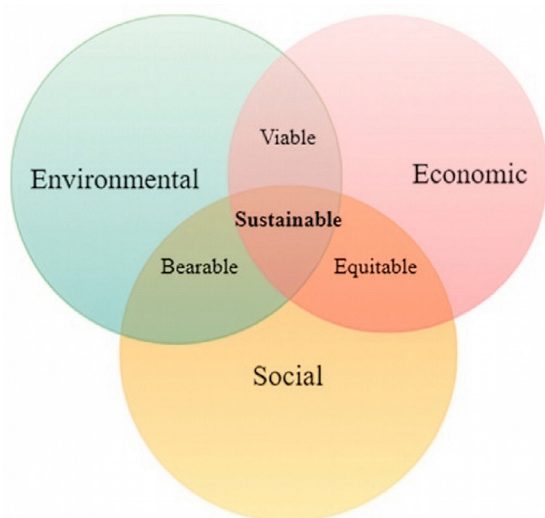


Figure 3. Components of sustainability

- **Ecology:** The ecological dimension focuses on reducing the negative environmental impact of real estate throughout its life cycle. This includes energy-efficient construction methods, the use of renewable energies, the minimization of resource consumption, and the reduction of CO₂ emissions. Life-cycle assessments (LCAs) are central in quantifying the environmental impact from material extraction to disposal. Ige et al. (2024) emphasize that “green investments”, which are financial investments made in companies or projects that support the environment, not only serve to protect the environment but also meet regulatory requirements, such as the EU Taxonomy.
- **Social:** The social dimension focuses on improving quality of life and creating social added value. This includes providing affordable housing, promoting inclusive communities, and protecting the health and well-being of residents. Projects such as “mixed-use spaces”, which are developments that combine residential, commercial, and recreational areas in one location, are examples of innovative approaches to social integration (Ige et al., 2024). According to Thieking (2016), such projects can contribute to long-term social stability and, at the same time, increase property value.

Riratanaphong and Pewklieng (2025) emphasize the importance of a holistic process model that integrates these dimensions throughout the entire life cycle of a property. This model, which includes the design, construction, operation, and maintenance of properties, ensures sustainability goals at every stage. These standards create transparency and trust among investors and stakeholders, providing a basis for benchmarking and allowing companies to assess their sustainability performance in an industrial context. In addition, Larsen et al. (2022) examine the role of life-cycle assessment (LCA) as a tool for assessing environmental impact over the entire life cycle of a property. LCA allows for a well-founded decision-making basis for optimizing resources and minimizing environmental impact.

Another aspect is the integration of sustainability models into financial valuation methods. Dobrovolskienė et al. (2021) show that sustainability should be viewed as a qualitative goal that also brings direct financial benefits, such as operating cost savings and increased property value. Developing sustainability indices that quantitatively assess ecological and social factors plays a central role. Such indices can serve as a basis for investor decisions and facilitate the communication of sustainability goals to external stakeholders (Ige et al., 2024).

The social responsibility of property management is becoming increasingly important, especially in providing affordable housing (Ullah & Al-Turjman, 2023). Barauskaite and Streimikiene (2021) show that social goals, such as promoting social integration, not only have social benefits but can also increase the attractiveness of real estate markets in the long term.

A central aspect of social responsibility is creating housing that is accessible to different social groups. This

includes affordable housing for low-income households, as well as for students, seniors, and refugees. Projects such as intergenerational housing models or barrier-free apartments contribute to social integration and inclusion. Adabanya et al. (2023) emphasize that such initiatives can promote the stability and cohesion of communities.

A growing trend in real estate development is the creation of “mixed quarters”, which integrate both housing and commercial and social facilities. These neighborhoods foster vibrant and inclusive communities (Ullah & Al-Turjman, 2023). They provide space for recreational and educational activities and cultural and local facilities, significantly improving the inhabitants’ quality of life. Mixed-use neighborhoods also reduce reliance on private transportation, as they often provide better infrastructure for sustainable mobility concepts, such as car sharing, bicycle infrastructure, and public transportation. In addition, there is an emphasis on the importance of sustainable jobs. Real estate companies can create social value by designing spaces that support flexible work and communal spaces. Flexible office concepts and co-working spaces can promote collaboration between different groups and industries, which increases neighborhoods’ innovative power in the long run (Matemilola & Muraina, 2023). Another important topic is stakeholder participation. Ratcliffe et al. (2021) show that the involvement of residents and local actors in the planning and development of real estate projects leads to greater acceptance and better adaptation to local needs. Participation processes, such as workshops or digital feedback platforms, help to better understand the community’s needs and minimize conflicts. Finally, social sustainability is becoming increasingly important in real estate valuations. Certification schemes such as DGNB certification are increasingly integrating social criteria, such as health and comfort standards, which help ensure that real estate projects meet ecological and economic objectives and contribute to social sustainability (Braune et al., 2019).

Mainstreaming sustainability requires clear goals and measurable indicators. Hao and Wang (2023) recommend using assessment matrices to identify synergies between ecological, social, and economic goals. These matrices serve as structured tools for evaluating the sustainability performance of projects and processes and help identify and resolve conflicting goals (Ige et al., 2024).

Thieking (2016) points out that data-driven management tools are crucial to continuously monitoring progress. Modern technologies such as BIM play a significant role in this. BIM can be used to collect real-time data on energy consumption, CO₂ emissions, and resource use, enabling informed decision-making and helping implement sustainability goals at all company levels (Borrmann et al., 2018; Mahdjoubi et al., 2013).

In addition, long-term sustainability strategies based on an integrative approach are needed. These strategies should cover the entire value chain, from planning to construction to the operation and maintenance of properties. Ketprapakorn and Kantabutra (2022) emphasize that an-

choring sustainability in the company’s vision and culture is crucial to promoting acceptance and commitment from all stakeholders. Another central aspect is employee training and awareness. Riratanaphong and Pewklieng (2025) show that regular training programs and workshops are needed to raise awareness of sustainability goals and provide expert knowledge. These measures help ensure that sustainability is anchored not only as a strategic goal but also as a core component of corporate culture. Additionally, companies should regularly document and communicate their progress. Sustainability reporting based on international standards, such as the Global Reporting Initiative (GRI), creates transparency and trust among investors and other stakeholders (Luo & Tang, 2023). Integrating ESG criteria—a set of standards that socially conscious investors use to screen potential investments—into a corporate strategy can also increase attractiveness for sustainable investors and facilitate access to green sources of financing (Riratanaphong & Pewklieng, 2025). An example of successful sustainability integration is the implementation of green building standards, such as LEED or DGNB, which define clear criteria for energy-efficient buildings and environmentally friendly materials that reduce the environmental footprint and operating costs in the long term (Ferreira et al., 2023; Pietocha, 2024).

Integrating sustainability into corporate strategy requires a combination of technological solutions, clear objectives, a strong corporate culture, and transparent communication. Companies that consistently pursue these approaches can meet regulatory requirements and ensure competitive advantages in an increasingly sustainability-oriented market.

The future of sustainability in real estate is bright with the further development of AI-supported tools. These technologies can process large amounts of data and perform real-time analytics, simplifying the analysis and implementation of sustainability models. They pave the way for more informed decisions and a more sustainable future.

2.3. Digitalization and technological innovations: Collaboration between levels of management

Digital technologies such as BIM and IoT are on the brink of revolutionizing real estate management. Rattanaprichavej (2023) highlights the potential of these tools to optimize sustainability goals and monitor energy efficiency. BIM, for instance, enables detailed planning and visualization of real estate projects throughout their life cycle, while IoT technologies provide real-time monitoring of building parameters such as energy consumption, temperature, and air quality (Borrmann et al., 2018). The integration of these technologies promises to streamline operational processes and use resources more specifically, ushering in a new era of efficiency and sustainability in real estate management.

Rattanaprichavej (2023) points out that these technologies require significant investment and depend on the

availability of standardized data. This standardization is a key challenge, as inconsistent data formats and proprietary systems make interoperability difficult. However, in the long term, developing open standards could help facilitate the use of digital technologies in real estate management.

Another significant trend in real estate management is the use of AI to predict market trends, optimize maintenance cycles, and improve building performance. AI-supported systems excel at identifying patterns in large amounts of data, thereby enhancing decision-making (Coman et al., 2023; Fülöp et al., 2024a, 2024b, 2024c; Starr et al., 2021). For example, AI algorithms can develop predictive maintenance strategies by detecting the potential failures of technical systems at an early stage, thus minimizing unplanned downtime. This not only contributes to cost reduction but also to the longevity of the property. This provides a sense of reliability and reassurance about the future of real estate management.

Blockchain technologies offer a promising avenue for improving transparency and security in real estate processes. Blockchain-based smart contracts have the potential to automate transactions and make contract execution more efficient. This is particularly relevant in complex multi-stakeholder real estate projects, as it can significantly increase trust between parties and reduce administrative costs (Coman et al., 2022; Fülöp et al., 2024c; Niu et al., 2024). The adoption of blockchain technologies in real estate processes promises to streamline operations and foster trust, painting an optimistic picture of the future of real estate management.

One significant advancement is the increasing adoption of digital twins. These are virtual models of physical properties that use real-time data to simulate and optimize a building's health and performance. The practical benefits of this technology are substantial, allowing for more precise planning and adjustment of operational strategies, and a faster response to changing conditions (Attaran & Celik, 2023).

Close cooperation between assets, property, and facility management is crucial to effectively achieving sustainability goals. Asset management focuses on strategic decisions and increasing the value of the real estate portfolio, while property management takes on operational tasks such as rental management and maintenance planning. Alternatively, facility management ensures the proper functioning of properties, including energy efficiency and technical maintenance (van der Voordt, 2017). Each of these levels of management has specific tasks and responsibilities that must be shared and coordinated to create synergies and minimize conflicting objectives.

Ullah et al. (2021) emphasizes that a precise distribution of roles and a common communication platform can significantly increase the effectiveness of such collaborations. A common platform that provides real-time data on energy consumption, maintenance status, and rental occupancy enables better decision-making and targeted management of sustainability measures. For example, asset management can develop long-term investment

strategies based on operational facility management data, while property management integrates these strategies into daily life (Treleven et al., 2021). Another crucial factor is the establishment of regular interface meetings and a central reporting system. These measures are vital for ensuring a continuous exchange of information and for aligning all levels of management toward the same goals. Bertoldi et al. (2021) underscore that such coordination measures are particularly significant when implementing complex projects such as energy-efficient renovations or sustainable new buildings.

Furthermore, collaboration can be significantly enhanced through the use of digital technologies such as BIM. BIM provides access at all levels of management to uniform data models that contain information throughout the entire life cycle of a property. The practical application of this technology in promoting transparency and integrating sustainability goals into strategic and operational processes is noteworthy (Fülöp et al., 2024a; Othman et al., 2021; Pinti et al., 2022). Another crucial aspect is training and raising employee awareness at all levels. Khando et al. (2021) recommend specific training programs to ensure that all stakeholders understand the importance of sustainability goals and can implement them in their areas of responsibility. Collaboration between management levels is incredibly successful when a shared vision and clear sustainability goals are defined. This common alignment not only creates efficiency but also strengthens the commitment of everyone involved in sustainable initiatives.

3. Methodology

In recent years, the importance of sustainability, risk management, and social responsibility in real estate management has been steadily increasing. This research, which is unique in its focus on the intricate interplay of these three dimensions, aims to generate practical recommendations for real-world applications. We adopt an exploratory qualitative design to examine the integration of sustainability, risk, and social responsibility (ESG principles) in real estate management. This approach combines a systematic literature review with expert interviews to generate context-specific insights, particularly within the Romanian real estate sector. This methodology is a combination of theoretical and empirical approaches used to address the current challenges and opportunities in these areas, making it well suited for the context of real estate management (Ige et al., 2024; Kuckartz, 2014; May et al., 2021; Riratanaphong & Pewklieng, 2025; Ullah & Al-Turjman, 2023; Zheng et al., 2024).

The research aims to analyze the integration of ESG criteria in real estate management and to show how these criteria can promote sustainable and responsible decision-making processes (Morgante et al., 2023; Warren-Myers, 2012). As part of this study, risk management strategies are also considered in the context of sustainable real estate projects. Here, the focus is on identifying risks and

developing strategies to mitigate them effectively. Another objective is to investigate the social responsibility of the real estate sector, especially its contribution to social justice and social development (Abdulai & Awuah, 2021). Finally, a framework is developed that describes the synergies and areas of tension between sustainability, risk, and social responsibility. This framework serves as a guide for strategic planning and decision-making processes.

This research is based on a systematic literature review that analyzes the interactions between sustainability, risk management, and social responsibility. Sustainability is examined by considering ESG criteria, which serve as guidelines for energy-efficient building methods and life-cycle analyses. Regarding risk management, models are used to identify and assess risks in construction projects. These theoretical approaches are based on research from the literature of Kramer and Porter (2011), Riratanaphong and Pewklieng (2025), and Yin's (2018) methodological approaches to qualitative case studies.

This study adopts an exploratory qualitative research design to uncover the practical challenges and opportunities associated with integrating ESG principles and social responsibility into real estate management. The exploratory approach is well suited for addressing complex and under-researched topics with limited theoretical and empirical knowledge (Stebbins, 2001). Given the evolving nature of ESG implementation and the lack of standardized practices across different markets—particularly in transitional economies like Romania—this design generates in-depth, context-specific insights (Creswell & Poth, 2018).

Expert interviews are the primary data collection method at the core of this research design. These interviews were conducted in a semi-structured format, allowing consistency in thematic coverage and flexibility in exploring individual perspectives. The interview guide was developed based on key themes identified in the literature, including ESG strategy integration, stakeholder engagement, risk management, and social inclusion (Dobrovolskienė et al., 2021; Riratanaphong & Pewklieng, 2025).

The target group consisted of experienced professionals from various segments of the real estate sector, including project developers, institutional investors, asset and facility managers, and ESG compliance officers. Participants were selected through purposive sampling to ensure relevance and depth of expertise. These industry experts provided valuable insights into the strategic and operational dimensions of sustainability adoption in real estate, including the barriers they encounter, the tools they apply

(BIM and ESG software), and the metrics used to assess performance.

Considering that the number of real estate companies capable of adopting advanced technologies—such as AI-driven valuation tools, ESG reporting automation, or real-time building performance optimization—is still relatively limited, we adopted the qualitative approach recommended by Braun and Clarke (2006, 2012, 2013, 2019) to explore how these innovations are practically integrated. Although Braun et al. (2016) suggest that six interviews can constitute a sufficient sample for thematic analysis, this number is not absolute. It must be interpreted by considering the research design and the inquiry's depth, as Cedervall and Åberg (2010) demonstrated in case-based studies. For our analysis of qualitative interview data, we employed the thematic analysis framework established by Braun and Clarke (2006), drawing conceptually on Mayring's (2015) qualitative content analysis methodology. This approach follows a structured and rule-based process that dissects the linguistic material step by step, developing a theory-informed coding framework and identifying categories by predefined analytical foci (O'Kane et al., 2021). The simplified procedure is illustrated in Figure 4, adapted for the context of sustainable real estate management.

Considering the specialized literature and the limited but growing adoption of AI and ESG-aligned systems in the property sector, we conducted twelve semi-structured interviews with professionals from firms involved in sustainable real estate development and management in the Romanian context. The interviews took place between June and December 2024 and lasted between 40 and 80 minutes each. Participants were selected using purposive sampling to ensure the relevance and depth of expertise required for the study. Inclusion criteria included a minimum of eight years of professional experience in real estate development or management, active involvement in ESG initiatives or digital innovation projects such as BIM or ESG reporting systems, and representation from a range of professional roles, including project developers, institutional investors, property and facility managers, and ESG compliance officers. Additionally, all participants were engaged with Romanian or EU regulatory frameworks related to sustainability in real estate. This diverse and experienced sample ensured that both operational and strategic perspectives were captured across the spectrum of ESG implementation.

The case study analyzes the processes and results of the project and identifies the challenges and success

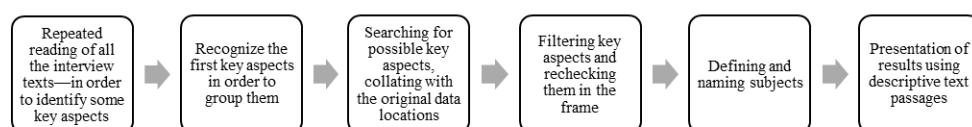


Figure 4. Simplified model of the interview procedure according to Braun and Clarke (2006) (source: own projection)

factors. This approach follows the methodological recommendations of Flick (2018).

Data was collected through the development of a structured questionnaire covering the core topics of sustainability, risk, and social responsibility. The questions aim to systematically collect information about ESG strategies, risk management, and social initiatives. Participants were recruited from various Romanian real estate industry areas to represent a wide range of perspectives. At the same time, specific projects were selected as case studies in collaboration with real estate companies. This meticulous and combined approach ensures a comprehensive database to provide a thorough understanding of the research findings.

The collected data was analyzed in several stages. First, interview transcripts were coded using qualitative content analysis, according to Kuckartz (2014), to identify central themes and patterns. The results of the case studies were then triangulated with the interview findings to highlight differences and similarities, providing robust validation of the theoretical findings. Finally, the results were combined into an integrative framework that maps the interactions between sustainability, risk, and social responsibility. This approach provides the opportunity to gain deeper insights into practice and validate theoretical findings, ensuring the credibility of the research.

The data analysis process involves specific steps. Interview transcripts were analyzed using a combination of Braun and Clarke's (2006) six-phase thematic analysis and Mayring's (2015) qualitative content analysis framework:

1. Familiarization with data through repeated reading.
2. Generation of initial codes via NVivo 12.
3. Theme identification based on frequency and conceptual relevance.
4. Theme review and refinement across cases.
5. Theme definition and final naming.
6. Report production with thematic synthesis.

Coding followed both inductive and deductive logic. Initial codes emerged from the interview data but were refined using themes from the literature review (e.g., ESG criteria, digital tools, stakeholder roles). Coding reliability was supported through peer review and intercoder dialogue to minimize subjectivity.

The research results are presented in several formats. The theoretical framework illustrates the connections between the three dimensions of sustainability, risk, and social responsibility and provides practical implications for real estate management. In addition, best practices and concrete recommendations for action are formulated that can serve as guidelines for property managers and policy-makers. These results provide a scientific basis and offer practical approaches for the further development of real estate management.

While this study offers valuable, context-specific insights into ESG integration within the Romanian real estate sector, several limitations must be acknowledged. First, the findings are specific to Romania and may not be generalizable to

other real estate markets with different regulatory, cultural, or economic conditions. Second, the qualitative nature of the research and the use of a targeted expert sample may introduce selection bias or reflect overly optimistic assessments based on self-reporting. Third, the evolving nature of ESG frameworks and regulatory standards could limit the long-term relevance of some conclusions, particularly as new guidelines and metrics are adopted. Lastly, the absence of quantitative performance benchmarks restricts the ability to compare results across markets or measure the tangible impact of ESG practices. Future research should address these limitations through longitudinal and cross-national studies that incorporate quantitative indicators to assess the effectiveness and scalability of ESG implementation in real estate more rigorously.

4. Results and discussion

The role of real estate professionals, researchers, and policy-makers in the industry is significant. Sustainability, risk, and social responsibility are integral parts of modern property management, and their growing importance reflects both social expectations and regulatory and market requirements. Companies in the real estate industry face the challenge of combining environmental sustainability, economic stability, and social responsibility. To address this, systematic risk analyses and the integration of ESG criteria provide a framework for effectively integrating sustainability strategies into business processes. This integration not only mitigates risks and ensures compliance with regulations but also enhances a company's reputation, attracts socially responsible investors, and fosters community goodwill, thereby creating long-term value for stakeholders.

We used interview-based research to capture the perceptions and implementation practices of this triad strategy in the Romanian real estate industry. The results obtained provide insight into the current state of integrating sustainability, risk, and social responsibility, as well as valuable recommendations to promote sustainable development in real estate management.

The interviews took place between June and December 2024. Twelve experts participated in the interviews, and the duration of the interviews ranged between 40 and 80 minutes (see Table 1). With the experts' consent, the interviews were audio-recorded, which allowed the statements from the interviews to be consulted after the fact. Based on the notes and recordings, the statements of the interviewees relevant to the study were transcribed in text form. To protect the interviewees' privacy, all personal and company-specific information was anonymized—which ensures that no conclusions can be drawn that would reveal the participant's or their organization's identity (Saunders et al., 2015). This practice aligns with ethical research standards and data protection regulations, such as the General Data Protection Regulation (GDPR), which defines anonymization as rendering data unidentifiable in a manner that prevents reidentification (European Union, 2016, Recital 26).

Table 1. Profile of the interviewees

Interview	Position	Age	Years of experience	Interview duration
1.	Facility manager	40–45	14	49:17
2.	Property manager	30–35	12	51:30
3.	Property manager	40–45	18	63:45
4.	Property manager	40–45	19	55:30
5.	Facility manager	30–35	10	70:45
6.	Property manager	45–50	24	66:30
7.	Property manager	25–30	5	57:45
8.	Facility manager	30–35	8	51:35
9.	Property manager	50–55	20	48:15
10.	Facility manager	45–50	25	62:10
11.	Facility manager	35–40	14	76:15
12.	Facility manager	35–40	13	63:10

To ensure that the topics are addressed equally, a uniform questionnaire was used, which was used in interviews with different weights for the individual questions. The questionnaire consists of basic and supplementary questions to complement the picture and statements presented further within the results.

This research analyzed data from expert interviews using qualitative content analysis, following the structured methodology proposed by Kuckartz (2014). A systematic approach to data analysis was adopted to enhance analytical transparency and ensure the trustworthiness of the results. In the second phase of the study, all individual interview transcripts were compiled into a document totaling 145 pages and imported into NVivo 12, a qualitative data analysis software widely used for content structuring and thematic exploration (Mayring & Fenzl, 2019).

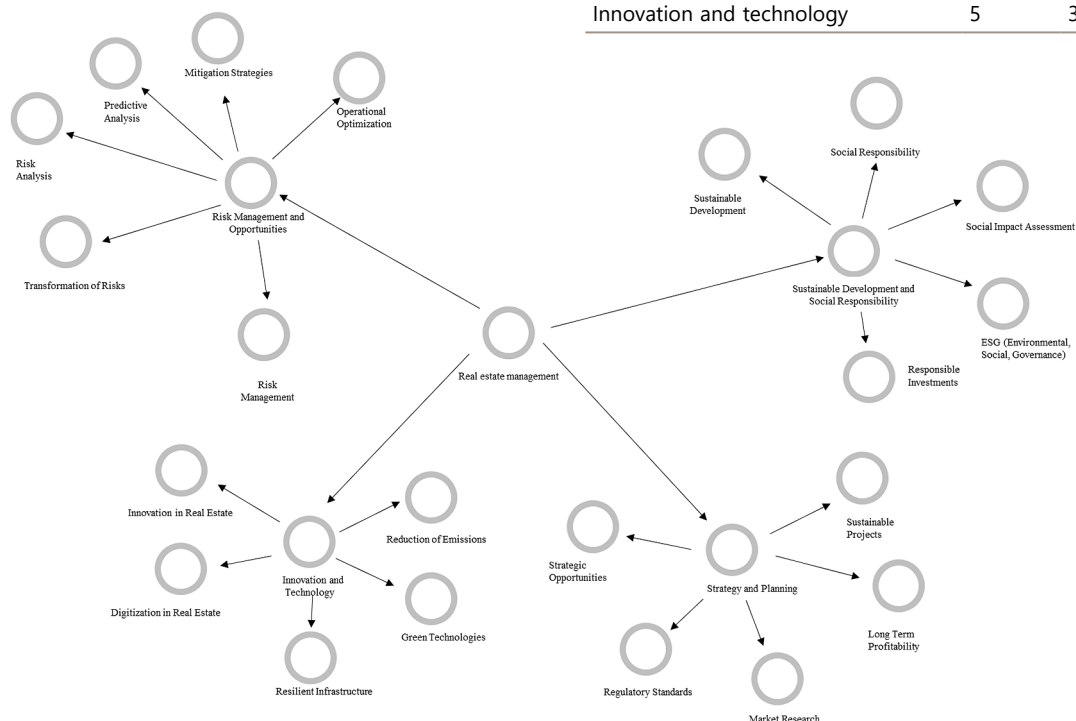
The entire coding process was conducted within NVivo 12, which facilitated both the organization of large volumes of text and the identification of recurring patterns across cases. The analysis followed the six-phase thematic analysis framework proposed by Braun and Clarke (2006). This method involves: (1) familiarization with the data, (2) generating initial codes, (3) searching for themes, (4) reviewing themes, (5) defining and naming themes, and (6) producing the report. This structured yet flexible approach allowed the research to identify key themes related to ESG integration, stakeholder engagement, and risk management within real estate while accommodating context-specific insights from the Romanian market. The use of thematic analysis further aligns with qualitative standards for rigor and reflexivity in exploratory research (Braun & Clarke, 2012; Kuckartz, 2014). This multi-layered approach ensured that the conclusions were grounded in empirical evidence and reflective of both theoretical frameworks and practical realities in the Romanian real estate sector.

RQ1: How can real estate management systematically identify risks and turn them into opportunities to develop sustainable and socially responsible strategies?

The results indicate that all those interviewed are familiar with the general aspects of real estate management (Table 2 and Figure 5).

Table 2. Thematic analysis of nodes and references for RQ1

Sub-theme	Number of nodes	Frequency of references
Risk management and opportunities	6	68
Sustainable development and social responsibility	5	44
Strategy and planning	5	54
Innovation and technology	5	38

**Figure 5.** Real estate management

Real estate management is undergoing a profound transformation, requiring an integrated approach that combines risk management, sustainability, social responsibility, and technology. Effective risk management is the basis of decision-making. Early identification of operational and financial risks can provide opportunities for rapid adaptation, turning them into competitive advantages (Mai et al., 2021; Riratanaphong & Pewklieng, 2025). For example, rising energy costs can boost investment in green technologies, which reduces long-term costs and supports sustainability.

Risk analysis and predictive tools allow for problem anticipation and proactive intervention. Predictive models based on AI provide solutions that identify patterns and enable effective interventions (Alzain et al., 2022). This not only helps with problem anticipation but also instills confidence in the decision-making process. Risk mitigation strategies, such as portfolio diversification or flexible contracts, help reduce uncertainty and adapt quickly to market changes. At the same time, predictive analytics support operational optimization, helping to maximize asset performance and reduce losses.

Sustainability and social responsibility play a key role in modern property management. First, sustainable development involves the integration of ecological and social criteria at all stages of the project. This is both a moral obligation and an economic necessity. Sustainable buildings attract quality tenants and ensure long-term success for properties, reduce operational costs, and increase the value of long-term assets (Thieking, 2016). Second, social impact assessment is essential for projects that support the inclusion and development of local communities. Respondents emphasize that *"buildings should reflect the values of the community and respond to their needs"*.

The ESG criteria provide a clear framework for developing sustainable projects. ESG integration not only improves regulatory compliance but also attracts responsible investors. These criteria balance financial performance and social or environmental impact, providing significant strategic opportunities (Riratanaphong & Pewklieng, 2025). Responsible investing thus becomes a way to combine financial profitability with long-term social value.

Strategy and planning are essential for success. The identification of emerging opportunities, supported by market research and strategic planning, allows for the anticipation of trends and the reduction of uncertainty. Sustainable projects reduce environmental impact and increase long-term profitability (Akhtar et al., 2022). Additionally, stringent regulatory standards create differentiation opportunities for companies that align with modern requirements.

Technology plays a transformative role in real estate. Digitalization facilitates asset management through detailed visualizations and real-time analysis through technologies such as BIM (Thieking, 2016). At the same time, the IoT allows continuous monitoring of building parameters, such as energy consumption and air quality, offering

the possibility of implementing fast and efficient solutions. Similarly, blockchain, through smart contracts, increases the transparency and security of real estate processes (Ullah & Al-Turjman, 2023). Another innovative technology, digital twins, offers a virtual simulation of buildings, allowing performance to be optimized and adapted to market requirements. Digital twins are virtual replicas of physical buildings that can be used for various purposes, including predicting maintenance needs and optimizing energy consumption. AI is also crucial in anticipating market trends and optimizing decision-making processes (Alzain et al., 2022).

Reducing emissions and using green technologies are central priorities in modern real estate strategies. Investing in resilient infrastructure, which refers to structures and systems designed to withstand and quickly recover from disruptive events, protects assets from climate risks and ensures long-term returns. This can include measures such as flood barriers, green roofs, and energy-efficient building materials.

In conclusion, real estate management requires an integrated approach to turn risks into opportunities and develop sustainable and socially responsible strategies. Respondents highlighted the importance of using innovative technologies, ESG criteria, and sound strategic planning to remain competitive. The integration of these elements supports regulatory compliance and provides opportunities for sustainable growth, positioning the real estate sector as a leader in responsible economic development (Riratanaphong & Pewklieng, 2025).

RQ2 What role do social responsibility and environmental sustainability play in the long-term value creation of real estate?

Social responsibility and environmental sustainability, when integrated into the real estate sector, create long-term value. These interconnected concepts contribute to the development of resilient projects that attract responsible investors and improve users' quality of life (Mai et al., 2021; Riratanaphong & Pewklieng, 2025). Data from interviews and literature highlight the importance of an approach that combines social inclusion, energy efficiency, and sustainable financial performance (see Table 3 and Figure 6).

First, social responsibility is a key element in creating stable communities. It includes social inclusion, community development, and social equity, all of which are fundamental to attracting a diverse spectrum of tenants and investors. Mai et al. (2021) point out that real estate projects that integrate affordable housing and community infrastructure reduce the economic risks associated with

Table 3. Thematic analysis of nodes and references for RQ2

Sub-theme	Number of nodes	Frequency of references
Social responsibility	6	56
Sustainability of the environment	7	52
Creating long-term value	7	64

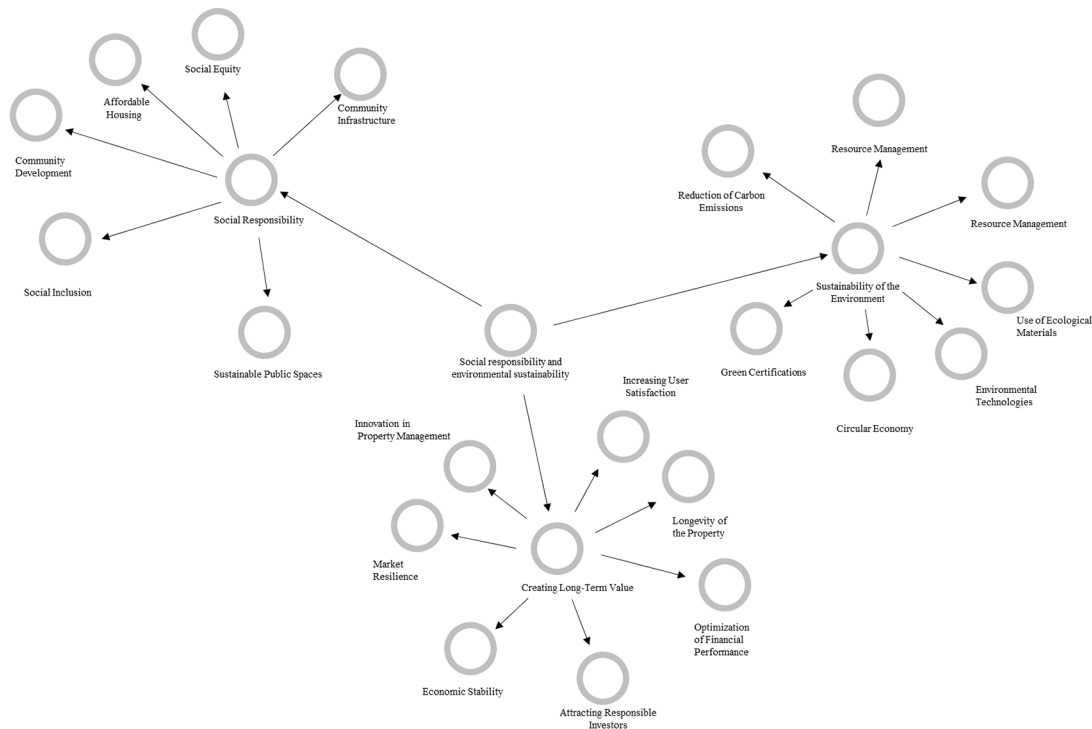


Figure 6. Social responsibility and environmental sustainability

social segregation. In addition, sustainable public spaces increase the attractiveness and long-term value of projects, providing an environment that supports the health and well-being of residents. One interviewee stated that *"creating an environment that supports diversity and inclusion contributes to the long-term stability of the real estate market"*.

Second, environmental sustainability is essential for reducing the environmental impact of real estate projects. Reducing carbon emissions and using green materials are top priorities, in line with international standards such as LEED and DGNB (Ferreira et al., 2023; Pietocha, 2024). Riratanaphong and Pewklieng (2025) show that integrating environmental technologies, such as IoT energy consumption monitoring systems, supports regulatory compliance and generates significant long-term savings. One of the interviewees stressed that *"investing in energy-efficient technologies is not only a legal obligation, but also an opportunity to build the company's reputation"*. An important aspect of sustainability is the circular economy, a concept that involves reusing resources and reducing waste in a continuous loop. In the context of real estate, this means designing buildings and communities that minimize resource consumption and waste generation, thereby reducing operational costs and attracting investors who value sustainability. In addition, eco-certifications provide a clear framework for assessing and communicating a project's sustainable performance, thus increasing market transparency and trust.

Integrating social responsibility and environmental sustainability into a coherent strategy can create long-

term value. Using sustainable materials and implementing advanced technologies directly influences a property's longevity. Scope et al. (2021) highlight that such practices not only extend the life of buildings but also reduce maintenance costs, thus increasing the attractiveness of real estate assets. A participant noted that *"the property's longevity is closely linked to the ability of projects to meet current needs without compromising the future"*.

Attracting responsible investors is a key factor in creating long-term value. ESG provides a strategic framework for sustainable projects, allowing companies to demonstrate a commitment to sustainability and social responsibility (Morgante et al., 2023). Newell et al. (2023) argue that projects integrating ESG attract responsible capital and provide a competitive advantage in a market increasingly focused on sustainability. This underlines the urgency of integrating ESG frameworks into real estate strategies.

Property management innovation also helps optimize financial performance and increase user satisfaction. Technologies such as digital twins offer modern solutions for efficient asset management, improving both user experience and economic profitability. Automation systems also play a key role in this, allowing for the efficient operation of sustainable features. According to one interviewee, *"users are attracted to buildings that offer modern and sustainable solutions, which contributes to loyalty and long-term value growth"*.

In conclusion, social responsibility and environmental sustainability are interdependent and essential for long-term value creation in the real estate sector. Integrating these elements into management strategies ensures

regulatory compliance and provides opportunities for sustainable growth. The literature and the interviewees' statements support the importance of a holistic approach that combines innovation, economic performance, and social impact to position the real estate sector as a leader in sustainable development.

RQ3 What measures and tools can be used to integrate the triad of sustainability, risk, and social responsibility into existing management processes?

Integrating the triad of sustainability, risk, and social responsibility into real estate management processes is a complex but essential challenge for the sector's sustainable development (see Table 4 and Figure 7). A key component of this integration is proactive risk management, which involves a combination of social initiatives and innovative technologies. Each of these elements contributes to the creation of a resilient and responsible real estate market (Mai et al., 2021; Riratanaphong & Pewklieng, 2025; Zheng et al., 2024).

Risk management is a central pillar of any modern real estate strategy. A detailed risk analysis, as highlighted by the interviewees and supported by the literature, is the first essential step in identifying vulnerabilities and trans-

forming them into strategic advantages. One interviewee stated, "A detailed risk analysis allows you to anticipate market changes and make informed decisions". Grybauskas et al. (2021) also emphasize the importance of using predictive methods to minimize uncertainties.

Modeling risk scenarios and implementing business continuity plans are complementary measures that support organizational resilience. Thus, companies can respond more effectively to economic crises, legislative changes, or other unforeseen events. At the same time, portfolio diversification has been identified as an effective risk mitigation strategy. It allows investments to be distributed across various properties and markets, reducing exposure to economic fluctuations. One respondent stated that "diversification gives us the flexibility to adapt to dynamic market conditions".

Another essential aspect is assessing financial and regulatory risks. A clear understanding of legislative requirements and financial implications is crucial, as it helps businesses avoid penalties and maintain compliance. Durable property insurance provides a safety net by absorbing the financial impact of unforeseen events, such as natural disasters.

Social responsibility is a fundamental element of sustainable real estate processes. The interviewees identified the creation of affordable housing and community development as strategic priorities. For example, one participant pointed out that "investing in affordable housing not only improves the quality of life but also contributes to long-term market stability". Jewett et al. (2021) also highlight the fact that social projects support community inclusion and cohesion, reducing the risks associated with social segregation.

Table 4. Thematic analysis of nodes and references for RQ3

Sub-theme	Number of nodes	Frequency of references
Risk management measures	6	68
Integration of social responsibility	7	56
Digital and technological tools	7	62

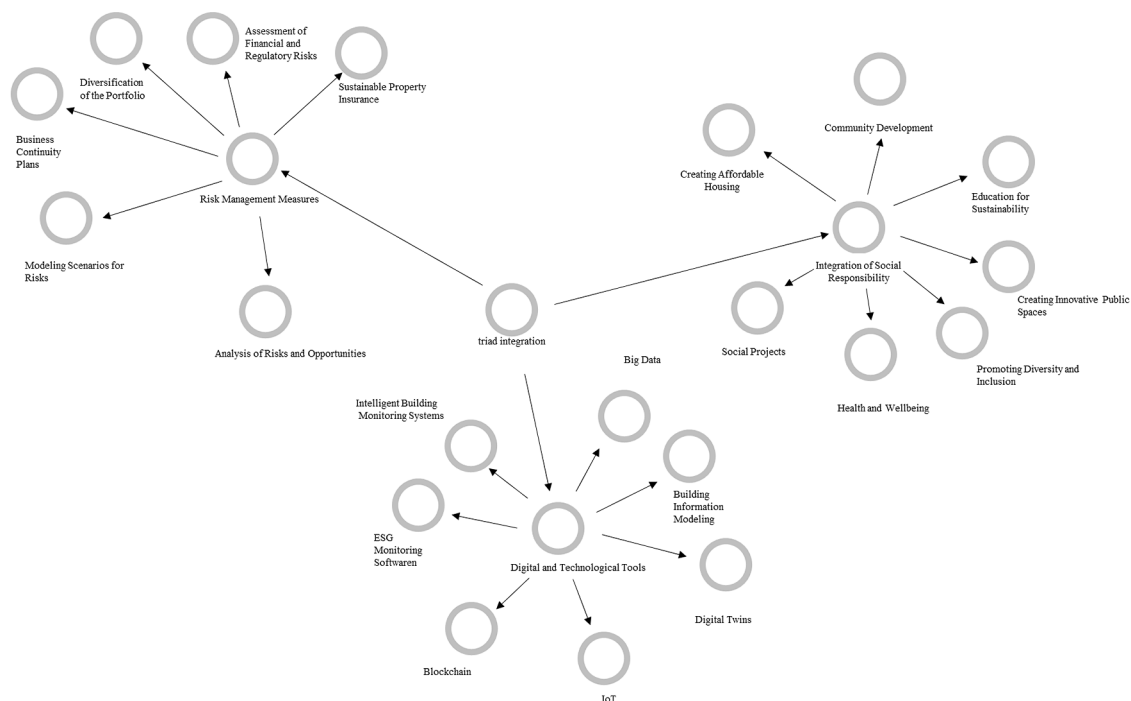


Figure 7. Triad integration

Furthermore, education on sustainability is important for raising awareness of social responsibility. This is complemented by initiatives that promote diversity and inclusion. Projects that integrate these principles attract responsible investors and create built environments that meet the needs of diverse populations. Ratcliffe et al. (2021) argue that these initiatives improve the organization's image and increase the value of assets in the long term.

Innovative public spaces and promoting health and well-being in built environments are other essential components of social responsibility. One interviewee noted that *"projects prioritizing user well-being increase user satisfaction and loyalty, which reflects positively on the financial performance of assets"*.

Technology is vital in integrating sustainability, risk, and social responsibility. BIM is one of the most widely used digital tools, enabling the detailed management of real estate projects throughout their life cycle (Othman et al., 2021; Pinti et al., 2022). *"BIM helps us identify potential problems before they arise, saving time and resources"*, said one interviewee. Thieking (2016) points out that BIM supports compliance with international standards and improves operational efficiency. Similarly, digital twins combined with IoT technologies provide accurate data on energy consumption and resource use, helping to reduce carbon emissions. Blockchain ensures the transparency and security of real estate transactions, eliminating the risks associated with fraud (Botoc et al., 2024).

ESG monitoring software is a vital tool for measuring a project's social and environmental performance. These tools not only allow companies to track progress in achieving sustainability goals but also effectively communicate the results to investors and other stakeholders. As the interviewees pointed out, these *"digital technologies simplify reporting processes and ensure alignment with regulatory requirements. This emphasis on communication should make the audience feel more informed and engaged in the sustainability efforts of the real estate sector"*.

Integrating sustainability, risk, and social responsibility into management processes is a challenge and a transformative journey. This holistic and multidimensional approach, as confirmed by the literature and the interviewees' statements, fundamentally reshapes the real estate sector. It ensures market resilience and user satisfaction, paving the way for a more sustainable and responsible future.

While there is a growing body of literature addressing sustainability in real estate, this study offers a distinctive theoretical contribution by developing an integrative framework that synthesizes agency theory with ESG-driven sustainability models in the context of emerging markets. The framework presented goes beyond existing approaches by addressing environmental criteria and incorporating risk management and social responsibility as strategic levers within corporate real estate management (Ige et al., 2024).

The theoretical foundation is anchored in principal-agent theory (Anglin & Arnott, 1991; Jensen & Meckling, 1976), which has been applied here to highlight the misalignment between long-term sustainability goals (valued by investors and regulators) and short-term operational incentives (pursued by managers). Extending this theory with ESG-aligned incentive structures and performance metrics, the study contributes a novel analytical model that enhances stakeholder alignment—especially relevant in fragmented regulatory environments such as Romania (Bernhold & Wiesweg, 2021; Kimmerle, 2019).

Moreover, the proposed model advances sustainability scholarship by incorporating technological enablers—such as BIM, IoT, and ESG dashboards—as mechanisms for resolving informational asymmetries, ensuring compliance, and enhancing transparency in reporting (Borrmann et al., 2018; McAllister & Nase, 2023). Unlike prior works that emphasize ESG criteria in isolation, this study demonstrates their systemic integration into all real estate life cycle phases, including planning, operation, stakeholder engagement, and impact measurement.

Notably, this research builds on and expands studies such as Riratanaphong and Pewklieng (2025), who developed an ESG-based framework for CREM in Thailand. While their contribution focuses on aligning ESG implementation with building conditions and corporate strategies in a Southeast Asian context, the present study extends this model by adapting it to European transitional markets, offering cross-contextual insights, and highlighting localized challenges, such as fragmented policy frameworks, limited digital adoption, and evolving investor expectations.

This study fills a critical gap in sustainability research by providing a theoretically grounded, technologically enabled, and practice-oriented framework that connects ESG compliance to long-term value creation across economic, social, and environmental dimensions (Dobrovolskienė et al., 2021; Morgante et al., 2023). This substantiates its theoretical claims and lays the groundwork for future empirical testing and policy adaptation in similar emerging markets, informing and enlightening the real estate and sustainability community.

The insights derived from expert interviews provide both theoretical contributions and actionable strategies for ESG integration in the real estate sector. These findings translate into several practical recommendations that can support developers, investors, and property managers in enhancing sustainability performance. For instance, many experts emphasized the value of integrating BIM with ESG dashboards to support real-time monitoring of environmental metrics such as energy consumption, water usage, and carbon emissions. In practice, this has been successfully demonstrated in several green-certified office buildings in Bucharest, where these tools facilitated improved operational efficiency and stakeholder reporting.

Furthermore, the interviewees highlighted the importance of structured stakeholder engagement processes, particularly during the planning and post-construction

phases. Institutional investors have implemented collaborative ESG frameworks that include regular impact assessments, third-party audits, and alignment with EU Taxonomy requirements. These practices not only improved transparency but also increased investor confidence and tenant satisfaction.

Another area of practical relevance lies in the social inclusion initiatives mentioned by facility managers, such as integrating community-oriented amenities (e.g., green spaces, mobility hubs, or cultural spaces) into urban developments. These were linked to positive long-term outcomes, including stronger tenant retention, improved well-being, and regulatory alignment with evolving ESG standards. Collectively, these examples support the view that ESG is not just a compliance requirement but a value-creation strategy. They demonstrate how the recommendations from this study are already shaping real-world practices, reinforcing the practical viability and transferability of the proposed ESG implementation framework.

5. Toward a holistic framework for sustainable real estate: Standards, technology, participation, and performance metrics

5.1. Standardizing sustainability: An ESG-based framework for real estate valuation

While integrating sustainability, risk, and social responsibility into real estate management has advanced significantly, a persistent methodological gap remains in inconsistent and non-standardized valuation frameworks. The reliance on metrics and qualitative assessments continues to undermine comparability and investor confidence, particularly in emerging markets such as Romania, where regulatory and institutional mechanisms for sustainability valuation are still developing (Riratanaphong & Pewklieng, 2025; Warren-Myers, 2012).

We propose a standardized valuation framework grounded in ESG principles to address this challenge. We extend the principal-agent theory by incorporating performance metrics that align with long-term sustainability objectives (Anglin & Arnott, 1991; Kimmerle, 2019). The environmental component of this model emphasizes measurable outcomes such as LCAs, energy use intensity, and carbon emissions, ensuring alignment with the EU Taxonomy for Sustainable Finance (Ige et al., 2024; Larsen et al., 2022). Social dimensions are assessed through indicators such as housing affordability, accessibility, and community health impact (Adabanya et al., 2023; Barauskaite & Streimikiene, 2021), while governance is evaluated through transparency standards, ESG disclosures, and stakeholder engagement practices using frameworks such as GRI and SASB (Luo & Tang, 2023; McAllister & Nase, 2023).

A scoring matrix based on multicriteria decision analysis is introduced to quantify and aggregate these dimensions into a composite sustainability score tailored to stakeholder priorities and adaptable across regulatory en-

vironments (Dobrovolskienė et al., 2021). The framework's operational viability relies on digital technologies such as BIM and IoT for real-time data integration (Borrmann et al., 2018; Pinti et al., 2022), cross-sector collaboration for regulatory alignment, and professional training for implementation capacity (Khando et al., 2021). Ultimately, this ESG-based valuation framework offers a transparent, replicable, and data-driven method for assessing long-term sustainable value, with future research needed to validate its regional applicability, optimize weighting systems using empirical investor data, and explore the integration of AI for dynamic sustainability scoring (Alzain et al., 2022; Starr et al., 2021).

5.2. Transforming real estate management with AI, IoT, and digital twins for sustainability

While the theoretical potential of AI, IoT, and digital twins to improve sustainability in real estate is widely acknowledged, there remains a critical gap in detailing their practical application (Rattanaprichavej, 2023; Starr et al., 2021). These technologies are increasingly seen as transformative tools capable of optimizing resource efficiency, reducing emissions, and enhancing occupant well-being through real-time monitoring and predictive analytics. IoT devices, for instance, enable continuous data collection on building performance parameters such as energy usage, air quality, and occupancy, which can be used to optimize HVAC and lighting systems, as exemplified by The Edge in Amsterdam—achieving a 98.4% BREEAM score using over 28,000 sensors (Deloitte, 2019).

Predictive AI-powered maintenance further strengthens sustainability outcomes by reducing unplanned downtime and extending equipment lifespan, as demonstrated by JLL's AI-driven system, which cut HVAC energy use by 18% (JLL, 2023). In the planning phase, AI-integrated tools such as Autodesk's Spacemaker support energy-efficient design through solar exposure and noise dynamics simulations, leading to energy savings even before construction begins. Digital twin technology takes this a step further by providing a dynamic virtual model of a building that responds to real-time data, enabling scenario-based performance optimization—such as in Singapore's Tengah Smart Town, where energy planning is managed across an entire district (Attaran & Celik, 2023). However, several barriers must be addressed, including high initial investment costs, data security concerns, interoperability challenges, and workforce skill gaps. These can be mitigated through green financing, cybersecurity protocols, adopting open standards like BACnet, and targeted training programs (Khando et al., 2021).

Implementing AI and IoT technologies promises to lower operational costs, improve ESG reporting transparency, and align real estate practices with EU Taxonomy and decarbonization targets. Policy support through tax incentives, regulatory standardization, and mandatory digital reporting frameworks is essential to accelerate this

transition. Ultimately, the integration of innovative technologies in real estate shifts buildings from static assets to intelligent, responsive systems. This enables sustainability across their life cycle and sets a foundation for further research into their long-term financial and social impacts (Alzain et al., 2022; Attaran & Celik, 2023; Starr et al., 2021).

5.3. From consultation to co-creation: Strategic stakeholder engagement in sustainable real estate management

The integration of sustainability, risk, and social responsibility in real estate management is inherently a social process, demanding the deliberate engagement of diverse stakeholders to align interests and co-create long-term value (Ratcliffe et al., 2021; Ullah & Al-Turjman, 2023). Despite its strategic relevance, many frameworks fail to offer practical guidance for coordinated collaboration between investors, developers, policymakers, and local communities.

Effective stakeholder engagement requires not only mapping roles—such as investors seeking ESG-aligned returns, developers managing implementation, and communities advocating for inclusion—but also understanding each actor's motivations and constraints (Newell et al., 2023; Riratanaphong & Pewklieng, 2025). Participatory planning workshops, such as those employed in Freiburg's Vauban District, exemplify how early community input can shape successful eco-developments (Glatte, 2021).

In parallel, digital platforms such as MindMixer and CoUrbanize offer inclusive tools for asynchronous feedback, extending engagement to underrepresented groups (Jewett et al., 2021). Additionally, stakeholder alignment sessions—particularly when anchored in ESG frameworks like GRESB or DGNB—can define shared metrics and reinforce accountability through formal charters. Social impact assessments (SIA) and community benefits agreements (CBAs) further institutionalize social responsibility, addressing potential displacement and gentrification before they escalate (Barauskaite & Streimikiene, 2021). To ensure continuity, real estate firms are encouraged to establish Sustainability Steering Committees, integrate stakeholder feedback into ESG reports, and implement grievance redress systems (Ketprapakorn & Kantabutra, 2022; Luo & Tang, 2023). While benefits include enhanced project legitimacy, risk mitigation, and higher ESG performance, challenges persist—ranging from power asymmetries and consultation fatigue to resource-intensive processes such as extensive data collection and analysis, and prolonged negotiation and consensus-building.

Overcoming these challenges requires a structured, transparent, ongoing commitment to engagement that can shift the process from tokenistic consultation to authentic co-creation. Ultimately, embedding stakeholder collaboration into the DNA of sustainable real estate strategies can enable socially responsive development, enhance community trust, and reduce regulatory and reputational risk, making it a cornerstone of modern property management.

5.4. Quantifying long-term value: A metrics-based approach to ESG integration in sustainable real estate

Long-term value creation is a foundational principle in sustainable real estate management, yet its practical realization hinges on developing standardized and multidimensional performance indicators. The integration of sustainability, risk, and social responsibility remains conceptually robust but practically limited without metrics that allow stakeholders to assess financial and socio-environmental outcomes over time (Dobrovolskienė et al., 2021; Morgante et al., 2023). We propose a comprehensive ESG-based framework comprising environmental, social, economic, and governance indicators to address this gap. These include energy use intensity and carbon emissions for environmental performance, housing affordability and tenant satisfaction to gauge social impact, life-cycle costs and NOI growth for economic viability, and ESG transparency scores and ESG-linked financing ratios for governance evaluation. These indicators are aligned with EU Taxonomy goals. They can be automated via BIM, IoT devices for data collection, and ESG software for analysis and reporting, enabling real-time benchmarking and reporting (Ige et al., 2024; Pinti et al., 2022).

Practical examples play a crucial role in further validating this framework. For instance, the EDGE building in Amsterdam demonstrates a 70% reduction in energy use and a 15% increase in NOI by leveraging IoT-driven energy monitoring (Deloitte, 2019). Singapore's Tengah Smart Town uses digital twins to model and manage long-term social and environmental impacts across an urban district (Attaran & Celik, 2023). Globally, the GRESB Real Estate Assessment illustrates how consistent ESG benchmarking can enhance shareholder value, with top-quartile performers achieving up to 10% higher returns (Newell et al., 2023). These examples reassure us of the framework's applicability and potential to drive positive changes in the real estate industry.

Beyond enhancing investment clarity and regulatory compliance, standardized metrics promote continuous improvement through adaptive management. For successful implementation, we recommend integrating KPIs into digital ESG dashboards, promoting staff training in sustainability reporting, aligning with certification bodies, and conducting longitudinal studies to evaluate real asset performance. However, the urgency and importance of global KPIs harmonizing cannot be overstated. It is a task that must be prioritized in future research, along with developing AI-enhanced ESG forecasting tools and integrating circular economy measures into valuation practices.

6. Conclusions

Sustainability (the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs), risk, and social responsibility form a central triad in real estate management that addresses

ecological, economic, and social objectives. While an integrative view of these dimensions through strategic processes and innovative technologies offers significant advantages, challenges such as high initial investment costs and conflicting objectives between actors remain.

This paper makes a significant theoretical contribution to sustainability research in real estate management. Integrating sustainability objectives with principal-agent theory provides a solid foundation for understanding conflicting objectives and informational asymmetries between owners, investors, and managers. This theoretical framework, which often arises from divergent interests and unequal availability of information, is a significant advancement in the field. Furthermore, the paper expands the understanding of ESG criteria, demonstrating that they are not isolated factors but dynamic and integrative elements of the real estate life cycle.

The research highlights that sustainability needs to be addressed not only at the level of individual buildings but also at the level of portfolio strategy and organizational structure. It emphasizes the relevance of a holistic approach that combines regulatory, strategic, and operational levels. This is particularly important for the development of theory, as it is an extension of classical approaches that often look at sustainability only as an additional criterion.

The paper also discusses how technological innovations, such as BIM and life-cycle analysis, have practical and theoretical implications for sustainability research. These technologies are not just changing how sustainability is implemented; they are also making it more feasible and less complex. They provide new data modeling and analysis insights, opening opportunities to better understand and quantify the interactions between ecological, social, and economic factors, and thereby strengthening the theoretical foundation of sustainability concepts.

This paper encourages further research on the interfaces between sustainability goals and other fundamental real estate-related theories, such as resource or stakeholder theories. This could lead to a more comprehensive theoretical framework that captures the complexity of sustainable property management in an increasingly technological and regulated environment. Therefore, the present study extends existing theoretical approaches and lays the foundation for subsequent interdisciplinary research approaches.

This paper offers practical recommendations for effectively implementing sustainability goals in real estate management. Companies should integrate sustainability into their strategic and operational processes using assessment matrices to identify synergies and potential conflicts. It also emphasizes the importance of coordination between different levels of property management and the role of modern technologies in implementation. By following these recommendations, stakeholders can successfully implement sustainability initiatives in real estate management practices.

Tools such as BIM and LCAs make planning and monitoring data-driven sustainability strategies possible. These

technologies provide increased transparency and promote the long-term planning and optimization of real estate projects. Additionally, companies should invest in training their employees and raising awareness among all stakeholders to increase the acceptance of sustainable practices. Transparent communication of goals and successes can strengthen investor and public confidence while increasing the speed of implementation. These recommendations demonstrate that an integrative and technology-based approach is essential for successful sustainability initiatives in real estate management.

Despite the various findings, this study needs to consider some limitations. First, much of the analysis is based on qualitative data, which limits the generalization of the results. Qualitative methods, such as those used in expert interviews and case studies, provide in-depth insights into specific contexts but cannot be easily transferred to other real estate markets or projects. Second, in practice, there is often a lack of standardized assessment methods to quantify the economic impact of sustainability measures accurately. This makes it difficult for investors and managers to make informed decisions and can lead to the potential benefits of sustainable investments not being fully recognized. This gap in valuation approaches highlights the need for further methodological developments, particularly in life-cycle cost analysis and ESG assessment. Third, regulatory frameworks vary significantly between countries and markets. This divergence makes it more difficult to implement international strategies and can lead to competitive advantages or disadvantages for companies, depending on the requirements in their market.

Sustainable real estate management prospects open exciting research and development directions that allow for theoretical and practical progress. A central focus should be on standardizing assessment methods. Uniform standards for the valuation of sustainable real estate projects are essential to improve the comparability and transparency of investments. Such standards allow investors and developers to make more informed decisions and better assess risks. At the same time, technological progress offers significant opportunities to improve sustainability performance. AI and the IoT could help optimize processes, increase energy efficiency, and analyze real-time data. However, these developments require further studies to understand their potential applications and impacts fully.

Another key consideration for future research is social responsibility in real estate management. In particular, creating affordable housing and promoting social integration are becoming increasingly important against increasing urbanization and social inequalities. Therefore, future studies should examine how social objectives can be effectively integrated into sustainable real estate projects without compromising economic viability. In addition, interdisciplinary approaches that combine sustainability, technology, and social responsibility are crucial. They could reveal new ways to design sustainable real estate projects. The involvement of different stakeholders—from municipalities and investors to tenants—could produce innovative

models that consider environmental, social, and economic interests equally. These perspectives highlight the need to look at sustainability not just as a technical or economic concept but as a comprehensive and dynamic approach that responds to the needs of a changing society. By considering these aspects, real estate management can contribute to increasing the value of projects and have a positive social and ecological impact.

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