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RESEARCH ARTICLE

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Promoting sustainable practices through green investments in the United Kingdom real estate industry

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Abstract

This paper aims to examine how sustainable practices in the UK real estate industry are impacted by green investments through qualitative research, focusing on interviews with developers. The findings reveal that regulatory frameworks, market demand, financial incentives, corporate responsibility, and technological innovation are crucial factors in sustainable practices. There is a growing consumer demand for sustainable properties, supported by financial incentives like grants, tax credits, and green finance mechanisms such as green bonds. These bonds play a crucial role in promoting sustainable building practices, including energy-efficient design and renewable energy integration. The research highlights motivators for stakeholders to participate in sustainability initiatives, including financial benefits, regulatory compliance, reputation, and consumer demand, despite challenges like perceived higher costs and regulatory hurdles. This research highlights specific implications for policymakers to design effective regulatory frameworks and incentives, investors to prioritize green investments through mechanisms like green bonds, and industry professionals to enhance corporate responsibility and meet growing consumer demand for sustainable properties.

KEYWORDS
green bonds, green investment, real estate, sustainable finance, sustainable practices

1 | INTRODUCTION

In recent years, the global focus on sustainability has intensified, with various industries exploring ways to reduce their environmental impact. The real estate industry, a significant contributor to carbon emissions and resource consumption, is increasingly integrating sustainable practices. Green investments, which emphasize environmentally friendly and energy-efficient practices, are gaining traction as a means to foster sustainability within the UK real estate sector (Alabid et al., 2022; Bergman & Foxon, 2020; Ratcliffe et al., 2021). This paper aims to explore how green investments can promote sustainable practices in the UK real estate industry, aligning with broader environmental goals.

The research on green investments and sustainable practices in the UK real estate industry highlights several critical findings and trends. Regulatory frameworks such as the Energy Performance Certificate (EPC) scheme and Minimum Energy Efficiency Standards (MEES) have played pivotal roles in incentivizing energy efficiency improvements in buildings (Denman et al., 2018; Li et al., 2019). These regulations not only raise awareness but also set minimum standards, driving the adoption of sustainable practices across the sector. Financial incentives, including grants, tax credits, and subsidies, alongside innovative financing mechanisms such as green bonds, have been instrumental in promoting green building development (Fatica & Panzica, 2021; Olubunmi et al., 2016). For instance, research

highlights the role of green bonds in mobilizing capital for sustainable building initiatives, although challenges like pricing premiums and ownership patterns persist (Agliardi & Agliardi, 2019; Baker et al., 2022).

The demand for eco-friendly buildings is driven by various factors including operational cost savings, enhanced worker productivity, and reputational benefits (Koengkan et al., 2023). Green buildings are increasingly recognized for their ability to provide healthier indoor environments and reduce operating costs through energy efficiency measures (Karimi et al., 2023). Real estate developers are responding by integrating sustainable features such as renewable energy technologies and energy-efficient designs into their projects (Alabid et al., 2022; Ionascu et al., 2020). These initiatives not only cater to market demands but also align with corporate social responsibility (CSR) objectives, emphasizing sustainability as a competitive advantage (Huijbregts et al., 2019; Ionascu et al., 2020).

Technological advancements have significantly contributed to advancing sustainable building practices. Innovations in energy-efficient HVAC systems, smart building automation, and renewable energy solutions have made sustainable practices more feasible and cost-effective (Bibri & Krogstie, 2020; Chong & Cheng, 2023). These technologies not only improve operational efficiency but also help in reducing carbon footprints, aligning with broader environmental sustainability goals (Walker & Goubran, 2020). However, despite these advancements, challenges such as regulatory hurdles, the high cost of sustainable materials, and the slow adoption of green technologies remain significant barriers to widespread implementation (Bergman & Foxon, 2020; Shen et al., 2018).

Investigating green investments and sustainable practices in the UK real estate industry holds significant value due to the country's proactive regulatory framework, robust policy incentives, and evolving market dynamics. The UK has established itself as a leader in implementing stringent environmental standards and regulations, such as the EPC scheme and MEES, which create a structured environment for studying the impacts of sustainability measures on building performance and carbon reduction (Denman et al., 2018; Li et al., 2019). Moreover, the government's initiatives including grants, tax credits, and green bonds stimulate investment in sustainable building practices, offering a fertile ground for examining the effectiveness of financial mechanisms in driving environmental outcomes (Agliardi & Agliardi, 2019; Olubunmi et al., 2016). The growing market demand for eco-friendly buildings driven by cost savings, health benefits, and reputational advantages further highlights the relevance of studying how real estate developers integrate sustainable features to meet consumer expectations and maintain competitiveness (Karimi et al., 2023; Koengkan et al., 2023). Additionally, as a participant in global climate agreements like the Paris Agreement, the UK's experiences can offer valuable insights for other countries grappling with similar challenges of urban sustainability and climate resilience (Dimitrov, 2016). Therefore, research in the UK real estate sector not only contributes to advancing sustainable practices locally but also informs global efforts towards achieving environmental goals and fostering resilient built environments.

Despite growing interest in green investment and sustainable practices within the real estate sector in the UK, there exists a notable research gap regarding the specific factors that influence the integration of sustainable practices through green investment across all stages of real estate development. Existing literature (Ionascu et al., 2020; Morri et al., 2021; Tokbolat et al., 2020) often focuses on isolated aspects such as economic benefits, regulatory frameworks, stakeholder roles, consumer demand, or educational initiatives, without fully exploring how these factors interact in the context of green investment. Moreover, while some studies (Baker et al., 2022; Fatica & Panzica, 2021; Gao et al., 2024; Shen, 2024) examine the impact of green bonds or financial incentives on sustainability outcomes, there is limited empirical research that comprehensively investigates how these financial mechanisms interact with regulatory frameworks, stakeholder engagement, consumer preferences, and educational initiatives to promote sustainable practices consistently from project inception to completion in the UK real estate market.

Addressing this research gap is crucial for guiding policy formulation, optimizing resource allocation, and enhancing industry practices. By filling this gap, policymakers can design more effective incentives and regulations that align financial mechanisms with sustainability goals, while stakeholders can adopt informed practices that reduce environmental impacts and enhance long-term economic viability. This research is pivotal for the UK real estate sector to contribute meaningfully to global sustainability targets and demonstrate leadership in sustainable development practices. Therefore, the first research question was developed to address this research gap.

> **RQ1.** What factors influence the integration of sustainable practices through green investment across all stages of real estate development in the UK?

Research on the impact of green bonds on sustainable construction practices within the UK real estate industry reveals several critical gaps. Existing literature (Ahmed et al., 2022; Debrah et al., 2022; Gao et al., 2024) often focuses on the theoretical benefits of green bonds, such as reducing carbon emissions or enhancing energy efficiency. However, there is a lack of studies that systematically measure and compare the environmental, social, and economic performance of green bond-funded projects against traditional projects. Without such evidence, it is challenging to quantify the tangible benefits and drawbacks of green bonds in driving sustainable construction practices in the UK.

Addressing this research gap is crucial for several reasons. First, empirical evidence is essential for policymakers, investors, and developers to make informed decisions about the efficacy of green bonds in achieving sustainability goals. Understanding the actual environmental impacts, energy savings, and lifecycle cost benefits of green bond-funded projects can provide concrete data to support future investments and policy initiatives. Second, empirical studies can identify best practices and lessons learned from successful green bond projects, helping to mitigate risks and optimize outcomes for future ventures. Atlast, closing this gap can contribute to broader knowledge

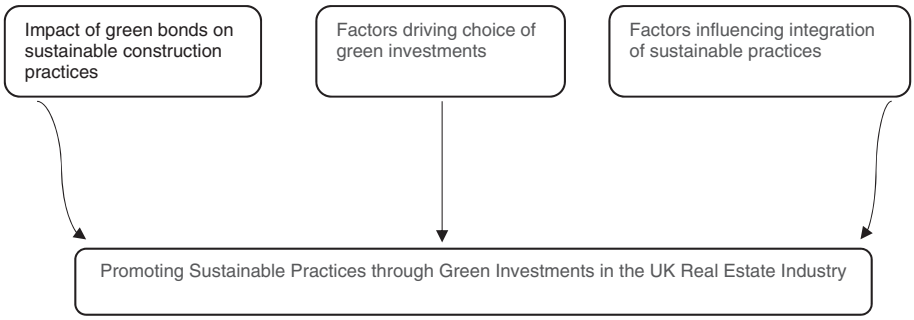

FIGURE 1 The framework of the study.

within the sustainable finance field, potentially influencing global standards and practices in green finance. The second research question was developed to address the above research gap.

> **RQ2.** How do green bonds affect sustainable construction practices in the UK real estate industry?

While there is growing interest in sustainable real estate development globally, there is a notable lack of comprehensive research focused specifically on the factors motivating UK real estate developers to choose green investments over traditional financing methods. Existing literature (Christensen et al., 2022; Karimi et al., 2023; Newell & Marzuki, 2022) often explores general motivations for sustainability in real estate, such as environmental concerns and long-term cost savings, but fails to provide a nuanced understanding of the unique economic, regulatory, and market-driven factors influencing decision-making within the UK context.

Addressing this research gap is crucial for two reasons. First, understanding the specific economic incentives and financial mechanisms that drive developers towards green investments in the UK can inform policymakers about the effectiveness of current incentives and identify areas for improvement. This understanding can guide the development of targeted policies and financial instruments that better align with the needs and motivations of developers, thereby accelerating the adoption of sustainable building practices. Second, gaining insights into the regulatory landscape affecting green investments in the UK is essential for both developers and policymakers. A clearer understanding of regulatory challenges and opportunities can help developers navigate compliance requirements more effectively, potentially reducing barriers to adopting sustainable building standards. Therefore, the third research question was developed.

> **RQ3.** What factors drive real estate developers in the UK to choose green investments over traditional financing methods?

The novelty of this study lies in its comprehensive approach to addressing critical gaps in understanding the long-term impact of green investments, conducting comparative analyses between investment approaches, and exploring stakeholder perspectives within the UK's real estate industry. By focusing on longitudinal assessments of sustainability measures financed through green investments, the study aims to provide empirical evidence on their lasting effectiveness in reducing carbon emissions and resource consumption. This fills a significant gap in existing literature, which predominantly focuses on short-term benefits. Additionally, the comparative analysis between traditional real estate investments and green investments will offer unique insights into their respective sustainability outcomes and financial returns, informing decision-making for investors and policymakers alike. Lastly, by exploring the motivations and challenges of stakeholders involved in green real estate investments, the study aims to uncover nuanced factors influencing adoption rates and identify strategies to overcome barriers to sustainability, thus contributing valuable insights to both research and practical applications in sustainable development.

Figure 1 shows the graphical explanation of the framework of the study.

2 | LITERATURE REVIEW

2.1 | Overview of sustainable practices and green investments in real estate

Sustainable practices in the context of real estate refer to the implementation of environmentally responsible strategies and techniques throughout the lifecycle of a property (Koengkan et al., 2023). These practices aim to minimize the negative impact on the environment, promote energy efficiency, and ensure the long-term viability of the built environment (Shen, 2024; Singh, 2024). On the other hand, green investments in real estate involve financial resources allocated towards properties that are designed, constructed, and operated in an environmentally friendly manner (Debrah et al., 2022; Gao et al., 2024).

From an environmental perspective, sustainable practices through green investments in real estate play a crucial role in mitigating the adverse effects of climate change and reducing resource depletion (Gao et al., 2024). Environmental Social and Governance (ESG) factors, particularly environmental considerations, have become crucial in real estate investment decisions by contributing to risk management, long-term performance, and alignment with global sustainability goals (Olteanu & Ionascu, 2023). The JLL GRETI sustainability sub-index reveals significant variations in ESG practices across 99 global real estate markets by emphasizing the need for improvement, especially

in emerging markets (Newell & Marzuki, 2022). Green building concepts are increasingly influencing sustainable management decisions by addressing environmental crises and driving value in real estate (Mondal & Sahoo, 2020).

Economically, sustainable practices and green investments in real estate offer numerous benefits. For instance, energy-efficient buildings can significantly reduce operational costs by minimizing energy consumption (Karimi et al., 2023; Koengkan et al., 2023). Additionally, green buildings often attract higher rental rates, lower vacancy rates, and increased property values (Alabid et al., 2022; Morri et al., 2021). Furthermore, by investing in sustainable real estate, individuals and organizations can align their financial interests with their commitment to environmental stewardship, thereby promoting a more sustainable and resilient economy (Debrah et al., 2022).

2.2 | Sustainable real estate practices in the United Kingdom

The current state of sustainable real estate practices in the UK reflects a growing emphasis on environmental responsibility and the integration of sustainability principles into the built environment (Alabid et al., 2022; Bergman & Foxon, 2020; Ratcliffe et al., 2021). This shift is driven by a combination of government policies, regulations, and industry standards that promote sustainable development and address climate change concerns.

Key policies and regulations have been instrumental in shaping sustainable real estate practices in the UK. Mandatory building codes, financial incentives, and procurement policies are identified as effective tools for encouraging green building adoption (Okwandu et al., 2024). In the UK, legislation like the Climate Change Act and Energy Performance of Buildings Regulations has significantly influenced construction and engineering practices (Fatica & Panzica, 2021; Olasolo-Alonso et al., 2023). The introduction of MEES in England and Wales has had a measurable impact on the commercial real estate market, with affected office units experiencing a reduction in rents (Akhtyrska & Fuerst, 2024; Denman et al., 2018; Li et al., 2019).

The UK Green Building Council (UKGBC) has played a crucial role in promoting sustainability within the real estate industry (Khan et al., 2019). The organization has developed industry standards, such as the BREEAM (Building Research Establishment Environmental Assessment Method), which assesses the environmental performance of buildings and awards certifications based on their sustainability credentials (Ferreira et al., 2023). BREEAM has become widely adopted in the UK, driving the implementation of sustainable design and construction practices.

Financial incentives have played a crucial role in promoting green investments in the UK real estate sector. Studies have shown that fiscal measures can stimulate sustainable property investment and management practices (Yan et al., 2023). The introduction of mandatory and voluntary environmental rating systems has led to the creation of 'green value,' with evidence suggesting a positive impact on sales and rental prices for green buildings (Dalton & Fuerst, 2018; Chegut et al., 2011). Research indicates that BREEAM-rated office buildings in the UK command a premium of between 8% and 12% in sales prices and 16%–20% in rental rates compared to non-green buildings (Jayakody & Vaz, 2023). The UK government has implemented various instruments to foster low-carbon investments including direct expenditures, indirect sector-specific interventions, and foregone tax revenues (Basaglia et al., 2024). These financial incentives have been instrumental in redirecting financial flows towards sustainable real estate practices in the UK.

2.3 | Global perspectives on sustainable real estate

There is an increasing trend of incorporating ESG factors into investment decision-making processes for sustainable investment practices (Olteanu & Ionascu, 2023; Simon, 2024). The integration of ESG factors into real estate investment decision-making processes has been emphasized in recent studies to promote sustainable investment practices. Newell et al. (2023) highlight the need for improved ESG benchmarking in real estate investments, emphasizing granularity, climate resilience, and the impact on investment decisions. Also, their research highlights the increasing importance of the social dimension in ESG for real estate by focusing on gender equality, cultural diversity, and community engagement.

Valeri et al. (2022) analyze green real estate (RE) investments within the EU by highlighting the benefits and performance characteristics of such investments in strategic asset allocation and portfolio diversification, emphasizing compliance with ESG criteria and risk minimization. A focus on developing economies is explored by another study that reviews the challenges and opportunities of sustainable real estate investment, particularly noting the growth potential of green bonds and the need for context-specific ESG strategies (Ametefe et al., 2023). Meanwhile, Amaechi (2022) discusses the necessity for methodological shifts to manage low-carbon investments in large real estate assets to meet European energy efficiency standards, proposing the evaluation of investment benefits across building portfolios rather than individual buildings.

The European Union's Energy Performance of Buildings Directive (EPBD) serves as a notable policy framework driving sustainable real estate investments. This directive mandates member states to create energy performance certification schemes and enforce minimum energy performance standards for buildings. Analyzing the impact of the EPBD reveals its effectiveness in promoting energy-efficient building practices and reducing carbon emissions. Valeri et al. (2022) emphasize that compliance with the EPBD has positively influenced green real estate investments in the EU by enhancing the marketability and financial performance of energy-efficient buildings. Amaechi (2022) further supports this by discussing how EU energy standards encourage large-scale investments in energy-efficient building portfolios, thus driving substantial reductions in carbon emissions (Amaechi, 2022).

The United States Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED) certification system has

been instrumental in promoting sustainable real estate investments in the US. The LEED system provides a globally recognized standard for green buildings, encouraging sustainable design, construction, and operation practices. A review of empirical research indicates that green building certifications, such as LEED, positively impact property cash flows and values, enhancing rental income and reducing operating expenses and vacancy rates (Leskinen et al., 2020). Another study highlights the behavioral response of developers and investors, noting that LEED-certified buildings often command price premiums due to their sustainable features (Ghosh & Petrova, 2023). Additionally, the financial feasibility of LEED buildings is supported in specific contexts, particularly for long-term hold strategies and large institutional investments (Christensen et al., 2022).

2.4 | Challenges and opportunities

One of the primary challenges faced by stakeholders is financial constraints. Implementing sustainable practices often requires significant upfront investments, which can deter real estate developers and investors (Dalirazar & Sabzi, 2022). The high costs associated with incorporating energy-efficient technologies, renewable energy systems, and sustainable materials can pose a major barrier to widespread adoption (Walker & Goubran, 2020; Yan et al., 2023). Additionally, the lack of access to affordable financing options for sustainable projects further exacerbates this challenge.

Regulatory hurdles also present a significant challenge in promoting sustainable real estate practices (Okwandu et al., 2024). Existing regulations and building codes may not adequately address sustainability concerns, making it difficult for stakeholders to incorporate green design principles into their projects. Moreover, navigating through complex and fragmented regulatory frameworks can be time-consuming and costly, further discouraging sustainable practices in the real estate industry (Ametefe et al., 2023).

Market resistance is another challenge that stakeholders face when promoting sustainable practices in real estate (Voland et al., 2022). Despite the growing demand for sustainable buildings, there is still a prevailing perception that sustainable features come at a premium. This perception can deter potential buyers or tenants who are unwilling to pay higher prices or rents for sustainable properties. Additionally, the lack of awareness and understanding of the long-term benefits of sustainable buildings can contribute to market resistance (Dalirazar & Sabzi, 2022).

Despite these challenges, there are several opportunities for advancing sustainable real estate practices. Technological innovations play a crucial role in driving sustainability in the industry. Advancements in building materials, energy-efficient systems, and smart technologies offer opportunities for reducing the environmental impact of buildings while improving their performance (Alabid et al., 2022; Li et al., 2019). For instance, the integration of renewable energy systems, such as solar panels and geothermal heating, can significantly reduce a building's carbon footprint (Ahmed et al., 2022).

Policy incentives also play a vital role in promoting sustainable real estate practices. Governments can provide financial incentives, tax breaks, or grants to encourage developers and investors to adopt sustainable practices (Olubunmi et al., 2016; Rana et al., 2021; Voland et al., 2022). Additionally, implementing stricter building codes and regulations that prioritize sustainability can create a level playing field and drive industry-wide adoption (Ametefe et al., 2023). Market trends also present opportunities for advancing sustainable real estate practices. As consumer preferences shift towards sustainability, there is an increasing demand for green buildings (Koengkan et al., 2023). Developers and investors who embrace sustainable practices can gain a competitive advantage by attracting environmentally conscious buyers or tenants. Furthermore, sustainable buildings often have lower operating costs and higher resale values, providing long-term financial benefits (Booker, 2020).

2.5 | Recent issues on sustainable development

Sustainable development has emerged as a critical area of inquiry in the context of global environmental challenges, social equity, and economic viability. The concept, initially popularized by the Brundtland Commission in 1987, emphasizes the need for development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Aiguobarueghian et al., 2024; Kalfagianni et al., 2024). Over the years, the literature on sustainable development has evolved significantly, addressing a wide array of issues ranging from climate change and biodiversity loss to social justice and economic growth.

The foundational work on sustainable development established a framework for integrating environmental, social, and economic dimensions (Gomez-Jaramillo et al., 2024). However, critiques of this framework have emerged, highlighting its limitations in addressing the complexities of sustainability. For instance, Adanma and Ogunbiyi (2024) argue that the traditional model often prioritizes economic growth at the expense of environmental integrity and social equity. In response, newer frameworks have been proposed, such as the Doughnut Economics model, which seeks to balance human needs with planetary boundaries (Demastus & Landrum, 2024; Dragicevic, 2024). This model has gained traction in recent years, prompting further research into its practical applications and implications for policymaking.

Recent studies have emphasized the importance of local contexts in shaping sustainable development strategies. For example, research by Ksenofontov and Petrov (2024) highlights the role of indigenous knowledge systems in fostering resilience and sustainability in local communities. This perspective has been further explored by Rahmah and Sulistyono (2024), where new empirical studies demonstrate how integrating traditional ecological knowledge with modern scientific approaches can lead to more effective and culturally relevant sustainability initiatives. Boguszewski et al. (2024) further reinforces this perspective by highlighting that the effectiveness of sustainability efforts is deeply influenced by the unique financial, social, and political conditions of each local government. Their research illustrates that a

one-size-fits-all approach to sustainability is inadequate, as local circumstances significantly determine the level of awareness, commitment, and capacity to implement sustainable practices. These findings collectively highlight the necessity of participatory approaches that empower local communities and incorporate diverse knowledge systems in sustainability efforts.

Another significant area of research has focused on the interplay between sustainable development and technological innovation. The rapid advancement of technology presents both opportunities and challenges for achieving sustainability goals. For instance, Umoh et al. (2024) have examined how technological transitions can facilitate sustainable practices, while Clarke et al. (2024) caution against the potential for technology to exacerbate existing inequalities. In addition to this, Jena and Sneha (2024) contribute to this discourse by exploring the ethical implications of emerging technologies, such as artificial intelligence (AI) and biotechnology, in the context of sustainable development. According to Bibri et al. (2024), the use of AI in environmental monitoring has enhanced the precision and scalability of sustainability efforts. AI-driven models are now capable of predicting environmental outcomes with greater accuracy, thereby informing policy decisions and improving resource management. These studies highlight the need for ethical frameworks that guide technological development to ensure that innovations contribute positively to sustainability objectives.

Climate change remains a central concern in the sustainable development literature. The Intergovernmental Panel on Climate Change (IPCC) reports have consistently emphasized the urgent need for mitigation and adaptation strategies to address climate impacts (Khojasteh et al., 2024). This debate has further advanced by focusing on the role of finance in supporting climate resilience. Research by Digitemie and Ekemezie (2024) demonstrate how innovative financing mechanisms, such as green bonds and climate risk insurance, can mobilize resources for sustainable development projects in vulnerable regions. This work aligns with the growing recognition of finance as a critical enabler of sustainability, emphasizing the need for robust financial frameworks that prioritize climate action.

Social equity and justice have gained increasing attention within the sustainable development debate. Chandiramani et al. (2024) argue that addressing social inequalities is essential for achieving sustainable outcomes. Kaklauskaite and Streimikiene (2024) builds on this foundation by examining the intersectionality of sustainability and social justice, particularly in the context of marginalized communities. Research by Kostakis and Tsiouris (2024) highlights how sustainability initiatives can inadvertently perpetuate inequalities if they do not consider the unique challenges faced by different social groups. This work highlights for a more nuanced understanding of equity in sustainability efforts, advocating for policies that explicitly address the needs of the most vulnerable populations.

Furthermore, the role of policy frameworks in promoting sustainable development has been extensively studied. The sustainable development goals (SDGs), adopted by the United Nations in 2015, provide a global framework for action (Khargonekar & Samad, 2024). However, critiques have emerged regarding the implementation and effectiveness of the SDGs, particularly in terms of accountability and measurement (Alsaid & Ambilichu, 2024). Recent studies in 2024 have sought to address these critiques by proposing new indicators and assessment tools that enhance the measurement of progress towards the SDGs (Viles et al., 2024). This research emphasizes the importance of robust monitoring and evaluation mechanisms to ensure that sustainability efforts are effective and equitable.

3 | METHODOLOGY

This research employs qualitative research methods in order to investigate the real estate developers' perspectives and insights related to green investments and sustainable practices in the UK. This research method is appropriate for this study as it explores real estate developers' opinions and experiences. Table 1 shows the different methodologies applied in the literature.

In the literature, different methodologies have been used by other researchers. According to Table 1, the qualitative research method is one of the most used methodologies and it allows researchers to understand complex phenomena, contexts, and experiences in-depth. Therefore, the qualitative method was selected for this research.

The study involved conducting interviews with 17 real estate developers who were involved in planning, designing, and constructing real estate projects, including residential, commercial, and mixed-use developments in the UK. They were chosen through purposive sampling by ensuring a diverse range of participants with varying levels of experience and perspectives. Table 2 shows the demographic information about the participants including selection reasons.

The selected participants were primarily active in Bristol, Bath, and Cardiff, key cities in the Southwest and Wales region. Participants specialize in various types of projects. Residential focuses on housing needs including affordable housing, luxury residences, and student accommodations. The commercial is about the development of office spaces, retail centers, and mixed-use complexes. Mixed-use is the integration of residential, commercial, and cultural facilities.

The interviews were conducted by the corresponding author between March 10 2024 and May 15 2024. This timeframe allowed for in-depth exploration of the subjects' perspectives and experiences. By directly involving the corresponding author in the data collection process, consistency, and reliability were maintained throughout the interviews.

Data for this study was collected through face-to-face interviews. The interviews were conducted in participants' workplaces to express their opinions freely. This approach aimed to minimize any potential bias or discomfort that might arise from conducting interviews in an unfamiliar setting. The interviews were semi-structured which means that a set of predetermined questions were asked, but participants were also encouraged to elaborate on their responses and provide additional insights.

The interview questions were designed to directly address the research objectives established through a thorough review of existing literature. To ensure the clarity and accuracy of these questions, they

TABLE 1 Methodologies used in the literature.

Research summary	Author(s)	Method
Assessment of renewable energy generation	Ahmed et al., 2022	Quantitative
Pricing and ownership of US green bonds	Baker et al., 2022	
Scoping review on green finance gap in green buildings	Debrah et al., 2022	
Assessment of UK building regulations for radon affected areas	Denman et al., 2018	
Involvement of real estate companies in sustainable development	Ionascu et al., 2020	
Impact of green building certification on cash flows and values	Leskinen et al., 2020	
Effectiveness of climate change regulations in real estate	Akhtyrska & Fuerst, 2024	Qualitative
Role of policy and regulation in promoting green buildings	Okwandu et al., 2024	
Barriers to sustainable building development	Dalirazar & Sabzi, 2022	
Assessment of factors in firms' carbon footprint reduction	Mahapatra et al., 2021	
Perspectives on drivers and barriers of sustainable construction	Tokbolat et al., 2020	
Sustainable real estate investment and finance in developing economies	Ametefe et al., 2023	Mixed
Institutional investor motivation for sustainable building investment	Christensen et al., 2022	
Benchmarking ESG in real estate investment	Newell et al., 2023	
Energy performance directive implementation in Southern Europe	Olasolo-Alonso et al., 2023	
Carbon pricing in UK manufacturing	Basaglia et al., 2024	Case Study
Impact study of green finance pilot zone policy on emissions	Gao et al., 2024	
Green technical capabilities and barriers in Thailand	Shen et al., 2018	
Relevance of green RE investments in strategic asset allocation	Valeri et al., 2022	
Public policy and incentives for socially responsible real estate projects	Voland et al., 2022	

were reviewed and refined by another researcher with expertise in the field. However, the study did not include pilot testing. Table 3 presents the themes related to interview questions.

The data collected from the interviews were transcribed and imported into qualitative data analysis software (NVivo) for analysis. A thematic analysis approach was employed to identify and analyze patterns, themes, and categories within the data. The analysis process involved several steps. First, the transcripts were read and re-read multiple times to gain familiarity with the data. Next, initial codes

TABLE 2 Participants' demographic Variables.

Participants	Active area	Specialization	Participant selection reason
1	Bristol	Residential	Known for sustainable housing projects
2	Bath	Mixed-use	Historical building preservation
3	Cardiff	Commercial	Large-scale office and retail developments
4	Bristol	Residential	Urban regeneration projects
5	Cardiff	Residential	Affordable housing initiatives
6	Bristol	Commercial	Redevelopment of industrial sites
7	Bath	Residential	Luxury housing development
8	Cardiff	Mixed-use	Waterfront developments and cultural hubs
9	Bristol	Commercial	Tech and innovation hubs
10	Cardiff	Residential	Student accommodation developments
11	Bristol	Residential	Affordable and social housing
12	Bath	Mixed-use	Contribution to local amenities
13	Cardiff	Commercial	Retail and leisure complexes
14	Bristol	Commercial	Corporate office developments
15	Bath	Residential	Residential properties development
16	Cardiff	Mixed-use	Mixed-use developments
17	Bristol	Mixed-use	Diverse portfolio including commercial and residential housing

TABLE 3 The interview questions related to themes.

Research questions	Interview questions	Themes
RQ1: What factors influence the integration of sustainable practices through green investment across all stages of real estate development in the UK?	Q1, Q2, and Q6	Green Investments and Sustainable Practices in Real Estate
RQ2: How do green bonds affect sustainable construction practices in the UK real estate industry?	Q3, Q4, and Q8	Impact of Green Bonds on Sustainable Construction
RQ3: What factors drive real estate developers in the UK to choose green investments over traditional financing methods?	Q5, Q7, and Q9	Motivators and Incentives for Sustainable Initiatives

were generated by identifying meaningful units of data within the transcripts. These initial codes were then grouped into broader categories and themes. The coding process was iterative, with codes being refined and revised as new data were analyzed. Once the coding process was completed, the identified themes and categories were further analyzed to identify patterns and relationships within the data. The findings from the analysis were then interpreted and discussed in relation to the research objectives and existing literature.

4 | FINDINGS AND DISCUSSION

Three research questions were examined to investigate three occurring themes.

4.1 | Theme 1: Green investments and sustainable practices in real estate

The analysis of the interview data reveals several key themes related to the evolution of green investments and sustainable practices in the real estate sector. These themes include the economic benefits and financial incentives driving the adoption of sustainable practices, the role of regulatory frameworks and government incentives in promoting sustainability, the growing awareness and recognition of environmental issues, the integration of sustainability into all aspects of real estate development, the importance of consumer demand and market preferences, and the role of education and training in promoting sustainable practices. These are shown in Figure 2.

The first theme identified in the analysis is the evolution of green investments in the real estate sector. Participants 1 and 4 highlight a shift from an initial emphasis on environmental consciousness to a more strategic approach driven by economic benefits, reduced operational costs, and long-term value. This notion is a result of a greater understanding of the need to address the environmental impact of the industry and the fact that sustainable practices can boost profits. This finding is consistent with previous research that has shown the economic benefits of sustainable buildings, including reduced energy and water costs, increased market value, and higher rental rates (Alabid et al., 2022; Morri et al., 2021).

Another significant aspect discussed by Participant 2 is the role of green bonds in promoting sustainable construction practices. Green bonds are recognized for their positive impact on sustainable development, channeling funds specifically into environmentally friendly projects. This aligns with the findings of previous studies highlighting the role of green bonds in financing environmentally sustainable projects and reducing carbon emissions (Agliardi & Agliardi, 2019; Baker et al., 2022). However, the development of a sustainable innovation model presents new challenges. There is a growing need for innovation models that not only incorporate sustainable practices but also address regional specificities and promote territorial cooperation. Participant 11 emphasizes the need for a model that allows for flexibility and adaptability to local contexts, which is essential for addressing the unique environmental and socio-economic conditions of different regions. This aligns with the findings by Koengkan et al. (2023) and Boguszewski et al. (2024) which underscore the importance of regional cooperation in driving sustainable development. The challenge lies in creating synergies between regional specificities and the broader goals of sustainable development, ensuring that innovation models are not one-size-fits-all but are instead tailored to local needs and conditions.

Moreover, Participants 3, 11, and 12 emphasized the growing importance of stakeholders such as site engineers, project managers, and environmental consultants in driving sustainable development initiatives within the real estate sector. Their experiences emphasize the integral role played by these stakeholders in integrating green

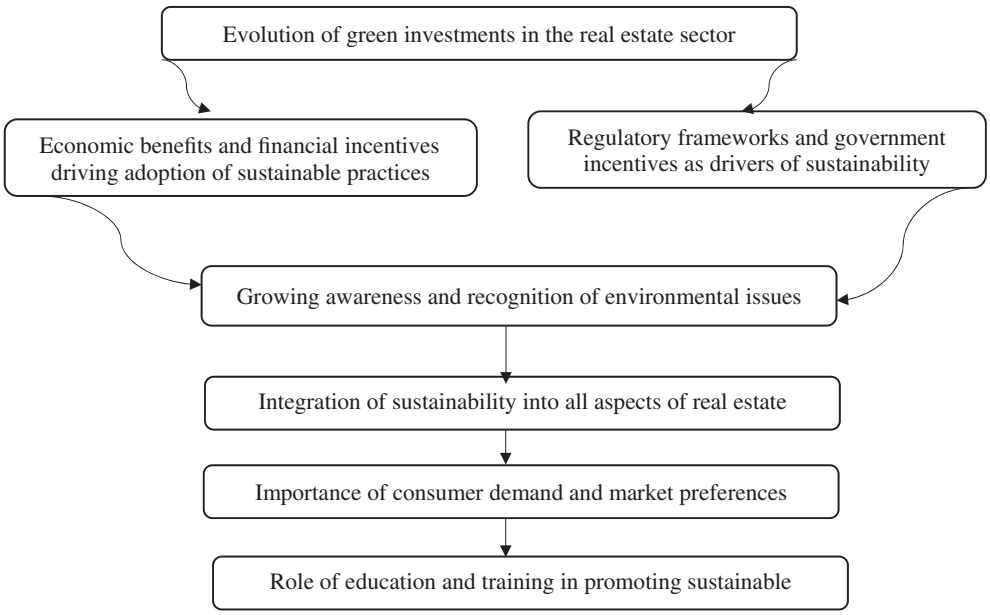

FIGURE 2 Interactions among the identified themes in RQ1.

principles into all aspects of real estate management, from design and construction to ongoing maintenance and operations (Shen et al., 2018; Tokbolat et al., 2020). However, the integration of sustainability into real estate development also requires effective territorial cooperation, which is often challenging due to the fragmented nature of the real estate sector across different regions. Participant 12 points out that while there is a push towards integrating sustainability into all phases of real estate development, there is a lack of coordination between different regional bodies and stakeholders, which hinders the overall effectiveness of these initiatives. Creating a cohesive framework that promotes synergy between regional stakeholders is crucial for overcoming this challenge and ensuring that sustainable practices are uniformly adopted across different territories (Ksenofontov & Petrov, 2024; Rahmah & Sulistyono, 2024).

The participants' perspectives serve as compelling evidence of the economic benefits and financial incentives associated with sustainable practices in the real estate sector. Their insights reflect a consensus on the financial advantages of sustainable buildings, such as reduced operational costs and increased market value. For instance, Participant 1 describes the evolution of green investments driven by an increasing recognition of the economic value of sustainability, while Participant 2 emphasizes the role of green bonds in promoting environmentally friendly projects, thereby aligning financial incentives with sustainable development. Furthermore, Participant 3, drawing from their experience as a Site Engineer, highlights the industry's shift towards designing buildings with lower maintenance requirements and higher energy efficiency, indicating a pragmatic approach towards achieving long-term financial savings. These participant views collectively strengthen the notion that sustainable buildings not only offer environmental benefits but also deliver tangible financial gains, supporting the broader narrative of the economic rationale behind adopting sustainable practices in real estate (Agliardi & Agliardi, 2019; Alabid et al., 2022; Baker et al., 2022; Bergman & Foxon, 2020).

The third theme identified in the interview revolves around the role of regulatory frameworks and government incentives in driving sustainability within the real estate sector. Participants 7 and 10 highlight the significance of building codes, regulations, and government incentives in promoting energy efficiency, water conservation, and the use of environmentally friendly construction materials. This is also supported by Participant 14 by emphasizing the positive impact of government incentives such as tax credits and grants, which encourage developers and property owners to invest in sustainable practices.

The third theme aligns with existing research that demonstrates the pivotal role of regulatory mechanisms and governmental support in fostering sustainability in the real estate industry (Dalirazar & Sabzi, 2022; Denman et al., 2018; Rana et al., 2021). For instance, Dalirazar and Sabzi (2022) discuss the critical social factors influencing sustainable building development by highlighting the role of government regulations in shaping sustainable construction practices. Similarly, Denman et al. (2018) assess the effectiveness of UK building regulations in radon-affected areas by illustrating how regulations can address specific environmental concerns within the built environment. Moreover, Rana et al. (2021) evaluate financial incentives for green buildings in Canada by shedding light on the positive impact of governmental support on incentivizing sustainable real estate development. These incentives not only encourage compliance with sustainability standards but also enhance the economic feasibility of green investments, as noted by several participants in the transcript. In addition to regulations, participants 11 and 16 also mention the importance of government grants and tax credits. These financial incentives play a crucial role in offsetting the initial costs associated with implementing sustainable practices in real estate projects. Studies such as those by Soderholm (2020) and Debrah et al. (2022) emphasize the significance of such incentives in bridging the green finance gap and promoting green building initiatives.

The fourth theme identified is the growing awareness and recognition of environmental issues in the real estate sector. Participants 5, 6, 13, and 17 uniformly emphasize the imperative of addressing climate change, curbing carbon emissions, and conserving natural resources. This heightened awareness is underpinned by multifaceted influences, including scientific studies, media coverage, and public discourse on environmental sustainability. Participant 5 clarifies this sentiment by articulating the urgency felt across various stakeholders in the real estate realm, from investors and builders to developers and governmental bodies. The recognition of the pressing need to adopt sustainable practices echoes findings by Bergman and Foxon (2020), who highlight the importance of reframing policies to address energy efficiency challenges in housing retrofits, particularly in the UK.

Moreover, Participant 13's explanation highlights a broader industry-wide acknowledgement of environmental imperatives. This shift is substantiated by research conducted by Ionascu et al. (2020), which evaluates real estate companies' involvement in sustainable development through the lens of SDGs reporting. The study emphasizes the growing integration of green principles into real estate practices as indicative of a commitment to long-term environmental stewardship and sustainable growth. Participant 17's observation about the mainstream acceptance of green investments reinforces empirical findings by Morri et al. (2021), who explore the relationship between greenness and financial performance in European Real Estate Investment Trusts (REITs). Their study reveals a positive correlation between environmental performance and financial returns, indicating a tangible shift in investor attitudes towards environmentally responsible investments within the real estate sector. Furthermore, Participant 6's perspective on the evolution of green investments in the UK aligns with insights from Alabid et al. (2022), who review energy retrofit policies and improvements in existing buildings. Their analysis emphasizes the instrumental role of green investments in fostering sustainable construction methodologies, thereby contributing to carbon reduction efforts and promoting environmentally friendly development.

The fifth theme emphasizes the imperative of integrating sustainability into every facet of real estate development, as emphasized by Participants 11, 12, and 15. This holistic approach ensures that sustainable practices are not merely peripheral considerations but are instead ingrained into the entire lifecycle of a building, from its conception to its ongoing operation and maintenance. Participant

11 articulates the significance of this integration, noting the evolution from sustainability being an afterthought to becoming a central focus in project planning and execution. This sentiment is reinforced by research conducted by Koengkan et al. (2023), which examines how eco-friendly homes are driving local economic development in the Lisbon Metropolitan Area. The study underscores the importance of sustainable development practices in real estate by emphasizing their role in promoting economic growth while mitigating environmental impacts.

Furthermore, Participant 12's observation about the industry's increasing focus on integrating green principles into various aspects of real estate management resonates with the findings by Shen et al. (2018). Their study explores the barriers and opportunities for green buildings in developing countries by highlighting the importance of understanding green technical capabilities and overcoming barriers to sustainable construction. By integrating sustainability into all phases of real estate development, stakeholders can enhance building performance, reduce environmental footprints, and create healthier, more resilient communities. Moreover, Participant 15's perspective emphasizes the operational aspect of sustainability integration. This aligns with research by Bertoldi et al. (2021), who review current and emerging financing instruments for energy renovation of residential buildings in the EU. Their analysis emphasizes the importance of energy-efficient upgrades and sustainable practices in property management strategies by highlighting the potential for significant cost savings and environmental benefits.

The sixth theme emphasizes the pivotal role of consumer demand and market preferences in propelling the acceptance of sustainable building practices within the real estate sector, as emphasized by Participants 7, 9, and 16. This dynamic reflects a paradigm shift wherein environmentally friendly properties are increasingly sought after, compelling developers and property managers to embrace green initiatives to maintain competitiveness in the market. Participant 9's observation regarding the shifting perspective from viewing green investments as obligations to recognizing them as opportunities for innovation resonates with research by Mahapatra et al. (2021). Their assessment of factors contributing to firms' carbon footprint reduction efforts highlights the growing recognition of sustainability as a driver of competitive advantage in the marketplace.

As consumer awareness of environmental issues continues to rise, developers and property managers are compelled to integrate sustainable practices into their offerings to meet evolving market preferences. However, a new challenge emerges when considering the diversity of consumer demand across different regions. Participant 9 mentioned that while there is a growing demand for sustainable buildings in urban areas, rural and less developed regions may not share the same level of demand, which can create disparities in the adoption of sustainable practices. This highlights the need for a nuanced approach that considers regional differences in consumer demand and tailors sustainable practices accordingly, rather than adopting a uniform approach across all regions (Boguszewski et al., 2024; Ksenofontov & Petrov, 2024).

Furthermore, Participant 16's insight into the industry's transition from conventional practices to environmentally conscious strategies aligns with the findings by Onuoha and Ezedike (2019). Their review of the social benefits of green and sustainable real estate properties highlights the importance of aligning development practices with consumer preferences for environmentally friendly and socially responsible spaces. By catering to these preferences, developers can not only attract more discerning consumers but also contribute to broader societal goals of environmental stewardship and sustainability. Additionally, Participant 7's observation about the sector's significant prioritization of responsibility towards the environment highlights the interconnectedness between consumer demand and corporate responsibility. This symbiotic relationship is elucidated by research by Fatica and Panzica (2021), who explore the role of green bonds as a tool against climate change. Their study highlights the importance of aligning financial incentives with environmentally responsible development practices by reflecting a broader trend towards market-driven sustainability initiatives within the real estate sector.

The seventh theme highlights the pivotal role of education and training programs in fostering sustainable practices within the real estate sector, as highlighted by Participants 3, 4, and 10. This emphasis on ongoing education reflects a recognition of the dynamic nature of sustainability issues and the need for professionals to continuously update their knowledge and skills to effectively integrate sustainable practices into their work. Participant 3's emphasis on ongoing education to introduce long-term sustainability and eco-friendly benefits into real estate resonates with research by Dalirazar and Sabzi (2022). Their study explores barriers to sustainable building development based on the perspectives of Swedish experts by highlighting the critical role of education in overcoming obstacles to sustainability adoption. However, a significant challenge lies in ensuring that education and training programs are accessible and relevant across different regions. Participant 10 emphasizes the importance of regional cooperation in developing training programs that are tailored to local needs and conditions. There is a need for educational initiatives that not only promote sustainable practices but also foster regional cooperation and encourage the sharing of best practices across different territories. This can help bridge the gap between regions with varying levels of expertise and resources, ensuring a more equitable and effective implementation of sustainable practices across the real estate sector (Aiguobarueghian et al., 2024; Gao et al., 2024; Singh, 2024).

Moreover, Participant 10's involvement in facilitating green investments within the real estate sector emphasizes the importance of training programs in equipping professionals with the knowledge and skills necessary to navigate sustainability challenges. This aligns with findings by Tokbolat et al. (2020), who examine construction professionals' perspectives on drivers and barriers to sustainable construction. Their research emphasizes the need for targeted training initiatives to bridge knowledge gaps and overcome barriers to sustainable development. Furthermore, Participant 4's emphasis on education as a catalyst for transformative approaches to green investments aligns with research by Allen and Macomber (2020) in their book "Healthy Buildings." They argue that education plays a crucial role in promoting health and sustainability in building design and operation. By fostering a deeper understanding of the interplay between built

environments and human health, education programs empower professionals to prioritize sustainability in their decision-making processes.

Figure 2 shows the summary of the identified themes and interactions among them.

4.2 | Theme 2: Impact of green bonds on sustainable construction

The analysis of the interview data reveals several key themes and insights related to the impact of green bonds on sustainable construction methodologies. These themes include the positive impact of green bonds on environmental sustainability, the role of financial incentives in promoting sustainable practices, the importance of collaboration and stakeholder engagement, and the challenges and benefits of green bond-funded projects. These findings align with existing literature on the subject and provide valuable insights into the transformative role of green bonds in driving sustainability within the real estate sector. These are shown in Figure 3.

One of the main themes that emerged from the interview is the positive impact of green bonds on environmental sustainability. Participant 2 emphasized the challenges faced by projects like "Pollution Prevention and Control Projects," indicating that despite financial backing through green bonds, investments, and other stakeholders might disagree if they believe that preventative chances are limited or if there are questions about the project's financial sustainability. On the other hand, Participant 2 clarified that creative thinking and strong communication regarding long-term environmental advantages might lead to success. Agliardi and Agliardi (2019) highlight the role of green bonds in financing environmentally sustainable projects by providing essential financial support and access to capital. This aligns with Participant 2's observation on the significance of financial incentives in driving sustainability initiatives.

Moreover, the importance of regulatory frameworks and government incentives in driving sustainability initiatives was confirmed by Participant 9. They highlighted the role of regulations in promoting energy efficiency, as well as economic incentives such as tax breaks and grants for sustainable development. Participant 12 emphasized the growing demand for environmentally friendly properties among consumers, driving developers and property managers to adopt green building practices to remain competitive in the market. This aligns with existing research by Karimi et al. (2023) and Morri et al. (2021), who discuss strategies for optimizing green buildings and highlight market demand for sustainable properties. Furthermore, Participants 2, 9, and 12 highlighted the significance of technological advancements and industry collaborations in driving the adoption of sustainable building practices. Participant 16 emphasized the importance of adherence to environmental regulations and meeting sustainability targets set by regulatory bodies, indicating a growing recognition of the importance of environmental stewardship.

The interviews conducted reveal a significant theme regarding the role of financial incentives in promoting sustainable construction methodologies within the UK's real estate industry. Real estate developers are strongly encouraged to choose green investments with lower maintenance costs and lower energy consumption prices, as pointed out by participants 3, 9, and 12. This finding aligns with previous research demonstrating the financial benefits of green investments, including reduced operational expenses and enhanced market appeal.

Participant 3 emphasized the importance of lower long-term operating costs linked to green investments, underlining the financial component as a major influencing factor for real estate developers. This sentiment was confirmed by Participant 12, who emphasized the growing demand for environmentally friendly properties among consumers, driving developers and property managers to adopt green building practices to remain competitive in the market. These observations highlight the economic considerations driving the adoption of

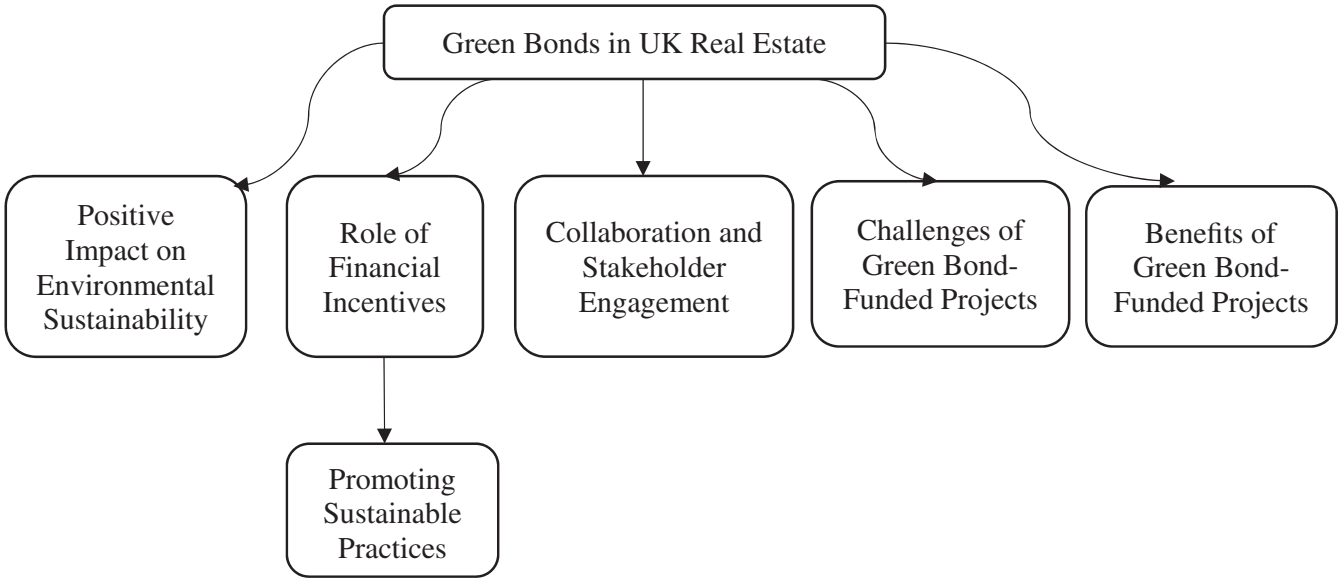

FIGURE 3 Interactions among the identified themes in RQ2.

sustainable practices within the industry. Bibri and Krogstie (2020) discuss the financial benefits of green investments by highlighting their potential to reduce operational expenses and enhance market appeal. Similarly, Osuizugbo et al. (2020) explore barriers to the adoption of sustainable construction and underscore the importance of financial incentives in overcoming resistance to green practices. These findings further support the notion that financial incentives play a crucial role in promoting sustainable practices within the real estate sector. Moreover, Participant 9 emphasized the role of economic incentives such as tax breaks and grants for sustainable development in driving the adoption of sustainable building practices. This aligns with the findings of Rana et al. (2021), who evaluate financial incentives for green buildings in the Canadian landscape and underscore their importance in incentivizing sustainable construction.

Collaboration and stakeholder engagement emerge as critical factors in driving the adoption of sustainable construction methodologies within the UK's real estate industry, as highlighted by Participants 2 and 5. They consistently emphasize that green bonds have played a significant role in increasing collaboration among builders, investors, and governments, fostering a collaborative approach to achieving sustainability goals. The industry has seen a significant shift and the broad adoption of sustainable construction practices thanks to this collaborative financing approach made possible by green bonds.

Participant 2's mention of opposition from investors and other parties highlights the importance of effective collaboration and stakeholder engagement in overcoming resistance to sustainable practices. Despite challenges, the success achieved through innovative solutions and stakeholder collaboration demonstrates the transformative potential of collaboration in driving sustainable development initiatives. This observation aligns with existing research on the importance of collaboration and stakeholder engagement in driving sustainable development. Soderholm (2020) discusses the challenges of technological change for sustainability and highlights the importance of collaboration among stakeholders in navigating these challenges effectively. Similarly, Ionascu et al. (2020) analyze real estate companies' involvement in sustainable development and highlight the role of stakeholder engagement in promoting sustainability within the industry. Furthermore, according to Participant 5, the collaborative financial approach facilitated by green bonds has been instrumental in promoting sustainable construction methodologies. Agliardi and Agliardi (2019) emphasize the role of green bonds in financing environmentally sustainable projects, highlighting their potential to mobilize capital for green investments and foster collaboration among stakeholders.

The interviews conducted shed light on the challenges and benefits associated with green bond-funded projects within the UK's real estate industry. Participants 2, 3, 12, and 16 highlighted various challenges, including initial investment costs, navigating complex regulatory frameworks, and securing buy-in from stakeholders. These challenges resonate with previous research identifying barriers to sustainable development, such as financial constraints and regulatory complexities. Participant 2's mention of opposition from investors and other parties emphasizes the challenges associated with securing buy-in from stakeholders by highlighting the importance of effective communication and stakeholder engagement in overcoming resistance to sustainable practices. Additionally, Participant 16's emphasis on regulatory compliance reflects the challenges associated with navigating complex regulatory frameworks, which can pose barriers to the implementation of sustainable construction methodologies.

The observations made by Participants 2 and 16 align with existing research on the challenges of green bond-funded projects. Osuizugbo et al. (2020) explore barriers to the adoption of sustainable construction and underscore the importance of overcoming financial constraints and regulatory complexities. Similarly, Debrah et al. (2022) discuss the green finance gap in green buildings, highlighting the challenges associated with securing financing for sustainable development projects. Despite these challenges, Participants 3 and 12 also emphasized the long-term benefits of green bond-funded projects. Participant 3 highlighted reduced operational expenses as a key benefit, while Participant 12 emphasized enhanced market appeal and positive environmental impacts. These findings underscore the potential benefits of green bond-funded projects in driving sustainability within the real estate sector.

The analysis of stakeholder perspectives reveals critical insights into the effectiveness of green bonds and sustainable construction methodologies. Financial incentives play a significant role in driving adoption, as highlighted by Participant 1 and 10 who emphasized the importance of lower long-term operational costs and reduced energy consumption. This aligns with existing research, which highlights that financial benefits can effectively drive green practices (Akhtyrska & Fuerst, 2024; Bibri & Krogstie, 2020). However, despite these financial incentives, securing buy-in from all stakeholders remains a challenge. Participant 2's observations about resistance from investors and other parties highlight the need for effective communication strategies to overcome concerns regarding the long-term environmental benefits of projects. This challenge is consistent with literature identifying financial constraints and regulatory complexities as barriers to sustainable development (Osuizugbo et al., 2020). Additionally, regulatory frameworks and government incentives are pivotal in promoting sustainability, as Participant 9 indicated. Regulations that promote energy efficiency and economic incentives such as tax breaks and grants are essential for supporting green building practices, a sentiment reflected in the study of Rana et al. (2021). Moreover, the growing consumer demand for environmentally friendly properties, highlighted by Participant 12, pushes developers to adopt green practices to remain competitive. This aligns with research by Karimi et al. (2023) and Morri et al. (2021), which emphasizes the influence of market demand on the adoption of sustainable practices.

The development of a sustainable innovation model must integrate stakeholder views, technological advancements, and regional cooperation. The role of technological advancements and industry collaboration is crucial, as Participants 2, 9, and 12 emphasized. Green bonds facilitate collaboration among stakeholders, creating an environment conducive to technological innovation and sustainable practices, as indicated by Agliardi and Agliardi (2019). Additionally, the model should address regional specificities through territorial cooperation, leveraging local knowledge, and resources to address unique

environmental and economic conditions. This approach aligns with Soderholm (2020) and Ksenofontov and Petrov (2024), who emphasis the importance of stakeholder engagement and regional collaboration in achieving sustainability goals. Furthermore, navigating complex regulatory frameworks, as highlighted by Participants 16 and 2, is a significant challenge. Streamlining regulatory processes and providing clear guidelines can facilitate the implementation of green bonds and sustainable construction methodologies. Lastly, despite the initial challenges and costs associated with green bond-funded projects, the long-term benefits are substantial. Participants 3 and 12 noted reduced operational expenses and enhanced market appeal as key advantages. A sustainable innovation model should balance these costs with long-term benefits, providing a framework for developers and investors to make informed decisions. By addressing these aspects, the model can effectively support the transition to sustainable construction methodologies (Umoh et al., 2024; Walker & Goubran, 2020).

Figure 3 presents the summary of the identified themes and their relationships with each other.

4.3 | Theme 3: Motivators and incentives for sustainable initiatives

The findings from the analysis of the interview shed light on the key themes and patterns that influence real estate developers to choose green investments over traditional financing methods. These themes include financial incentives, regulatory compliance, reputation and marketability, consumer demand, and challenges and barriers. These are shown in Figure 4.

In discussing the role of financial incentives in driving real estate developers towards green investments, it is evident that participants across the industry recognize the significant impact of economic factors on decision-making. Participant 6 emphasizes the potential for enhanced competitiveness in the market as a key driver for embracing green investments, aligning with the broader sentiment that financial performance is a crucial motivator for sustainable practices (Agliardi & Agliardi, 2019; Baker et al., 2022). This acknowledgement emphasizes the importance of considering both the short-term costs and long-term benefits associated with sustainable initiatives.

Furthermore, the emergence of green bonds as a financing option for sustainable projects, as highlighted by Participant 14, demonstrates the evolving landscape of sustainable finance within the real estate sector (Fatica & Panzica, 2021). Green bonds not only provide developers with access to capital for green initiatives but also signal a growing investor appetite for environmentally responsible investments. In addition, the development of sustainable innovation models, which integrate financial, regulatory, and market considerations into a cohesive framework, is vital for driving green investments. Financial mechanisms such as green bonds and subsidies can help mitigate initial costs (Agliardi & Agliardi, 2019; Baker et al., 2022), while regulatory frameworks must be streamlined to support compliance and

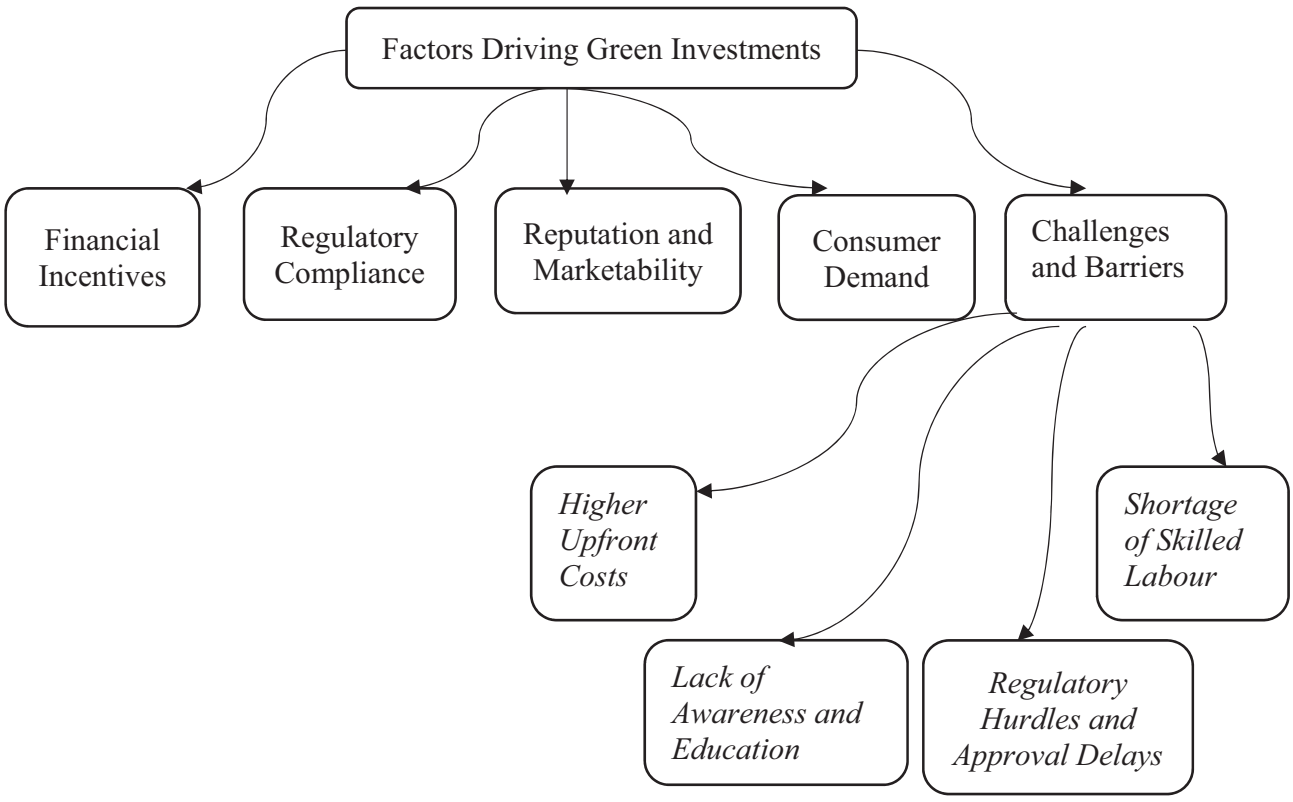

FIGURE 4 Interactions among the identified themes in RQ3.

incentivize sustainable practices (Alabid et al., 2022; Okwandu et al., 2024).

Policy frameworks also play a vital role in shaping the incentives for sustainable practices. Participant 3 discusses the intensification of MEES in the UK as a regulatory push towards environmentally friendly real estate developments by echoing the broader impact of policy interventions on industry practices (Booker, 2020). Similarly, Participant 7 emphasizes the importance of reframing policies to address energy efficiency challenges, highlighting the role of regulatory frameworks in driving sustainability (Bergman & Foxon, 2020). However, despite the clear benefits of green investments, challenges remain. Participant 5 points out obstacles such as financial constraints and a lack of awareness, highlighting the need for concerted efforts to overcome barriers to sustainable construction (Osuizugbo et al., 2020). Participant 12 reinforces this perspective, highlighting the importance of collaboration among stakeholders in addressing challenges and promoting sustainable practices (Tokbolat et al., 2020). The discussion of stakeholder views further reveals that policymakers must balance economic growth with environmental stewardship through supportive policies. Effective policies should align incentives across stakeholders (Basaglia et al., 2024; Newell et al., 2023), foster collaboration (Kostakis & Tsiouris, 2024), and address regional specificities to drive sustainable development (Aiguobarueghian et al., 2024; Boguszewski et al., 2024).

Regulatory compliance is identified as another important factor in encouraging real estate developers to adopt green initiatives. This observation aligns closely with the perspectives shared by several participants. Participant 1 emphasizes the role of government regulations, such as green certifications and tax breaks, in incentivizing developers to opt for sustainable investments. This aligns with Denman et al. (2018) study. Similarly, Participant 17 highlights regulatory compliance as a key motivator for real estate stakeholders to embrace green initiatives. It is similar to Ionascu et al. (2020) study. These viewpoints highlight the importance of regulatory frameworks in shaping the decision-making process within the industry. Moreover, Participant 4 discusses the significance of regulatory compliance as a factor influencing financial performance and market competitiveness, further emphasizing the interplay between regulations and economic considerations. This perspective reflects the broader recognition among participants of the multifaceted impact of regulatory frameworks on sustainable practices in real estate development. To address regulatory hurdles and approval delays, suggested strategies include procedural simplification and support for more effective approval processes (Olasolo-Alonso et al., 2023; Tokbolat et al., 2020). Collaboration among stakeholders can also help overcome these challenges and facilitate the timely adoption of sustainable practices (Khan et al., 2019; Koengkan et al., 2023).

The explanations of regulatory compliance as a driving force behind the choice of sustainable investments resonate with existing research findings. Studies have consistently highlighted the pivotal role of regulations in promoting sustainability in the real estate sector (Alabid et al., 2022). By providing clear guidelines and incentives, government regulations create a conducive environment for developers to prioritize environmentally responsible practices. Furthermore, the role of tax incentives and green certifications in encouraging sustainable investments is well-documented in academic literature (Fatica & Panzica, 2021). These incentives not only contribute to financial performance but also enhance the marketability of green buildings, as noted by Participant 5. Such findings highlight the interconnectedness between financial incentives, regulatory compliance, and the adoption of sustainable practices in the real estate industry.

Reputation and marketability play crucial roles in driving real estate developers towards green investments, a sentiment supported by insights from Participants 8 and 12. Participant 12 emphasizes that the positive financial performance associated with sustainable practices not only contributes to profitability but also helps in building a favorable reputation within the market. This reputation, rooted in environmentally responsible behavior, acts as a magnet, attracting investors, tenants, and other stakeholders who prioritize sustainability (Morri et al., 2021). Furthermore, Participant 8 highlights the importance of marketability in the context of green buildings. As consumer awareness regarding environmental issues grows, there is an increasing demand for sustainable living spaces. Real estate developers who align their projects with these preferences gain a competitive edge in the market, positioning themselves as leaders in sustainability (Huijbregts et al., 2019). This alignment with broader societal values not only enhances the attractiveness of their properties but also fosters trust and loyalty among stakeholders.

Developers and investors often view sustainable practices as strategies to enhance property value and market competitiveness (Ghosh & Petrova, 2023; Leskinen et al., 2020). This view highlights the need for a holistic approach that integrates financial, regulatory, and market considerations into the development of sustainable innovation models (Ahmed et al., 2022; Baker et al., 2022). Effective collaboration among stakeholders, including local communities, environmental groups, and policymakers, is essential for addressing the broader benefits of sustainable practices and achieving sustainable development goals in the real estate sector (Aiguobarueghian et al., 2024; Clarke et al., 2024).

Consumer demand is indeed a significant motivator for real estate developers to prioritize green investments, as highlighted by insights from industry participants 6, 11, and 14. Participant 6 emphasizes the shifting preferences of consumers towards environmentally friendly properties, driven by increasing environmental awareness and concerns about sustainability. This aligns with Baker et al. (2022) findings. Participant 11 further elaborates on how real estate developers recognize the importance of aligning with these evolving consumer preferences to remain competitive in the market. It is similar to Mahapatra et al. (2021) study. Moreover, Participant 14 highlights the notion that attracting buyers and tenants necessitates demonstrating CSR and offering environmentally friendly properties. This sentiment reflects a broader acknowledgement among industry stakeholders of the imperative to address consumer demand for sustainable living options (Denman et al., 2018). By responding to these preferences, developers not only cater to a growing market segment but also enhance the marketability and long-term viability of their projects (Li et al., 2019).

Consumer preferences increasingly drive the demand for sustainable living spaces, highlighting the need for developers to align with these trends (Newell & Marzuki, 2022; Viles et al., 2024). Strategies to address consumer demands include integrating sustainable practices into development projects (Ferreira et al., 2023; Karimi et al., 2023), enhancing marketability through green certifications, and leveraging reputation to attract environmentally conscious investors and tenants (Ghosh & Petrova, 2023; Morri et al., 2021).

In terms of challenges and barriers faced by real estate professionals when implementing sustainable building practices, the analysis reveals several themes. The perceived higher upfront costs associated with green investments are identified as a significant challenge, as noted by Participant 3 and Participant 8. These are similar to Morri et al. (2021) and Rana et al. (2021) findings. The broad adoption of sustainable building methods must be aided by removing financial obstacles and identifying affordable solutions. This finding is consistent with previous studies that have highlighted the importance of addressing cost concerns in promoting sustainable practices (Baker et al., 2022). Addressing the barriers to sustainable building practices involves overcoming financial constraints (Bertoldi et al., 2021; Rana et al., 2021), increasing awareness, and building local expertise (Dalirazar & Sabzi, 2022; Dragicevic, 2024). Targeted education, stakeholder collaboration, and regional cooperation are critical for mitigating these challenges and promoting broader adoption of sustainable methods (Olasolo-Alonso et al., 2023).

Lack of awareness and education is seen as another barrier to implementing sustainable practices, as emphasized by Participants 9 and 12. Participants mentioned a lack of awareness and misconceptions about higher costs, as well as resistance to change, as challenges. Targeted education, collaboration among stakeholders, and showcasing successful case studies are mentioned as ways to overcome these challenges. This finding highlights the importance of increasing awareness and providing accurate information about the benefits of sustainable practices (Karimi et al., 2023; Osuizugbo et al., 2020).

The shortage of skilled labor is identified as a barrier to the seamless integration of green initiatives, as discussed by Participants 15 and 18. The implementation of sustainable methods is hampered by the lack of competent personnel, as sustainable construction frequently calls for certain expertise and abilities. To tackle this issue, strategies like funding training initiatives, advocating for sustainable building education, and encouraging cooperation between academic institutions and industry players are proposed. This finding is consistent with previous research (Chong & Cheng, 2023; Tokbolat et al., 2020) that has highlighted the importance of addressing the skills gap in promoting sustainable practices. Addressing the shortage of skilled labor involves funding training initiatives and advocating for sustainable building education (Shen et al., 2018; Tokbolat et al., 2020). Collaboration between academic institutions and industry can help build a skilled workforce to support the integration of green initiatives (Ghosh & Petrova, 2023; Karimi et al., 2023).

Regulatory hurdles and approval delays are mentioned as challenges that can hinder the timely implementation of sustainable practices, as highlighted by Participants 7 and 10. Sustainable initiative adoption may be slowed down by complicated regulatory regulations and lengthy approval processes. Suggested strategies to get beyond these obstacles include collaboration, procedural simplification, and support for more effective approval processes. This finding emphasizes the need for a supportive regulatory environment that facilitates the adoption of sustainable practices (Baker et al., 2022; Denman et al., 2018).

Developers and investors often prioritize profitability and market competitiveness, viewing sustainable practices as strategies to enhance property value and attract tenants while mitigating long-term risks. Policymakers, on the other hand, must balance economic growth with environmental stewardship through policies that incentivize green investments and regulate sustainable building practices. Meanwhile, local communities and environmental groups advocate for sustainability to improve environmental quality and ensure social equity in urban development. Consumers and tenants increasingly seek eco-friendly buildings for health and environmental reasons. Effective discussions should focus on aligning incentives across stakeholders, fostering dialog to bridge differences, integrating supportive policies, and enhancing awareness about the broader benefits of sustainable practices. This approach can facilitate collaborative efforts towards achieving sustainable development goals in the real estate industry.

Figure 4 reveals the identified themes and the relationship among them.

5 | CONCLUSION

The analysis of the interview data in this study has provided valuable insights into the key themes related to green investments and sustainable practices in the real estate industry. The findings from the three identified themes—green investments and sustainable practices in real estate, the impact of green bonds on sustainable construction, and motivators and incentives for sustainable initiatives—contribute to the existing literature and provide valuable information for policymakers, investors, and industry professionals.

The first theme highlights the evolution of green investments in the sector. There is a rising recognition of the need to address the environmental impact of the sector, as seen by the change from an early emphasis on environmental consciousness to a more strategic approach motivated by long-term value. The economic benefits and financial incentives driving the adoption of sustainable practices, such as reduced operational costs and increased market value, further support the business case for sustainability in real estate. The role of regulatory frameworks and government incentives in promoting sustainability, the growing awareness and recognition of environmental issues, the integration of sustainability into all aspects of real estate development, the importance of consumer demand and market preferences, and the role of education and training in promoting sustainable practices are also key factors in driving the adoption of sustainable practices in the sector.

The second theme focuses on the positive impact of green bonds on environmental sustainability. Green bonds have facilitated the adoption of sustainable practices by providing financial support and access to capital for environmentally friendly projects. The financial

incentives provided by green bonds have incentivized investment in energy-efficient technologies, renewable energy sources, and green building materials, leading to a tangible reduction in the carbon footprint of construction projects. Collaboration and stakeholder engagement have also played a crucial role in driving the adoption of sustainable construction methodologies, with green bonds fostering a collaborative approach among builders, investors, and governments. The challenges and benefits of green bond-funded projects, such as initial investment costs and navigating complex regulatory frameworks, further highlight the transformative role of green bonds in driving sustainability within the real estate sector.

The third theme clarifies the variables that impact real estate developers' decision to select green investments over conventional financing techniques. Financial incentives, regulatory compliance, reputation and marketability, and consumer demand are identified as key motivators. The potential for long-term cost savings, reduced operational expenses, and increased property values outweigh the initial investment costs, making green investments economically attractive. Government policies that encourage developers to make sustainable investments include tax benefits and green certifications. Reputation and marketability are significant motivators as well, since sustainable practices help cultivate a positive image and draw in stakeholders and investors that value making eco-friendly decisions. Consumer demand for environmentally friendly properties further drives the adoption of sustainable practices.

However, several challenges and barriers to implementing sustainable building practices were also identified. The perceived higher upfront costs associated with green investments, lack of awareness and education, shortage of skilled labour, and regulatory hurdles, and approval delays were identified as significant challenges. Overcoming these challenges requires addressing cost concerns, increasing awareness, and providing accurate information about the benefits of sustainable practices, investing in training programs, promoting sustainable building education, and advocating for more efficient approval procedures.

While the findings and policy recommendations primarily apply to the UK, they may have relevance for other countries and regions, especially those with similar regulatory frameworks and market dynamics. The insights generated from this study offer valuable implications for policymakers, investors, and industry professionals seeking to advance sustainability within the real estate sector. These include:

1. Implementing and enhancing financial incentives for green investments.
2. Promoting awareness and education about the benefits of sustainable practices.
3. Investing in training programs to address the shortage of skilled labour.
4. Streamlining regulatory approval processes to facilitate sustainable building practices.

The conclusion of this study supports sustainable development by synthesizing key findings and offering actionable insights for stakeholders in the UK real estate industry. It emphasizes the importance of regulatory frameworks, market demand, financial incentives, corporate responsibility, and technological innovation in driving sustainable practices. By highlighting the role of green investments, including green bonds, the conclusion underscores their significance in funding energy-efficient and renewable energy projects, thereby reducing environmental impact.

Furthermore, the conclusion identifies motivators for stakeholders such as financial benefits, regulatory compliance, reputation, and consumer demand to engage in sustainability initiatives despite challenges like perceived higher costs and regulatory hurdles. These insights guide policymakers in formulating targeted regulations and incentives to promote sustainable practices. They also inform investors on prioritizing green investments that align with environmental goals while enhancing CSR and meeting consumer demand for sustainable properties.

Despite the valuable insights gained from this research, several limitations should be acknowledged. First, the sample size of 17 real estate developers may limit the generalizability of the findings. While purposive sampling was employed to ensure diversity in participants' backgrounds and perspectives, a larger sample size could provide a more comprehensive understanding of the subject matter. Additionally, the focus of the study was on real estate developers in the UK, which may restrict the applicability of the findings to other geographical regions with different regulatory frameworks and market dynamics. Furthermore, the reliance on qualitative data collected through interviews may introduce subjectivity and bias, as participants' responses are influenced by their own experiences and perceptions. Future research could address these limitations by employing larger and more diverse samples, including participants from various regions and utilizing mixed method approaches to triangulate findings.

Despite these limitations, this research makes several significant contributions to the existing literature on green investments and sustainable practices in the real estate sector. First, by exploring the perspectives and experiences of real estate developers, this study provides valuable insights into the factors driving the adoption of sustainable practices and the impact of green bonds on sustainable construction methodologies. The identified themes, including the evolution of green investments, the role of financial incentives, regulatory frameworks, and consumer demand, contribute to a deeper understanding of the complexities surrounding sustainability in the real estate industry. Additionally, the findings highlight the transformative role of green bonds in promoting environmental sustainability and fostering collaboration among stakeholders. This research also underscores the importance of addressing challenges such as cost concerns, lack of awareness, and regulatory hurdles to promote the widespread adoption of sustainable building practices. Overall, the insights generated from this study offer valuable implications for policymakers, investors, and industry professionals seeking to advance sustainability within the real estate sector and contribute to broader efforts to mitigate climate change and environmental degradation.

Future research could explore how ESG factors influence sustainable practices in the UK real estate industry. This could include assessing the financial impacts of energy-efficient technologies and renewable energy sources, and evaluating government incentives

and policies' effectiveness in promoting these practices. Investigating circular economy principles and comparing new developments with retrofitting strategies can provide insights into resource optimization. Additionally, examining social responsibility initiatives, such as affordable housing and community engagement, can reveal their effects on market dynamics, tenant satisfaction, and property value. Lastly, integrating green spaces and biophilic design can enhance occupant well-being and contribute to urban biodiversity, offering a holistic view of sustainability in real estate.

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REFERENCES

Adanma, U. M., & Ogunbiyi, E. O. (2024). A comparative review of global environmental policies for promoting sustainable development and economic growth. *International Journal of Applied Research in Social Sciences*, *6*(5), 954–977. https://doi.org/10.51594/ijarss.v6i5.1147

Agliardi, E., & Agliardi, R. (2019). Financing environmentally-sustainable projects with green bonds. *Environment and Development Economics*, *24*(6), 608–623. https://doi.org/10.1017/S1355770X19000020

Ahmed, A., Ge, T., Peng, J., Yan, W. C., Tee, B. T., & You, S. (2022). Assessment of the renewable energy generation towards net-zero energy buildings: A review. *Energy and Buildings*, *256*, 111755. https://doi.org/10.1016/j.enbuild.2021.111755

Aiguobarueghian, I., Adanma, U. M., Ogunbiyi, E. O., & Solomon, N. O. (2024). An overview of initiatives and best practices in resource management and sustainability. *World Journal of Advanced Research and Reviews*, *22*(2), 1734–1745. https://doi.org/10.30574/wjarr.2024.22.2.1519

Akhtyrska, Y., & Fuerst, F. (2024). The effectiveness of climate change regulations in the commercial real estate market. *Energy Policy*, *185*, 113916. https://doi.org/10.1016/j.enpol.2023.113916

Alabid, J., Bennadji, A., & Seddiki, M. (2022). A review on the energy retrofit policies and improvements of the UK existing buildings, challenges and benefits. *Renewable and Sustainable Energy Reviews*, *159*, 112161. https://doi.org/10.1016/j.rser.2022.112161

Allen, J. G., & Macomber, J. D. (2020). *Healthy buildings*. Harvard University Press.

Alsaid, L. A. Z. A., & Ambilichu, C. A. (2024). Performance measurement in urban development: Unfolding a case of sustainability KPIs reporting. *Journal of Accounting in Emerging Economies*, *14*(1), 48–74. https://doi.org/10.1108/JAEE-09-2021-0299

Amaechi, C. V. (2022). *Real estate as an investment hub within the built environment for sustainability in a circular economy* (No. 2022_256). European Real Estate Society (ERES). https://ideas.repec.org/p/arz/wpaper/2022_256.html

Ametefe, F. K., Brenni, P. A., & Viruly, F. (2023). Sustainable real estate investment and finance in developing economies: Challenges and opportunities. *Sustainable and Responsible Investment in Developing Markets*, Chapter 17, (pp. 262–285). Edward Elgar Publishing. https://doi.org/10.4337/9781803927060.00027

Baker, M., Bergstresser, D., Serafeim, G., & Wurgler, J. (2022). The pricing and ownership of US green bonds. *Annual Review of Financial Economics*, *14*, 415–437. https://doi.org/10.1146/annurev-financial-111620-014802

Basaglia, P., Isaksen, E., & Sato, M. (2024). Carbon pricing, compensation and competitiveness: Lessons from UK manufacturing. In *Grantham research institute on climate change and the environment working paper (406)*. London School of Economics and Political Science. https://eprints.lse.ac.uk/122364/

Bergman, N., & Foxon, T. J. (2020). Reframing policy for the energy efficiency challenge: Insights from housing retrofits in the United Kingdom. *Energy Research & Social Science*, *63*, 101386. https://doi.org/10.1016/j.erss.2019.101386

Bertoldi, P., Economidou, M., Palermo, V., Boza-Kiss, B., & Todeschi, V. (2021). How to finance energy renovation of residential buildings: Review of current and emerging financing instruments in the EU. *Wiley Interdisciplinary Reviews: Energy and Environment*, *10*(1), e384. https://doi.org/10.1002/wene.384

Bibri, S. E., & Krogstie, J. (2020). Environmentally data-driven smart sustainable cities: Applied innovative solutions for energy efficiency, pollution reduction, and urban metabolism. *Energy Informatics*, *3*(1), 29. https://doi.org/10.1186/s42162-020-00130-8

Bibri, S. E., Krogstie, J., Kaboli, A., & Alahi, A. (2024). Smarter eco-cities and their leading-edge artificial intelligence of things solutions for environmental sustainability: A comprehensive systematic review. *Environmental Science and Ecotechnology*, *19*, 100330. https://doi.org/10.1016/j.ese.2023.100330

Boguszewski, R., Pilat, A., & Węgrzyn, P. (2024). Global lessons from local actions: A typology of polish local government approaches to sustainable development. *Sustainable Development*, *32*(1), 682–695. https://doi.org/10.1002/sd.2698

Booker, Y. (2020). Assessing the impact of the intensifying UK minimum energy efficiency standards (MEES) on regional office rental values. *International Journal of Urban Sciences*, *24*(2), 152–172. https://doi.org/10.1080/12265934.2019.1651669

Chandiramani, J., Tripathi, S., Benara Misra, S., Patil, G., & Shende, A. (2024). Does inequality exist in attaining sustainable development goals within a city? A case study in Pune city, India, *4*, 1–38. https://doi.org/10.1080/12265934.2024.2382705

Chegut, A., Eichholtz, P., Kok, N., & Quigley, J. M. (2011). The value of green buildings: new evidence from the United Kingdom. *ERES 2010 proceedings*, 1–43.

Chong, H. Y., & Cheng, M. (2023). Integrating advanced Technologies for Sustainable Construction Purposes. *Energies*, *16*(16), 6015. https://doi.org/10.3390/en16166015

Christensen, P. H., Robinson, S., & Simons, R. (2022). Institutional investor motivation, processes, and expectations for sustainable building investment. *Building Research & Information*, *50*(3), 276–290. https://doi.org/10.1080/09613218.2021.1908878

Clarke, L., Sahin-Dikmen, M., & Werna, E. (2024). Climate change, inequality and work in the construction industry. In *Research handbook on inequalities and work* (pp. 507–522). Edward Elgar Publishing. https://doi.org/10.4337/9781800886605.00047

Dalirazar, S., & Sabzi, Z. (2022). Barriers to sustainable development: Critical social factors influencing the sustainable building development based on Swedish experts' perspectives. *Sustainable Development*, *30*(6), 1963–1974. https://doi.org/10.1002/sd.2362

Dalton, B., & Fuerst, F. (2018). The 'green value' proposition in real estate: a meta-analysis. In *Routledge handbook of sustainable real estate* (pp. 177–200). Routledge.

Debrah, C., Chan, A. P. C., & Darko, A. (2022). Green finance gap in green buildings: A scoping review and future research needs. *Building and Environment*, *207*, 108443. https://doi.org/10.1016/j.buildenv.2021.108443

Demastus, J., & Landrum, N. E. (2024). Organizational sustainability schemes align with weak sustainability. *Business Strategy and the Environment*, *33*(2), 707–725. https://doi.org/10.1002/bse.3511

Denman, A. R., Crockett, R. G., & Groves-Kirkby, C. J. (2018). An assessment of the effectiveness of UK building regulations for new homes in radon affected areas. *Journal of Environmental Radioactivity*, *192*, 166–171. https://doi.org/10.1016/j.jenvrad.2018.06.017

Digitemie, W. N., & Ekemezie, I. O. (2024). Assessing the role of climate finance in supporting developing nations: A comprehensive review.

Finance & Accounting Research Journal, *6*(3), 408–420. https://doi.org/10.51594/farj.v6i3.926

Dimitrov, R. S. (2016). The Paris agreement on climate change: Behind closed doors. *Global Environmental Politics*, *16*(3), 1–11. https://doi.org/10.1162/GLEP_a_00361

Dragicevic, A. Z. (2024). Deconstructing the doughnut. *Current Opinion in Environmental Sustainability*, *68*, 101451. https://doi.org/10.1016/j.cosust.2024.101451

Fatica, S., & Panzica, R. (2021). Green bonds as a tool against climate change? *Business Strategy and the Environment*, *30*(5), 2688–2701. https://doi.org/10.1002/bse.2771

Ferreira, A., Pinheiro, M. D., de Brito, J., & Mateus, R. (2023). A critical analysis of LEED, BREEAM and DGNB as sustainability assessment methods for retail buildings. *Journal of Building Engineering*, *66*, 105825. https://doi.org/10.1016/j.jobe.2023.105825

Gao, J., Hua, G., & Huo, B. (2024). Turning "green" into "gold": A study on the impact of green finance pilot zone policy on energy carbon emission efficiency. *Sustainable Development*, 1–15. https://doi.org/10.1002/sd.3114

Ghosh, C., & Petrova, M. T. (2023). Building sustainability, certification, and Price premiums: Evidence from Europe. *Journal of Real Estate Research*, *45*(1), 1–24. https://doi.org/10.1080/08965803.2023.2267717

Gomez-Jaramillo, Y., Berrouet, L., Villegas-Palacio, C., & Berrio-Giraldo, L. (2024). Conceptual framework for analyzing the sustainability of socio-ecological systems with a focus on ecosystem services that support water security. *Sustainable Development*, *32*(3), 2298–2313. https://doi.org/10.1002/sd.2780

Huijbregts, R., Heurkens, E., & Hobma, F. (2019). Real estate investors' maturity in using corporate social responsibility to develop sustainable properties (No. eres2019_270). *European Real Estate Society (ERES)*, Conference 2019, Cercy/Paris, 5 July. https://ideas.repec.org/p/arz/wpaper/eres2019_270.html

Ionascu, E., Mironiuc, M., Anghel, I., & Huian, M. C. (2020). The involvement of real estate companies in sustainable development—An analysis from the SDGs reporting perspective. *Sustainability*, *12*(3), 798. https://doi.org/10.3390/su12030798

Jayakody, T. A. C. H., & Vaz, A. (2023). Impact of green building certification on the rent of commercial properties: A review. *Journal of Informatics and Web Engineering*, *2*(2), 8–28. https://doi.org/10.33093/jiwe.2023.2.2.2

Jena, A. C., & Sneha, V. (2024). Exploring the ethical implications and development in technology science: An applied ethics perspective. *International Research Journal of Humanities and Interdisciplinary Studies*, *5*(4), 512–526. https://doi-ds.org/doilink/04.2024-46824537/IRJHIS2404053

Kaklauskaite, U., & Streimikiene, D. (2024). Climate justice from the lens of sustainable development. *Sustainable Development*, 1–13. https://doi.org/10.1002/sd.3062

Kalfagianni, A., Pedersen, S., & Stevis, D. (2024). Planetary justice: A systematic analysis of an emerging discourse. *Environmental Politics*, 1–20. https://doi.org/10.1080/09644016.2024.2374155

Karimi, H., Adibhesami, M. A., Bazazzadeh, H., & Movafagh, S. (2023). Green buildings: Human-centered and energy efficiency optimization strategies. *Energies*, *16*(9), 3681. https://doi.org/10.3390/en16093681

Khan, J. S., Zakaria, R., Shamsudin, S. M., Abidin, N. I. A., Sahamir, S. R., Abbas, D. N., & Aminudin, E. (2019). Evolution to emergence of green buildings: A review. *Administrative Sciences*, *9*(1), 6. https://doi.org/10.3390/admsci9010006

Khargonekar, P. P., & Samad, T. (2024). The United Nations sustainable development goals: An IFAC agenda. *IFAC-PapersOnLine*, *58*(3), 153–158. https://doi.org/10.1016/j.ifacol.2024.07.142

Khojasteh, D., Haghani, M., Shamsipour, A., Zwack, C. C., Glamore, W., Nicholls, R. J., & England, M. H. (2024). Climate change science is evolving toward adaptation and mitigation solutions. *Wiley Interdisciplinary Reviews: Climate Change*, *15*(e884), 1–18. https://doi.org/10.1002/wcc.884

Koengkan, M., Fuinhas, J. A., Oliveira, F. P., Ursavaş, U., & Moreno, N. (2023). Building a sustainable future: How eco-friendly homes are driving local economic development in Lisbon metropolitan area. *Energies*, *16*(13), 4855. https://doi.org/10.3390/en16134855

Kostakis, V., & Tsiouris, N. (2024). How to unite local initiatives for a more sustainable global future. *Sustainable Futures*, *7*, 100187. https://doi.org/10.1016/j.sftr.2024.100187

Ksenofontov, S. S., & Petrov, A. N. (2024). Global change impacts on indigenous sustainability in Sakha Republic: A synthesis of knowledge. *Sustainability*, *16*(3), 1157. https://doi.org/10.3390/su16031157

Leskinen, N., Vimpari, J., & Junnila, S. (2020). A review of the impact of green building certification on the cash flows and values of commercial properties. *Sustainability*, *12*(7), 2729. https://doi.org/10.3390/su12072729

Li, Y., Kubicki, S., Guerriero, A., & Rezgui, Y. (2019). Review of building energy performance certification schemes towards future improvement. *Renewable and Sustainable Energy Reviews*, *113*, 109244. https://doi.org/10.1016/j.rser.2019.109244

Mahapatra, S. K., Schoenherr, T., & Jayaram, J. (2021). An assessment of factors contributing to firms' carbon footprint reduction efforts. *International Journal of Production Economics*, *235*, 108073. https://doi.org/10.1016/j.ijpe.2021.108073

Mondal, S., & Sahoo, K. K. (2020). A study of green building prospects on sustainable management decision making. In *Green building management and smart automation* (pp. 220–234). IGI Global.

Morri, G., Anconetani, R., & Benfari, L. (2021). Greenness and financial performance of European REITs. *Journal of European Real Estate Research*, *14*(1), 40–61. https://doi.org/10.1108/JERER-05-2020-0030

Newell, G., & Marzuki, M. J. (2022). The increasing importance of environmental sustainability in global real estate investment markets. *Journal of Property Investment & Finance*, *40*(4), 411–429. https://doi.org/10.1108/JPIF-01-2022-0005

Newell, G., Nanda, A., & Moss, A. (2023). Improving the benchmarking of ESG in real estate investment. *Journal of Property Investment & Finance*, *41*(4), 380–405. https://doi.org/10.1108/JPIF-10-2021-0084

Okwandu, A. C., Esho, A. O. O., Iluyomade, T. D., & Olatunde, T. M. (2024). The role of policy and regulation in promoting green buildings. *World Journal of Advanced Research and Reviews*, *22*(1), 139–150. https://doi.org/10.30574/wjarr.2024.22.1.1047

Olasolo-Alonso, P., López-Ochoa, L. M., Las-Heras-Casas, J., & López-González, L. M. (2023). Energy performance of buildings directive implementation in southern European countries: A review. *Energy and Buildings*, *281*, 112751. https://doi.org/10.1016/j.enbuild.2022.112751

Olteanu, A. L., & Ionascu, A. E. (2023). The importance of ESG in the real estate investments. *Ovidius University Annals, Economic Sciences Series*, *23*(2), 810–817. https://shorturl.at/QDtwI

Olubunmi, O. A., Xia, P. B., & Skitmore, M. (2016). Green building incentives: A review. *Renewable and Sustainable Energy Reviews*, *59*, 1611–1621. https://doi.org/10.1016/j.rser.2016.01.028

Onuoha, I. J., & Ezedike, C. E. (2019). Review of Social Benefits of Green and Sustainable Real Estate Properties. https://doi.org/10.7176/JETP

Osuizugbo, I. C., Oyeyipo, O., Lahanmi, A., Morakinyo, A., & Olaniyi, O. (2020). Barriers to the adoption of sustainable construction. *European Journal of Sustainable Development*, *9*(2), 150. https://doi.org/10.14207/ejsd.2020.v9n2p150

Rahmah, M., & Sulistyono, A. (2024). The integration of traditional knowledge and local wisdom in mitigating and adapting climate change: Different perspectives of indigenous peoples from Java and Bali Island. In *Traditional knowledge and climate change: An environmental impact on landscape and communities* (pp. 61–80). Springer Nature Singapore. https://doi.org/10.1007/978-981-99-8830-3_4

Rana, A., Sadiq, R., Alam, M. S., Karunathilake, H., & Hewage, K. (2021). Evaluation of financial incentives for green buildings in Canadian landscape. *Renewable and Sustainable Energy Reviews*, *135*, 110199. https://doi.org/10.1016/j.rser.2020.110199

Ratcliffe, J., Stubbs, M., & Keeping, M. (2021). *Urban planning and real estate development*. Routledge. https://doi.org/10.4324/9780429398926

Shen, S. (2024). Resilience and sustainability: Engineering solutions in disaster-affected real estate markets. *Sustainable Development*, 1–15. https://doi.org/10.1002/sd.2960

Shen, W., Tang, W., Siripanan, A., Lei, Z., Duffield, C. F., & Hui, F. K. P. (2018). Understanding the green technical capabilities and barriers to green buildings in developing countries: A case study of Thailand. *Sustainability*, *10*(10), 3585. https://doi.org/10.3390/su10103585

Simon, D. C. (2024). Introduction to Sustainable Finance & Investing. *Sustainability: Business and Investment Implications*, *5*, 195–240. https://doi.org/10.1142/9789811240928_0008

Singh, R. (2024). Scientometric evaluation of cutting-edge research on sustainable development and environmental concern. *Sustainable Development*, 1–13. https://doi.org/10.1002/sd.3115

Soderholm, P. (2020). The green economy transition: The challenges of technological change for sustainability. *Sustainable Earth*, *3*(1), 6. https://doi.org/10.1186/s42055-020-00029-y

Tokbolat, S., Karaca, F., Durdyev, S., & Calay, R. K. (2020). Construction professionals' perspectives on drivers and barriers of sustainable construction. *Environment, Development and Sustainability*, *22*, 4361–4378. https://doi.org/10.1007/s10668-019-00388-3

Umoh, A. A., Nwasike, C. N., Tula, O. A., Adekoya, O. O., & Gidiagba, J. O. (2024). A review of smart green building technologies: Investigating the integration and impact of AI and IOT in sustainable building designs. *Computer Science & IT Research Journal*, *5*(1), 141–165. https://doi.org/10.51594/csitrj.v5i1.715

Valeri, G., Biasin, M., & Giacomini, E. (2022). *The relevance of "green" RE investments in strategic asset allocation decisions: Evidence of EU member countries (No. 2022_202)*. European Real Estate Society (ERES). https://ideas.repec.org/p/arz/wpaper/2022_202.html

Viles, E., Cavallieri, M. S., Kalemkerian, F., Montoya-Torres, J. R., & Santos, J. (2024). Assessing sustainable production: A selection of indicators aligned with the SDGs. *Sustainable Development*, *32*(3), 2530–2548. https://doi.org/10.1002/sd.2793

Voland, N., Saad, M. M., & Eicker, U. (2022). Public policy and incentives for socially responsible new business models in market-driven real estate to build green projects. *Sustainability*, *14*(12), 7071. https://doi.org/10.3390/su14127071

Walker, T., & Goubran, S. (2020). Sustainable real estate: Transitioning beyond cost savings. In *Sustainability* (pp. 141–161). Emerald Publishing Limited. https://doi.org/10.1108/S2514-175920200000004008

Yan, H., Qamruzzaman, M., & Kor, S. (2023). Nexus between green investment, fiscal policy, environmental tax, energy price, natural resources, and clean energy—A step towards sustainable development by fostering clean energy inclusion. *Sustainability*, *15*(18), 13591. https://doi.org/10.3390/su151813591

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