

Mediation Framework of ESG On Relationship Between Climate Change and Housing Affordability (Real Estate) Investment

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ABSTRACT

Climate change poses a significant challenge to the real estate investment sector, impacting property values and risk factors. ESG principles are increasingly recognized as key mediators in this relationship, shaping real estate investment decisions and climate change. This study aimed at assessment of the mediation effect of ESG on the relationship between climate change and real estate investment, quantitative and qualitative research design was employed where 162 set of questionnaire from real estate investors/ developers and 5 developer from real estate developers association of Nigeria (REDAN) was interviewed spatial equation modeling using smart PLS and thematic content analysis was carried using NVivo simple random sampling and purposive sample was employed in get the sample for both method respectively. From the finding of the study it obtained that the three dimension of ESG social and environment positively mediate the relationship between real estate investment and climate change with path coefficient of 0.408, 0.112, T-statistics of 3.714 and 1.359 and p-value of 0.000 and 0.175 respective contrary governance natively mediate the relationship with path coefficient of -0.548, T-statistics of 2.006 and p-value of 0.045, from the qualitative result is show that ESG have positive influence in real estate investments decision making and cash follow and it if further shown that it mediate the relationship and it can be conclude that the implication and the provision of ESG affect the real estate investment.

Keywords: Real Estate Investment; Climate Change; Environmental; Social Governance; Finance Decision Making;

INTRODUCTION

Climate change poses a growing threat to real estate investment (Baldauf *et al.*,2020). Rising temperatures, extreme weather events, and sea-level rise can significantly impact property values and investment returns (French, 2020; Drebenstedt, *et al* 2023; Newell, & Marzuki, 2022; Salisu *et al.*, 2023). Coastal properties are particularly vulnerable, facing increased risks of flooding and erosion, which can lead to property devaluation and insurance challenges (Baldauf *et al.*,2020; Warsame, *et al.*, 2023). Additionally, regulatory changes aimed at reducing carbon emissions can necessitate costly retrofits for non-compliant properties, potentially lowering their investment appeal (Warren-Myers *et al.*, 2020). Thus, climate change is reshaping the risk landscape for real estate investors, necessitating a greater focus on climate resilience and adaptation strategies (Fan *et al.*, 2022; Li, & Grant, 2022; Sorensen, & Pfeifer, 2011).



Climate change has emerged as a significant and pressing global issue with profound implications for various sectors, including real estate investment (French, 2020; Hein, *et al.*, 2019). The scientific consensus on climate change has strengthened over the years, with research pointing to the accelerating impacts of rising global temperatures, extreme weather events, and sea-level rise (IPCC, 2021). These environmental changes pose challenges to real estate investment by increasing the vulnerability of properties to damages, reducing their long-term value, and altering investment dynamics (Li, & Grant, 2022).

One of the key ways in which climate change affects real estate is through the increased frequency and intensity of extreme weather events (Warren-Myers *et al.* 2020). Hurricanes, floods, wildfires, and storms have become more prevalent globally, leading to extensive property damage and disruptions (Salisu, *et al.*, 2023). The intensification of these events raises concerns for real estate investors as properties face higher risks of destruction, resulting in financial losses and insurance complications (PwC, 2020).

Sea-level rise is another critical aspect of climate change that impacts real estate, particularly in coastal areas (Henin *et al.*, 2019). The melting of polar ice caps contributes to rising sea levels, threatening properties in low-lying coastal regions (Chen, & Lee, 2020). Real estate investments in these areas face depreciation and potential loss as the risk of flooding and saltwater intrusion rises (Eriksen *et al.*, 2020).

Investors are also increasingly recognizing the significance of climate-related regulations and policies (Giglio *et al.*, 2021). Governments worldwide are implementing measures to mitigate climate change, such as building codes, energy efficiency standards, and emission reduction targets (Ngoc, 2023). These regulatory shifts affect real estate investments by influencing construction practices, property values, and the demand for sustainable buildings (IPCC, 2021).

Moreover, climate change considerations are reshaping investor preferences and strategies (Baldauf *et al.*, 2020). The growing awareness of environmental, social, and governance (ESG) factors has led investors to prioritize sustainable and climate-resilient properties (Sanfelici, & Halbert, 2019). Real estate assets that fail to meet these criteria may face challenges in attracting capital and may experience diminished market demand (UNEP FI, 2020).

Environmental, Social, and Governance (ESG) factors have emerged as crucial mediators in shaping the effects of climate change on real estate investments (Zhou *et al.*, 2022). Incorporating ESG principles, investors and developers are better equipped to navigate the risks and opportunities arising from climate change impacts (Tan, & Zhu, 2022). A notable example is the Rockefeller Foundation's commitment to the Rockefeller Climate Solutions Fund, focusing on real estate projects that integrate sustainability measures to mitigate climate change risks (Rockefeller Foundation, 2021). ESG considerations act as a mediating force by influencing investment decisions and strategies to align with sustainability goals (Zhou *et al.*, 2023).

One key environmental consideration within ESG is energy efficiency, which has become central to real estate investment. Sustainable building practices and energy-efficient technologies can mediate the adverse effects of climate change by reducing the carbon footprint of properties (Zhou *et al.*, 2023). For instance, the Edge, a sustainable office building in Amsterdam, employs innovative technologies to maximize energy efficiency, showcasing how environmentally conscious design can enhance the resilience of real estate investments to climate-related challenges (World Green Building Council, 2021).

The social dimension of ESG also plays a mediating role in climate change impacts on real estate investment (Chen, & Lee, 2020). The inclusivity and resilience of communities surrounding real estate developments are critical considerations. In Japan, Sumitomo Forestry has taken an innovative approach by incorporating greenery and community spaces in its W350 project, a wooden skyscraper aimed at promoting biodiversity and community well-being while mitigating the urban heat island effect (Sumitomo Forestry, 2021). Such projects demonstrate how ESG principles can contribute to social resilience amid changing climate conditions (Zhou *et al.*, 2023).

Governance, the third pillar of ESG, influences how real estate assets respond to climate risks. Robust governance frameworks ensure that investment decisions consider long-term climate resilience. In the United States, Boston Properties, a real estate investment trust, has been recognized for its commitment to sustainability governance by incorporating environmental performance targets and disclosure practices, providing an example of how effective governance can enhance the climate resilience of real estate portfolios (GRESB, 2021).

ESG factors mediate the effects of climate change on real estate investment by guiding decision-making and shaping sustainable practices. Real-world examples, such as the Rockefeller Climate Solutions Fund, the Edge in Amsterdam, Sumitomo Forestry's W350 project in Japan, and Boston Properties in the United States, highlight the transformative impact of integrating ESG principles in real estate strategies to mitigate climate risks.

The impact of Environmental, Social, and Governance (ESG) considerations on real estate investment has gained significant attention in recent years (Newell, *et al.*, 2023; Fan, *et al.*, 2022). ESG principles have evolved from being a set of ethical guidelines to becoming a crucial factor that influences investment decisions and market dynamics in the real estate sector (Newell, 2023; Gradillas, *et al.*, 2021; Robinson, & McIntosh, 2022). The evolution of ESG has been driven by increasing awareness of sustainability and corporate responsibility issues, as well as a growing recognition of the financial implications of ESG factors in real estate investment as noted by Zhao, 2023; Trisnowati, *et al.*, 2022; Pott, 2021; Erol *et al.*, 2023).

Exploring knowledge of real estate investment with its heterogeneous nature it is worthy to note that the ESG principles have a profound impact on real estate investment due to their potential to enhance risk management, long-term financial performance, data for valuation, investment strategy and the overall sustainability of real estate assets (Erol *et al.*, 2023; Kempeneer, *et al.*, 2021). With the incorporated factors affecting real estate value and investment in ESG, the environmental scope which encompasses factors like energy efficiency, carbon emissions, and sustainable building practices realizing that properties designed which is managed with environmentally friendly practices to adherence of EGS principle can reduce operational costs and attract environmentally conscious tenants, ultimately leading to higher asset values (Lo, 2023; Jaspers, & Ankerstjerne, 2023; Luo, & Tang, 2023; Feng, & Wu, 2023; Veith, *et al.*, 2022).

The need for studying the ESG dimension in real estate sector persist as the "S" in ESG, referring to social factors, takes into account considerations such as tenant satisfaction, community engagement, social value derivation, and workforce diversity these is directly in-cooperating the considerations of ESG in real estate investment (Newell, 2023; Romijn, 2021; Brounen, & Marcato, 2018;). Socially responsible real estate investments are not only more likely to be preferred by tenants, but they can also reduce vacancy rates and improve asset performance (Newell, 2023; Ben-Ali, & Chouaibi, 2023; Brounen *et al.*, 2021). Additionally, responsible community engagement practices can contribute to enhanced public relations and social goodwill, benefiting real estate investors in the long term (Aroul, *et al.*, 202; Kempeneer, *et al.*, 2021).

The "G" in ESG pertains to Governance, which encompasses transparent and ethical business practices, anti-corruption measures, and accountable corporate governance (Newell *et al.* 2023b). Companies with strong governance structures are less likely to engage in fraudulent activities or unethical behaviors that could negatively impact the value of real estate investments (Kang, & Jung, 2020; Richter, *et al.*, 2022). Furthermore, they are more likely to maintain higher levels of transparency, reducing investment risks (Chouaibi, *et al.*, 2022).

The integration of ESG principles into real estate investment is driven by the realization that it is not only socially responsible but also financially prudent (Feng, & Wu, 2023; Morgante *et al.*, 2023). It was noted in the study of Newell (2023) real estate investors are increasingly factoring in ESG considerations when making investment decisions. Understanding the implications of ESG in real estate investments is crucial for both investors and industry stakeholders as it not only helps in mitigating risks but also enhances the sustainability and resilience of real estate portfolios in an evolving global landscape (Hult, & Touati, 2022; Romijn, 2021;). In light of these considerations, it is evident that ESG has become a pivotal driver of change in the cooperate including real estate investment industry (Tang, 2022; Fan, *et al.*, 2022; Gradillas, *et al.*, 2021; Robinson, & McIntosh, 2022).

The relationship between climate change and real estate investment is a multifaceted and increasingly significant one (Newell, & Marzuki, 2022; Giglio, *et al.*, 2021). Climate change introduces a range of risks and opportunities that affect different aspects of the real estate sector (Sayce *et al.*, 2022; Clayton *et al.*, 2021). The effect of climate change on real estate ranging from physical risks, with events like sea-level rise, extreme weather, and wildfires causing property damage and leading to property devaluation (Bunten, & Kahn, 2017). Previous researches of Newell, 2023; Sayce, *et al.*, 2022; Salisu, *et al.*, 2023; Semenenko & Yoo, 2019; Chen *et al.* 2022 has shown that

these climate change risks can significantly impact property values, particularly in vulnerable areas such as coastal regions).

Climate change triggers regulatory and policy impacts, as governments implement more stringent environmental regulations and building codes to address climate-related challenges (Tan, & Zhu, 2022; Wu, *et al.*, 2023). These changes can result in increased costs for non-compliant properties and influence investment decisions, forcing investors to consider not only short-term gains but also long-term compliance and sustainability (Zhao, 2023; Giglio, *et al.*, 2021; Cvijanovic, & Van de Minne, 2021).

Going with the background and in response to these risks, there has been an upsurge in the integration of Environmental, Social, and Governance (ESG) principles in real estate investment (Warren-Myers, 2022; Oerte *et al.*, 2022). ESG criteria, which encompass climate-related factors, are increasingly considered by investors when evaluating properties (Salisu *et al.*, 2023). This integration is driven by the recognition that ESG principles can enhance the long-term sustainability of real estate investments, improve asset performance, and reduce risks associated with climate change (Erol *et al.*, 2023; Salami *et al.* 2023; Hult, & Touati, 2022). Simultaneously, the real estate market offers opportunities in the development and investment of green or environmentally sustainable real estate (Lambourne, 2022). Energy-efficient buildings and the incorporation of renewable energy technologies are increasingly attractive to both investors and tenants. These green initiatives not only align with climate action goals but also improve the overall value of real estate assets by reducing operational costs and attracting environmentally-conscious tenants (Newell, 2023). The relationship between climate change and real estate investment is multi-dimensional, encompassing risks and opportunities (Oertel, *et al.* 2022; Baldauf *et al.*, 2020; Li, & Grant, 2022). Real estate investors are increasingly recognizing the need to address climate-related factors in their investment strategies, not only to mitigate risks but also to harness the long-term potential and sustainability of their investment portfolios (Lambourne, 2022; French, 2020).

PROBLEM STATEMENT

ESG, has dominated real sectors and carbon finance aspect as there are constant need for addressing the effect of climate change for sustainable environment (Erol *et al.*, 2023; Salami *et al.* 2023). Environmental, Social, and Governance (ESG) principles can serve as a critical mediator in mitigating the impact of climate change on real estate investment. By incorporating ESG criteria into investment decisions, investors are prompted to embrace sustainable and climate-resilient practices within the real estate sector. This entails prioritizing energy-efficient building designs and technologies, considering the physical and regulatory risks linked to climate change (Wang, *et al.*, 2023). This holistic approach encourages real estate investors to adopt strategies that takes into account climate-related risks, societal impacts, and the long-term financial sustainability of their investments (Newell *et al.*, 2022). Thus, ESG principles provide a framework for informed and responsible investment choices that can effectively mitigate the risks associated with climate change and contribute to the resilience and enduring value of real estate portfolios.

With the pervasive effect of the climate change identified on the real estate and real estate investment, the need for constant research for contribution to body of knowledge, need for understanding of sustainable real estate investment strategies and their impact on mitigating climate change, need for educating real estate investors and policymakers on how ESG factors can help shape more sustainable real estate investment practices and policies, there are several previous studies on the real estate, ESG and climate change, including Baldauf *et al.*, 2020; Warren-Myers *et al.* 2020; Li, & Grant, 2022; French, 2020; Newell, & Marzuki, 2022; Fan, *et al.*, 2022; Gradillas *et al.* 2021; Robinson, & McIntosh, 2022; Brounen,*et al.* 2021; Pott, 2021; Erol *et al.*, 2023; Kempeneer, *et al.*, 2021; Luo, & Tang, 2023; Veith, *et al.* 2022; Romijn, 2021; Hult, & Touati, 2022; Brounen, & Marcato, 2018; Luan, & Wang, 2023 none of the study has holistically carried out on the need to study the element such as ESG that can mediate the relationship between real estate investment and climate change. With above pressing needs which facilitated and fueled the need for holistic study on the mediation effect of ESG on the relationship between real estate investment and climate change this study emerged to explores the role of Environmental, Social, and Governance (ESG) factors as a mediation framework in the relationship between climate change and real estate investment. It examines how ESG criteria influence climate change-related risks and opportunities in the real estate sector, impacting investment decisions and outcomes. The study seeks to provide insights into how

ESG considerations mediate the impact of climate change on real estate investments and promote sustainable practices within the industry

LITERATURE REVIEW

Environmental Social Governance

The concept of ESG derived from sustainability, as It encapsulates the idea of meeting the needs of the present without compromising the ability of future generations to meet their own needs (Warren-Myers, 2022; Lambourne, 2022). Environmental, Social, and Governance (ESG) is a fundamental concept in the corporate world, increasingly recognized for its influence on the business environment and investment decisions (Erol *et al.*, 2023; Luan, & Wang, 2023). ESG is a holistic framework encompassing three critical dimensions Environmental, Social, and Governance (Tang, 2022). The three dimensions of ESG which collectively shape a company's approach to sustainability, ethics, and responsible business practices become subject of concern (Piserà, & Chiappini, 2022; Ben-Ali, & Chouaibi, 2023). Environmental Responsibility (E): The "E" in ESG underscores a company's commitment to environmental responsibility (Romijn, 2021; Veith *et al.*, 2022). It centers on the organization's response to environmental challenges and its contribution to sustainability (Ortas, *et al.*, 2015; Tan, & Zhu, 2022). ESG environmental criteria include efforts to reduce carbon emissions, resource conservation, sustainable waste management, and practices that safeguard the environment (Zhao, 2023; Luan, & Wang, 2023; Feng, & Wu, 2023; Cucari, et a 2018).

Social Responsibility (S): The "S" in ESG represents social responsibility, emphasizing the relationships between the company, its employees, customers, and the communities it engages with (Kang, & Jung 2020: Kang, & Jung, 2020; Luo, & Tang, 2023). Social responsibility entails fair labor practices, fostering diversity and inclusion, active community engagement, and the respect of human rights (Pott, 2021; Brounen, *et al.*, 2021; Widyawati, 2020; Lagasio, & Cucari,2019). Companies that prioritize social responsibility aim to create a positive social impact and promote harmonious relationships with all stakeholders (Newell *et al.*, 2023; Warren-Myers, & Hurlimann, 2022).

Governance Practices (G): The "G" stands for governance practices, which evaluate a company's corporate governance structure, adherence to ethical business practices, and commitment to transparency and accountability (Robinson, & McIntosh 2022). Strong governance practices incorporate independent boards of directors, effective oversight mechanisms, anti-corruption measures, and the safeguarding of shareholder rights (Zehir & Aybars, 2020). The interconnectedness of these three dimensions is a fundamental tenet of ESG, recognizing that a company's overall performance is influenced by its management of environmental, social, and governance factors (Trisnowat *et al.*, 2021; Gradillas, *et al.*, 2021). Neglecting any one aspect can lead to risks related to reputation, regulatory compliance, and long-term sustainability (Chouaibi, & Affes, 2021). The importance of ESG has grown significantly as investors, consumers, and other stakeholders consider ESG criteria when evaluating a company's commitment to responsible business practices (Gradillas, *et al* 2021). incorporating ESG considerations, companies aim not only to achieve financial success but also to make a positive contribution to society and the environment (Pineau, *et al.*, 2022).

The need for the ESG in real estate investment cannot be overemphasize due to increasing attention it gained in the real estate investment industry in recent years (Newell *et al.*, 2023). ESG considerations are becoming integral to investment decision-making as they play a pivotal role in assessing both the short-term performance and long-term sustainability of real estate assets (Fan *et al* 2022; Li *et al.*, 2021; Pike, 2020; Arou *et al.*, 2022). Environmental factors within ESG encompass various aspects, including energy efficiency, water conservation, and sustainable building practices (Siew, 2015; Autio, *et al.*, 2023; Pitkälä, 2020). These considerations are increasingly crucial in the real estate sector, where buildings contribute significantly to energy consumption and carbon emissions (Townsend, 2020). Sustainability initiatives, such as LEED certification, have gained prominence in the industry, as they emphasize green building practices (Gallent *et al.*, 2017; Townsend, 2020; Krosinsky, 2019). Investing in environmentally friendly buildings not only aligns with global climate goals but can also lead to reduced operational costs, enhanced tenant attraction, and increased property value (Brounen *et al.*, 2012; Krosinsky, 2019; Froese, & Schilling, 2019).

Social aspects of ESG in real estate investment extend to factors such as tenant well-being, community engagement, and diversity and inclusion (Froese, & Schilling, 2019; Krosinsky, 2019; Aroul *et al.*, 2022; Christensen, & Gabe, 2019). Ensuring a positive and healthy living and working environment is essential for tenant satisfaction and retention (Worzala *et al.*, 2013; Bienert, 2013). Furthermore, social factors, including contributing to the local community and fostering diversity in the real estate workforce, are increasingly valued by investors and stakeholders (Walker, & Goubran, 2020; Mironiuc *et al.*, 2021). Meeting these social criteria of ESG can enhance an asset's reputation and promote long-term stability (Mironiuc *et al.*, 2021; Warren-Myers, & Hurlimann, 2022).

Governance in real estate investment pertains to issues such as corporate governance, ethical business practices, and transparent decision-making (Newell, 2016; Newell, & Marzuki 2022; Putra, *et al.*, 2015). Sound governance is vital in maintaining investor trust and upholding ethical standards (Iliyasu, *et al.*, 2023). Transparency in financial reporting and adherence to ethical principles can contribute to more favorable investment outcomes and protect against reputational risks (Higgins *et al.*, 2017; Baldauf, *et al.*, 2020; Mangialardo, *et al.*, 2018; Peiris, & Evans, 2010). Proper governance practices within real estate investment entities also ensure accountability and responsible management (Li, *et al.*, 2021; Shen *et al.*, nd:)

Real Estate Investment

Real estate investment is a multifaceted concept that plays a central role in both the global economy and the personal financial strategies of investors (Sadayuki, *et al.*, 2019; Holtermans, *et al.* 2022; Mangialardo, 2018; Baldauf, *et al.* 2022). At its core, real estate investment involves the purchase, ownership, management, and potential appreciation or rental income generation from physical properties, which can include residential homes, commercial buildings, vacant land, or real estate investment trusts (REITs) as financial instruments (Abdallah, *et al.*, 2021; Fuerst, & McAllister, 2008; Putra, *et al.*, 2015). Real estate investment provides various opportunities for building wealth and income streams (Clayton *et al.*, 2021; Newell, *et al.*, 2015; Peirani, & Cochard, 2021; Christensen, & Gabe, 2019). Residential real estate, including single-family homes and apartment buildings, allows individuals to earn rental income and potentially benefit from property appreciation over time (Mironiuc, *et al.*, 2021; Salem, & Baum, 2016). Commercial real estate, such as office buildings, retail centers, and industrial warehouses, offers investors the potential for income through lease agreements with businesses and tenants (Holtermans, *et al.* 2022; Khairulanuwar, & Chuweni, 2021).

Moreover, real estate investment can also involve participation in real estate investment trusts (REITs), which are publicly traded companies that pool capital from various investors to invest in a diversified portfolio of income-generating properties (Salami *et al.* 2023; Hin *et al.*, 2013; Mpofo *et al.*, 2023; Salisu, *et al.*, 2023). REITs provide an opportunity for individuals to invest in real estate without owning and managing properties directly (Kabir, *et al.* 2023; Romijn, 2021; Siew, 2015;). The concept of real estate investment is deeply intertwined with broader financial and economic principles, including the creation of diversified investment portfolios, the potential for capital appreciation, rental income, and the use of leverage through mortgage financing (Newell, & Marzuki, 2022; Ali, *et al.*, 2023; Morgante, *et al.*, 2023). Additionally, real estate investments are influenced by market dynamics, economic cycles, and regulatory factors, which can impact the performance and risks associated with these investments (Ruan, & Liu, 2021; Newell *et al.*, 2023; Jitmaneroj, 2016;). Real estate investment has gained recognition for its potential to provide both income and long-term wealth growth (Giglio *et al.* 2021). It serves as a valuable asset class that can complement traditional investment vehicles such as stocks and bonds, and its role in individual wealth creation and economic development is substantial and enduring (Sadayuki, *et al.*, 2019).

Climate Change

The concept of climate change refers to the long-term alteration of Earth's average weather patterns, including shifts in temperature, precipitation, and wind patterns (Bedeke, 2023; Froese, & Schilling, 2019). Climate change is a phenomenon driven primarily by human activities, such as the burning of fossil fuels, deforestation, and industrial processes, leading to an increase in greenhouse gas emissions (Mongie, *et al.*, 2023; Bedeke, 2023). These emissions trap heat in the Earth's atmosphere, resulting in global warming and a range of environmental consequences (Warren-Myers, & Hurlimann, 2022).

Climate change is a complex issue with multifaceted impacts on various aspects of the natural world and human society (Iliyasa *et al.*, 2023). It leads to more frequent and severe extreme weather events, including hurricanes, droughts, and heatwaves, which can have devastating effects on communities and ecosystems (Baldauf, *et al.*, 2020; Giglio *et al.*, 2021). Rising sea levels, driven by the melting of polar ice caps and glaciers, threaten coastal regions and low-lying areas, exacerbating the risk of flooding and coastal erosion (Silva, *et al.*, 2023; Sayce, *et al.*, 2022). Furthermore, climate change has implications for global food security, as shifts in temperature and precipitation patterns can disrupt agricultural practices and lead to crop failures (Clayton *et al.*, 2021). Biodiversity is also at risk, with many species facing habitat loss and increased vulnerability to changing conditions (Semenenko & Yoo, 2019). Additionally, climate change impacts public health through the spread of diseases and the exacerbation of heat-related illnesses (Ardia, *et al.* 2022; Cvijanovic, & Van de Minne 2021). Efforts to address climate change center around mitigation, involving the reduction of greenhouse gas emissions through cleaner energy sources, energy efficiency, and sustainable land use practices (Graff Zivin, & Neidell, 2014). Adaptation strategies are equally vital, focusing on how to cope with and adjust to the changes that are already underway (Giglio, *et al.*, 2021; Froese, & Schilling, 2019). The concept of climate change is fundamental to addressing one of the most critical global challenges of our time. Scientific research, international cooperation, and individual actions are all essential components in the effort to mitigate the effects of climate change and promote a more sustainable and resilient future for the planet (Mongie, *et al.*, 2023; Bedeke, 2023).

Real Estate and Climate Change

Climate change poses direct physical risks to real estate assets. Sea-level rise, for instance, can lead to increased flooding and coastal erosion, putting coastal properties at risk (Giglio *et al.* 2021; Deng *et al.*, 2021). Extreme weather events, including hurricanes and wildfires, can cause damage to real estate structures and disrupt local property markets (Noy *et al.*, 2019). The increasing frequency and severity of these events have the potential to reduce the value and desirability of real estate investments in vulnerable areas. Government responses to climate change, including regulations and policies aimed at reducing greenhouse gas emissions and promoting sustainable practices, can impact real estate investments. Stricter building codes, energy efficiency requirements, and disclosure mandates may affect property values and operating costs (Mayer *et al.*, 2018). Investors who fail to account for these regulatory changes may face financial risks and market devaluation (Giglio *et al.* 2021).

Climate change awareness and concerns are influencing market perceptions and demand for real estate, there is growing interest in sustainable and environmentally responsible properties (Clayton, *et al.*, 2021; Buntun, & Kahn, 2017). Properties with green features, such as energy-efficient systems and low-carbon footprints, are increasingly attractive to investors and tenants (Eichholtz *et al.*, 2019; Salisu, *et al.*, 2023; Semenenko, & Yoo, 2019). Understanding these evolving market preferences is essential for real estate investors to remain competitive and profitable (Cvijanovic, & Van de Minne, 2021).

On the flip side, climate change also offers opportunities for real estate investment (Giglio, *et al.*, 2021; Noguera, 2023). Properties equipped with sustainable features and resilience measures can provide a competitive advantage and better withstand climate-related risks (Er *et al.*, 2023; Eichholtz *et al.*, 2019; Liet *et al.*, 2023b). Real estate investors can participate in climate mitigation efforts by investing in renewable energy projects or adopting energy-efficient technologies, potentially leading to cost savings and new revenue streams (Seagraves, 2023; Yazdani, & Raissi, 2023).

The need for transparency in disclosing climate-related risks has gained prominence in the real estate investment industry (Lee, *et al.* 2023). Organizations like the Task Force on Climate-related Financial Disclosures (TCFD) have called for more comprehensive and consistent reporting of climate risks in financial disclosures (TCFD, 2017). Investors are increasingly relying on such disclosures to assess the climate resilience of their real estate investments. The relationship between climate change and real estate investment is multifaceted and evolving (Shui, *et al.* 2023). Climate change poses physical, regulatory, and market risks to real estate assets, affecting property values and market dynamics (Abeysekara, *et al.*, 2023). However, it also presents opportunities for sustainable and climate-resilient investments. Investors need to consider climate-related factors in their decision-making processes, adapt to changing market preferences, and ensure transparency in reporting climate-related risks to navigate this complex and dynamic landscape (Abeysekara *et al.* 2023).

The need for studies on the relationship between climate change and real estate investment is underscored by the growing recognition of climate change as a major global challenge (IPCC, 2021; Ashworth, & Clarke, 2023). Climate change, driven by increasing greenhouse gas emissions and resulting in more frequent and severe weather events, poses significant risks to various sectors, including real estate (Deng *et al.*, 2021; Ma, & Yildirim, 2023; Kadletz, 2023). Investigating these risks is imperative, as they encompass physical threats, such as rising sea levels and extreme weather events, which can cause damage to properties and disrupt local real estate markets (Noy *et al.*, 2019; Holme, & Rocha, 2023). Additionally, regulatory and policy risks associated with climate change, like stricter building codes and energy efficiency requirements, can impact property values (Mayer *et al.*, 2018). Market perceptions and demand are also shifting, with sustainable properties gaining preference, making it vital for investors to adapt to these dynamics (Eichholtz *et al.*, 2019; Martino, 2023;). Furthermore, climate change offers opportunities for real estate investment in sustainable and resilient properties (Duong, *et al.* 2023; Eichholtz *et al.*, 2019). Finally, the growing emphasis on disclosure and transparency, as advocated by organizations like the Task Force on Climate-related Financial Disclosures (TCFD), underscores the importance of studying the effectiveness of disclosure practices (TCFD, 2017). In conclusion, the multifaceted impact of climate change on real estate necessitates comprehensive research to inform investment decisions, mitigate risks, and promote sustainability in an evolving and climate-affected world.

METHODOLOGY

In this study both quantitative and qualitative was employed, set of questionnaire survey was distributed to the real estate investors registered with real estate developer association of Nigerian (REDAN), the sample of this study was determine using the Krejcie and morgan table where from active registration list there are 280, impliedly as sample of 162 is used, purposive sampling techniques was employed in choosing the respondents, going with the facts of activeness and performance in terms of number of properties investing, after data collection Cronbach and alpha was used to assessing the reliability of the data before the structural equation model analysis using smart PLS in assessing the inferential and correlational relationships between the ESG, real estate, and climate change. In the aspect of the qualitative data 5 property investors was interviewed meeting the require of the software, thematic analysis was systematically carried out using computer assisted data analysis software NVivo, sequentially the integration of the qualitative and the quantitative data was emerged.

FINDINGS AND DISCUSSIONS

The relationship between climate change and real estate investment is a complex and increasingly significant one. Climate change impacts, such as rising sea levels, extreme weather events, and shifting climate patterns, have the potential to affect the real estate sector in various

Table 1: Data administration

Options	Frequency	Percentage
Questionnaire Administered	170	100%
Questionnaire retrieved	164	96.5%
Questionnaire used	162	95.0%

In Table 1 above it shows the data administration where to avoid shortage of data in the research 185 set of questionnaire survey was distributed to avoid shortage of data, 162 set of questionnaires was retrieved and 162 set was used for the analysis which is the actual sample of the study.

Data Normality Assessment

In the assessment of data normality for the study, the application of skewness and kurtosis statistics was utilized. These statistical measures were employed to gauge the distribution of the dataset under examination. Notably, the results revealed that all the data points fell within the acceptable range of +3 to -3 for both skewness and kurtosis. This adherence to the specified range suggests that the data can

be reasonably considered to follow a normal distribution, further supporting the validity of the statistical analyses conducted in the study

Demographic result

From the result obtain 2 demographic data obtained these data are the gender, year of experience, and it shows that 142 with 87.7% are male and 20 with 12.3% are female, regarding the experience 105 with 64 .8 are have 15 years and above experience while 47 with 35.2% are having 5-10 years' experience.

Assessment of Measurement Models

In the initial phase of PLS-SEM evaluation, meticulous scrutiny is devoted to the measurement models, encompassing the critical assessment of their reliability, convergent validity, and discriminant validity. The evaluation of measurement model reliability hinges on the deployment of the composite reliability measure, which assesses the homogeneity of a block by employing Dillon-Goldstein's (or Joreskog's) rho (Vinzi, Trinchera, & Amato, 2010). Subsequently, the examination extends to the realms of convergent validity and discriminant validity (Hair *et al.*, 2014).

Convergent validity assessment entails a close examination of factor loadings, which encapsulate the extent of variance explained, along with the Average Variance Extracted (AVE). This dual evaluation helps in ascertaining the model's proficiency in elucidating the variance among the indicators (Wong, 2016). For robust results, the outer loadings are expected to be statistically significant, preferably exceeding 0.7 (Lowry & Gaskin, 2014), and aligning with the recommendation by Hair *et al.* (2011). According to their suggestion, items with factor loadings falling below 0.4 should be considered for elimination, and those slightly above this threshold may warrant removal if they contribute to AVE improvement. The AVE itself is deemed substantial when it exceeds 0.5 for a specific measurement model, in line with Bagozzi and Yi's (1988) guidance. In tandem with convergent validity, the assessment of discriminant validity involves a multifaceted analysis employing the Hetero-trait Monotrait (HTMT) ratio, the Fornell and Larcker criterion, and cross-loadings, to ensure that constructs are distinct and not conflated.

Measurement Models Reliability

The assessment of the measurement models' reliability is a pivotal step in evaluating reflective measurement models, aiming to ascertain the consistency and dependability of the scale's measurements over time. In this context, composite reliability serves as a valuable metric (Lowry & Gaskin, 2014). Similar to Cronbach's alpha, composite reliability assesses internal consistency by quantifying the effectiveness of a construct's measurement by its observable variables (Memon & Rahman, 2014). When conducting PLS-SEM analysis, employing composite reliability for assessing reliability is recommended over the traditional use of Cronbach's alpha (Hair *et al.*, 2011; Wong, 2016). Scholars have proffered guidance on acceptable thresholds for measurement models or constructs to be deemed reliable. Commonly, a composite reliability value of 0.7 or higher is advocated as indicative of internal consistency and reliability (Pallant, 2011; Wong, 2013; Hair *et al.*, 2011). However, even a value of 0.6 is considered acceptable for confirming reliability (Chin, 1998; Hair *et al.*, 2014). The composite reliability values for the measurement models can be found in Table 2 below, providing insights into the reliability of the constructs in the study.

Table 2: Reliability of Reflective Constructs

Constructs	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Climate Change	0.776	0.793	0.850	0.536
Environmental	0.805	0.834	0.863	0.560
Governance	0.763	0.814	0.839	0.526
Real Estate Inv	0.823	0.835	0.876	0.586

Social	0.866	0.887	0.904	0.656
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Table 2 provides a comprehensive assessment of the reliability of the reflective constructs within the study, focusing on their internal consistency and dependability. The table presents key reliability measures for each construct, including Cronbach's Alpha, rho_A, composite reliability, and Average Variance Extracted (AVE).

For the "CLIMATE CHANGE" construct, the reliability indicators are as follows: Cronbach's Alpha of 0.776, rho_A of 0.793, composite reliability of 0.850, and an AVE of 0.536, signifying good internal consistency and reliability. The "ENVIRONMENTAL" construct also demonstrates strong reliability with a Cronbach's Alpha of 0.805, rho_A of 0.834, a composite reliability of 0.863, and an AVE of 0.560, indicating robust internal consistency. The "GOVERNANCE" construct exhibits acceptable reliability, with a Cronbach's Alpha of 0.763, rho_A of 0.814, a composite reliability of 0.839, and an AVE of 0.526, confirming its reliability. The "REAL ESTATE INV" construct showcases high reliability, boasting a Cronbach's Alpha of 0.823, rho_A of 0.835, a composite reliability of 0.876, and an AVE of 0.586, highlighting its robust internal consistency. Lastly, the "SOCIAL" construct demonstrates excellent reliability, featuring a Cronbach's Alpha of 0.866, rho_A of 0.887, a composite reliability of 0.904, and an AVE of 0.656, emphasizing its strong internal consistency and reliability.

Assessment of Convergent Validity

Convergent validity, a crucial aspect of measurement model assessment, examines how well an item relates to other measures targeting the same phenomenon. In reflective measurement models, it is evaluated through factors like factor loadings, Average Variance Extracted (AVE), and the number of iterations needed for model convergence. For reflective models, items should ideally have substantial loadings exceeding 0.5, be statistically significant, and contribute to an AVE of 0.5 or higher. Timely convergence of loadings is also essential. For formative models, the focus is on the significance of path weights leading to Higher Order Constructs. The research assessed convergent validity meticulously, as detailed in Tables 3 and 4.

Table 3: Convert reliability

	CC	ENVIRO	GOV	REIT	SOCIA
AVE	0.536	0.560	0.526	0.586	0.656
	CC	ENVIRO	GOV	REIT	SOCIA
CC1	0.720				
CC2	0.809				
CC3	0.773				
CC4	0.797				
CC5	0.526				
EVIRO1		0.638			
EVIRO2		0.703			
EVIRO3		0.728			
EVIRO4		0.837			
EVIRO5		0.818			
GOV1			0.361		
GOV2			0.834		
GOV3			0.754		
GOV4			0.813		
GOV5			0.757		
REIT1				0.750	

REIT2				0.731	
REIT3				0.803	
REIT4				0.838	
REIT5				0.697	
SOCIA1					0.846
SOCIA2					0.826
SOCIA3					0.866
SOCIA4					0.619
SOCIA5					0.865

Table 3 highlights that the retained factor loadings consistently exceed the 0.7 threshold, and their significance is confirmed by T-statistics values surpassing 1.96. Additionally, all measurement models exhibit Average Variance Extracted (AVE) values above the recommended minimum of 0.5, as advised by Bagozzi & Yi (1988). Moreover, the rapid convergence of the measurement models, well below the maximum limit of 300 iterations, aligns with Wong's guidelines (2013), signifying a robust estimation of the measurement model.

Assessment of Discriminant Validity

In multivariate analysis, ensuring the distinctiveness of constructs is essential, particularly in Partial Least Squares Structural Equation Modeling (PLS-SEM). Discriminant validity is the key to achieving this, verifying a measurement model's unique ability to capture its intended phenomena. To assess discriminant validity, various criteria are used, including the Heterotrait-Monotrait (HTMT) ratio, the Fornell and Larcker criterion, and cross-loadings. These evaluations collectively ensure the distinctiveness and validity of the measurement model. The Fornell and Larcker criterion, developed by Fornell and Larcker (1981), requires that a construct's correlation with others should not exceed the square root of its Average Variance Extracted (AVE), considered a conservative approach. Conversely, the cross-loading criterion, proposed by Chin (1998), demands that items load more strongly on their designated construct than on others, seen as a more liberal method to establish discriminant validity. Results of discriminant validity assessments, employing these criteria, are presented in Table 4, Table 5, and the Appendix, collectively reinforcing the distinctiveness and validity of the measurement models.

Table 4: Cross loading factor

	CC	ENVIRO	GOV	REIT	SOCIA
CC1	0.720	0.584	0.754	0.444	0.527
CC2	0.809	0.672	0.813	0.524	0.597
CC3	0.773	0.568	0.757	0.522	0.515
CC4	0.797	0.567	0.663	0.573	0.524
CC5	0.526	0.491	0.357	0.581	0.375
EVIRO1	0.415	0.638	0.514	0.312	0.515
EVIRO2	0.406	0.703	0.432	0.471	0.438
EVIRO3	0.667	0.728	0.738	0.550	0.646
EVIRO4	0.693	0.837	0.650	0.749	0.603
EVIRO5	0.679	0.818	0.706	0.574	0.652
GOV1	0.224	0.387	0.361	0.129	0.548
GOV2	0.677	0.763	0.834	0.619	0.782
GOV3	0.720	0.584	0.754	0.444	0.527
GOV4	0.809	0.672	0.813	0.524	0.597
GOV5	0.773	0.568	0.757	0.522	0.515

REIT1	0.507	0.670	0.483	0.750	0.447
REIT2	0.564	0.473	0.494	0.731	0.453
REIT3	0.589	0.598	0.546	0.803	0.473
REIT4	0.639	0.640	0.604	0.838	0.584
REIT5	0.397	0.399	0.358	0.697	0.361
SOCIA1	0.511	0.570	0.611	0.435	0.846
SOCIA2	0.563	0.557	0.605	0.518	0.826
SOCIA3	0.686	0.686	0.735	0.518	0.866
SOCIA4	0.291	0.549	0.413	0.493	0.619
SOCIA5	0.693	0.734	0.767	0.527	0.865

Table 5: Discriminant validity using Fornell and Larcker criterion

	CC	ENVIRO	GOV	REIT	SOCIAL
CC	0.732				
ENVIRO	0.791	0.749			
GOV	0.934	0.827	0.725		
REIT	0.714	0.740	0.659	0.765	
SOCIA	0.700	0.770	0.790	0.613	0.810

Table 5, utilizing the Fornell and Larcker criterion, assesses discriminant validity by comparing the square root of the Average Variance Extracted (AVE) for each construct to the correlations between constructs. The AVE indicates the proportion of variance explained by a construct's indicators. In terms of discriminant validity, it is crucial that the diagonal elements, representing the square root of AVE for each construct, exceed the correlations between that construct and others. This ensures that a construct shares more variance with its own indicators than with other constructs, thus establishing discriminant validity. The table consistently demonstrates that the diagonal elements (square root of AVE) surpass the correlations between constructs, validating discriminant validity. These results affirm that the study's constructs are distinct and can be effectively differentiated from one another, affirming the robustness of the measurement model.

In Table 5, the results of the discriminant validity assessment using the Fornell and Larcker criterion are presented. The square root of the Average Variance Extracted (AVE) is shown diagonally in bold italics. The figures both horizontally and vertically represent the correlations among the research constructs. The findings indicate that all LOCs meet the specified condition. Instances where LOCs exhibit higher correlations are exclusively with their corresponding HOCs, aligning with the expectations outlined by Sarstedt *et al.* (2019). Thus, the research successfully establishes discriminant validity based on the Fornell and Larcker criterion.

Model Assessments

The second phase of assessing Partial Least Squares Structural Equation Modeling (PLS-SEM) focuses on the structural (inner) model, which establishes the interconnections among measurement models and outlines the anticipated causal effects of exogenous measurement models on endogenous latent measurement models. These hypothesized relationships are essential for addressing research questions and achieving research goals. Evaluating the structural model entails analyzing its predictive ability regarding the endogenous models.

Assessing the quality of the structural model encompasses various crucial elements, including the scrutiny of path coefficients and their significance, determining coefficients of determination (R^2), measuring effect sizes (f^2), evaluating predictive relevance, and assessing the goodness of fit of the structural model. This phase seeks to validate these hypothesized relationships and gain insights into the underlying structural dynamics of the research model.

Based on these, the structural model is specified and presented in figures 4.2 showing the path coefficients and their significance respectively

Figure 1: Structural model using algorism

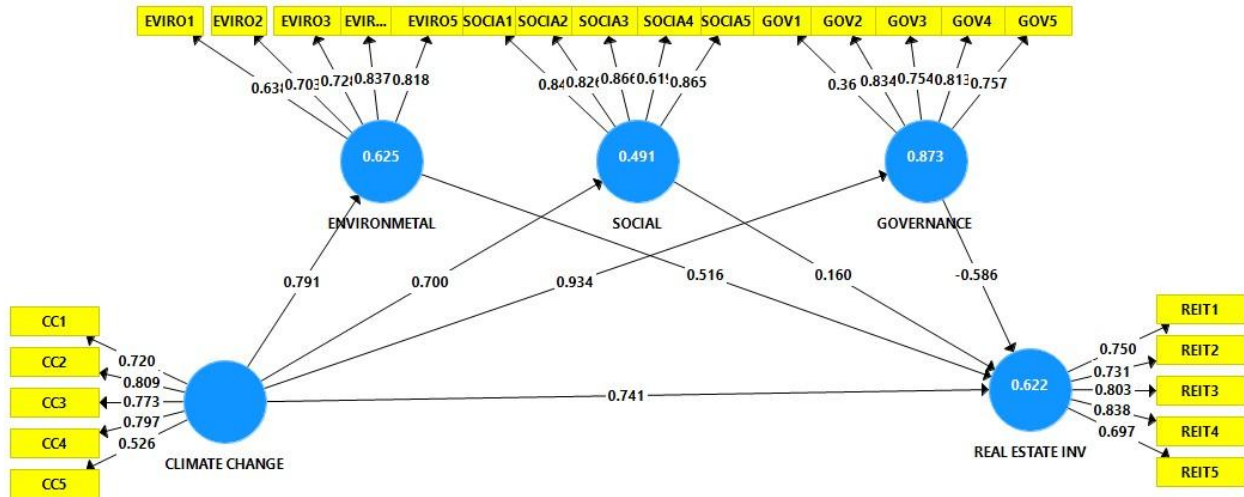
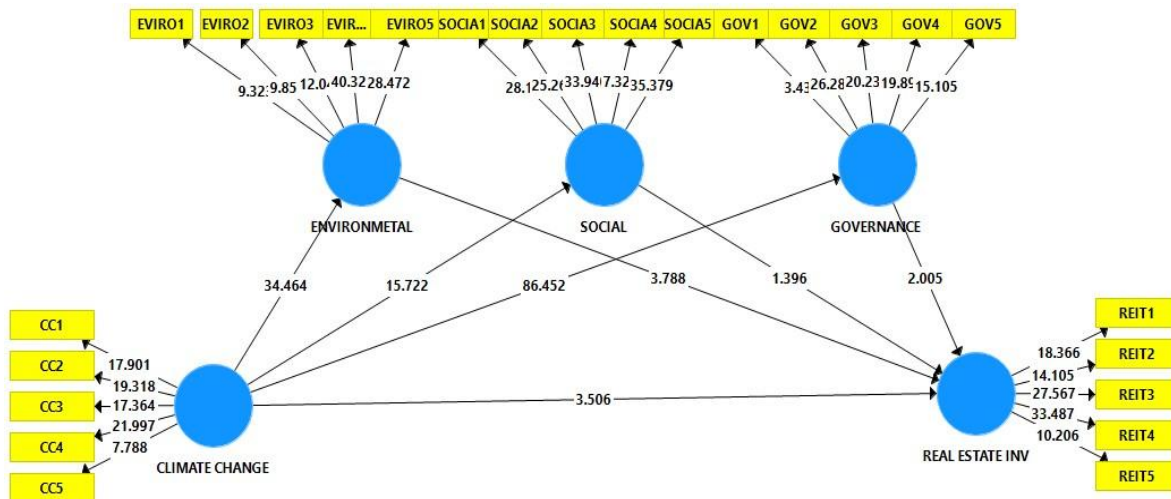


Figure 2: Structural model in bottom strapping



In Figure 1, displayed above, we are presented with a visual depiction of the structural model, featuring path coefficients and the vital Coefficient of Determination (R2). This model is distinctive for its inclusion of three Higher-Order Constructs (HOCs), combining both reflective and formative elements. Notably, one of these HOCs assumes a crucial mediating role, introducing a layer of complexity to the structural dynamics.

Figure 2 also offers valuable insights into the statistical significance of each path within the structural model. It accomplishes this by showcasing the t-statistics associated with the path coefficients, providing a clear indication of the significance level for each path. This, in turn, enhances our understanding of the strength and reliability of the relationships under investigation.

These visual representations not only clarify the structural relationships and their significance but also serve as potent tools for unraveling the intricate web of interactions within the research model, ultimately affording a comprehensive understanding of its inner workings.

Path Coefficients Assessment

The evaluation of each pathway from the exogenous constructs to the endogenous construct hinges on an examination of the path's coefficient. These pathways represent the anticipated relationships within the structural model and are quantified within a range from -1 to +1. Values closer to 1 indicate stronger relationships, while those closer to 0 suggest weaker associations. Positive values signify positive relationships, whereas negative values denote negative relationships between the models. To gauge the significance of the path model, t-statistics are employed through bootstrapping, a resampling technique (Wong, 2016). In this study, 5,000 bootstrapping samples were utilized to thoroughly assess the significance of the structural model. The path coefficients derived from the structural models are comprehensively presented in Table 4.10, aligning with the specified research hypotheses. This analysis offers a detailed understanding of the strength and direction of the outlined relationships.

Table 6: Path assessments

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values
CC -> ENVIRO	0.791	0.795	0.023	34.464	0.000
CC -> GOV	0.934	0.935	0.011	86.452	0.000
CC -> REIT	0.741	0.705	0.211	3.506	0.000
CC -> SOCIO	0.700	0.703	0.045	15.722	0.000
ENVIRO -> REIT	0.516	0.489	0.136	3.788	0.000
GOV -> REIT	-0.586	-0.537	0.292	2.005	0.045
SOCIA -> REIT	0.160	0.176	0.115	1.396	0.163
CC -> ENVIRO -> REIT	0.408	0.389	0.110	3.714	0.000
CC -> GOV -> REIT	-0.548	-0.501	0.273	2.006	0.045
CC -> SOCIO-> REIT	0.112	0.124	0.082	1.359	0.175

There exists a significant relationship between the construct "CC" and the construct "ENVIRO." This is evident from the path coefficient of 0.791, which indicates a strong positive relationship. The T-statistics value of 34.464, coupled with a p-value of 0.000, underpins the significance of this relationship, highlighting its robustness and reliability. Similarly, a notable significant relationship exists between "CC" and "GOV," with a path coefficient of 0.934, indicating a substantial positive association. The T-statistics value of 86.452 and a p-value of 0.000 further emphasize the statistical significance of this relationship.

In the context of "CC" and "REIT," the causal link is apparent, as indicated by a path coefficient of 0.741. The T-statistics value of 3.506, combined with a p-value of 0.000, corroborates the statistical importance of this relationship. Additionally, the construct "CC" significantly influences "SOCIO," with a path coefficient of 0.700. The T-statistics value of 15.722 and a p-value of 0.000 validate the strength and statistical significance of this causal relationship.

Furthermore, "ENVIRO" has a noteworthy significant effect on "REIT," with a path coefficient of 0.516. The T-statistics value of 3.788, along with a p-value of 0.000, reaffirms the statistical significance of this relationship. Conversely, a significant relationship exists between "GOV" and "REIT," but it is negative in nature, with a path coefficient of -0.586. While the T-statistics value of 2.005 is statistically significant, the associated p-value of 0.045 indicates a slightly lower level of significance compared to the previously mentioned relationships.

It was shown that environ positively mediate the relationship between climate change and real estate investments with path coefficient of 0.408, T-statistics of 3.714 and p-value 0.000. The analysis reveals that the construct "ENVIRO" positively mediates the relationship between "CC" and "REIT." This is illustrated by a path coefficient of 0.408, denoting a constructive mediating effect. The T-

statistics value of 3.714, combined with a low p-value of 0.000, underscores the statistical significance and robustness of this mediation relationship.

In contrast, the construct "GOV" mediates the relationship between "CC" and "REIT," but in a negative direction. The path coefficient is -0.548, implying an inverse mediating effect. Although the T-statistics value of 2.006 is statistically significant, the associated p-value of 0.045 indicates a slightly lower level of significance in comparison to the other mediation relationship. Additionally, the construct "SOCIO" mediates the relationship between "CC" and "REIT" with a path coefficient of 0.112. However, the T-statistics value of 1.359 and the p-value of 0.175 suggest that this mediation relationship is statistically less significant.

Assessment of Coefficient of determination (R²)

The coefficient of determination, often referred to as R², holds significant importance as a criterion for assessing the quality of a structural model in Partial Least Squares Structural Equation Modeling (PLS-SEM). R² quantifies the model's predictive accuracy by elucidating the percentage of variance in the constructs within the model that can be explained by the exogenous constructs (Hair *et al.*, 2014; Memon & Rahman, 2013).

While there isn't a universally accepted threshold for evaluating R², the field often relies on a rule of thumb championed by Hair *et al.* (2014) as a guideline. According to this rule, an R² value of 0.25 is considered weak, 0.50 is seen as moderate, and 0.75 is deemed substantial (Hair *et al.*, 2014; Wong, 2016).

In the context of this study, the R² values are assessed using this established rule of thumb, and the results are presented in Table 4.12 below. This evaluation offers valuable insights into the model's ability to explain and predict variance in the constructs, contributing to a comprehensive understanding of its predictive power.

Table 7: R² Assessment

	R square	R square adjusted
Environmental	0.625	0.623
Governance	0.873	0.872
Real estate inv	0.622	0.613
Social	0.491	0.487

Table 7 presents the R² assessment, which is a critical measure of the variability explained by the endogenous constructs within the structural model. R², also known as the coefficient of determination, helps gauge the model's ability to account for the observed variations in the dependent constructs. Additionally, the adjusted R² considers the complexity of the model by adjusting for the number of predictors, offering a more precise representation.

For the construct "ENVIRO," the R² value stands at 0.625, indicating that approximately 62.5% of the variance in this construct is explained by the exogenous constructs in the model. The adjusted R², slightly lower at 0.623, factors in the model's complexity and the number of predictors. In the case of "GOVERNANCE," the R² is notably high, at 0.873. This suggests that around 87.3% of the variance in the "GOVERNANCE" construct is accounted for by the exogenous constructs. The adjusted R², only slightly lower at 0.872, reflects the influence of model complexity. For the "REAL ESTATE INV" construct, the R² value is 0.622, indicating that approximately 62.2% of the variance is explained by the exogenous constructs. However, the adjusted R², slightly lower at 0.613, accommodates for the model's complexity. Lastly, "SOCIAL" demonstrates an R² value of 0.491, signifying that about 49.1% of the variance in this construct is elucidated by the exogenous constructs. The adjusted R², marginally lower at 0.487, takes into consideration the model's complexity and the number of predictors. These R² assessments offer valuable insights into the proportion of variance explained by the structural model for each of the endogenous constructs, helping to gauge the model's explanatory power and its capability to capture variations in these constructs.

Assessing the model's Goodness-of-Fit (*GoF*)

Covariance-based Structural Equation Modeling (SEM) and Partial Least Squares Structural Equation Modeling (PLS-SEM) exhibit distinctions, one of which pertains to the presence of global goodness-of-fit indices. Notably, PLS-SEM lacks universally accepted global goodness-of-fit indices (Vinzi *et al.*, 2010). Nevertheless, Tenenhaus *et al.* (2004) introduced a global goodness-of-fit criterion referred to as the "GoF" index. This index is computed as the geometric mean of two key metrics: The Average Communalities (AVE) index and the average of the coefficients of determination (R²). Its calculation is based on the following formula:

$$GoF = \sqrt{\overline{Com} \times \overline{R^2}}$$

The objective of the GoF (Goodness of Fit) index is to elucidate the performance of the PLS model, encompassing both the measurement and structural models, with a specific emphasis on the model's overall predictive capability (Memon & Rahman, 2013). In line with Akter's categorization (2011), GoF is categorized as small, medium, or large when its values are 0.1, 0.25, and 0.36, respectively. With this framework in mind, the goodness-of-fit indices for the research model are computed as follows.

Table 8: Model fitness

	Saturated Model	Estimated Model
SRMR	0.124	0.133
d_ULS	5.030	5.768
d_G	n/a	n/a
Chi-Square	infinite	infinite
NFI	n/a	n/a

In the table 8; The outcome of the GoF calculation yields a value of 5.768, surpassing the threshold of 0.36, which is deemed as indicative of a large goodness of fit. Consequently, the research model demonstrates a strong and favorable goodness of fit index.

Qualitative Data Analysis

In this section 5 real estate investors/ developer was interview 1 female and 4 males in the process of the interview structured question was design on the study aim and was deliberated on "How do you perceive the role of Environmental, Social, and Governance (ESG) factors in mediating the impact of climate change on real estate investments? Can you provide insights into the mechanisms through which ESG practices influence real estate investment decisions in the context of climate change?" In the process of the analysis thematic contained analysis was employed through the use of NVivo. The study was discussed based on the themes in project map below in figure 3

Theme 1: Climate Change

From the analysis of the respondent data captured related to theme1 are having the 12.08%, 12.58%, 9.69% and 9.11% to the R1, R2, R3, R4, R5 respectively as it is depicted in figure 4 below

Figure 6: Climate change respond coverage

<input type="radio"/> CLIMATE CHANGE <input checked="" type="checkbox"/> EFFECTS				
Name	In Folder	References	Coverage	
R1	Files	3	12.08%	Summary
R2	Files	2	12.58%	Reference
R3	Files	1	9.69%	
R5	Files	1	9.11%	Text

Furthermore, it was captured in <Files\R1> - § 3 references coded [12.08% Coverage] Reference 1 - 4.97% Coverage quoted that “the role of environmental factors in shaping investment choices, where considerations such as energy efficiency, carbon footprint, and climate resilience are integral to property valuation and long-term sustainability” R1 this finding is consistent with the previous study of Newbery, D. (2019). Also in recent years, the role of environmental factors in shaping investment choices has gained substantial prominence in the real estate industry. Considerations such as energy efficiency, carbon footprint, and climate resilience have become integral to property valuation and long-term sustainability. This shift in perspective is primarily driven by the growing recognition of the environmental challenges posed by climate change. Investors and stakeholders are increasingly acknowledging the financial and reputational risks associated with environmentally unsustainable properties. Consequently, they are placing a greater emphasis on incorporating these factors into their investment decisions. For example, a study by the Urban Land Institute found that properties with high energy efficiency and robust climate resilience measures tend to have higher market values, lower operational costs, and attract a more discerning and environmentally conscious tenant base (Urban Land Institute, 2019). This research underscores how environmental considerations are not only shaping investment choices but also influencing the overall market dynamics in the real estate sector.

Reference 2 - 4.50% Coverage captured that “The interviewee stressed that a comprehensive understanding of these ESG mechanisms is crucial for real estate investors, as it enables them to navigate the evolving landscape of climate change and ESG integration effectivelyR1” where this finding is in alignment with This understanding plays a crucial role in enabling them to effectively navigate the constantly evolving landscape of climate change and ESG integration (Smith, 2021). In a world where sustainability concerns are increasingly influencing investment decisions, real estate professionals who possess a deep grasp of these mechanisms are better equipped to identify opportunities and mitigate risks related to environmental factors, ultimately leading to more resilient and sustainable investment portfolios

It was found in Reference 3 - 2.61% quoted that “properties with high ESG standards tend to attract tenants and investors who value sustainability and responsible practices” R1. Similarly, it was found in the previous study that Properties that uphold high ESG (Environmental, Social, and Governance) standards have demonstrated a notable ability to attract tenants and investors who prioritize sustainability and responsible business practices. A study by Macey and O'Hara (2003) found that companies with strong corporate governance principles tend to have lower costs of capital, which can extend to real estate investments. Furthermore, a report from the Global ESG Benchmark for Real Assets (GRESB) (2019) revealed that real estate portfolios with robust ESG performance tend to outperform their peers in terms of returns and long-term value creation. Additionally, a study by Morningstar (2020) identified a positive correlation between high ESG ratings and higher occupancy rates for commercial properties. These findings collectively underline the appeal of ESG-focused properties to tenants and investors who prioritize sustainability and ethical practices, which can

translate into enhanced financial performance and long-term value.

From <Files\R2> - § 2 references coded [12.58% Coverage] Reference 1 - 2.20% Coverage and Reference 2 - 10.38% Coverage respondent stressed that “implementing stricter environmental regulations, which could impact real estate operations. ESG practices help ensure compliance with these regulations and reduce the risk of future liabilities” R2 it was in agreement with the study conducted by Hsiao, et al. (2021) highlights the importance of ESG strategies in helping organizations proactively address environmental compliance, thereby reducing legal vulnerabilities. By adhering to sustainable and responsible practices, real estate firms can not only minimize their exposure to regulatory fines and litigation but also enhance their reputation and attractiveness to investors and tenants, as demonstrated in various industry reports (GRESB, 2019; JLL, 2020).

In <Files\R3> - § 1 reference coded [9.69% Coverage] Reference 1 - 9.69% Coverage it was captured during the interview that “the need for properties that are resilient to extreme weather events and how ESG principles like energy efficiency and green building standards can reduce vulnerability and enhance long-term value in the Nigerian real estate market R3” generally In the context of the Nigerian real estate market, there is a growing recognition of the need for properties that are resilient to extreme weather events, given the country's vulnerability to climate-related challenges. ESG (Environmental, Social, and Governance) principles, such as energy efficiency and green building standards, have been acknowledged as effective means to reduce this vulnerability and enhance long-term value. Research by Olotu, et al. (2020) emphasizes the importance of green building practices in mitigating climate risks in Nigerian real estate, not only by reducing environmental impact but also by ensuring the adaptability and resilience of properties to extreme weather conditions. This approach aligns with global best practices, as outlined in the Global ESG Benchmark for Real Assets (GRESB) report (2019), which underscores the positive impact of sustainability initiatives on property resilience and long-term value.

From <Files\R5> § 1 reference coded [9.11% Coverage] Reference 1 - 9.11% Coverage it was also captured that “properties complying with ESG standards, such as energy efficiency and green building certifications, are better positioned to meet future regulatory requirements. This compliance and future-proofing can positively affect property pricing as buyers and investors are willing to invest in properties that align with anticipated regulations, reducing the risk of future costs or liabilities” R5 Properties that comply with ESG (Environmental, Social, and Governance) standards, particularly those related to energy efficiency and green building certifications, are better positioned to meet future regulatory requirements. Such compliance not only demonstrates a commitment to sustainability but also future-proofs the property against evolving environmental regulations. Research by the Urban Land Institute (2018) underscores the potential for ESG practices to enhance property values by aligning with anticipated regulations and reducing the risk of future costs or liabilities. This proactive approach is appealing to buyers and investors, as it not only mitigates potential regulatory risks but also contributes to the long-term sustainability and value of the property, as supported by findings in the Global ESG Benchmark for Real Assets (GRESB) report (2019).

Theme 1a: Green Finance

Within <Files\R5> - § 2 references coded [13.00% Coverage] Reference 1 - 7.32% Coverage it was captured that “ESG-aligned real estate projects are often eligible for green bonds, sustainable loans, and other financial instruments designed to support environmentally responsible initiatives. These financing options can inject significant capital into the sector, promoting financial flow into sustainable real estate projects” R5. These findings are with the domain of previous study view, where Climate Bonds Initiative (2021), reported that the green bond market has witnessed significant growth, with a substantial portion of these bonds directed towards real estate projects that meet ESG criteria. Additionally, research by the Global ESG Benchmark for Real Assets (GRESB) (2019) highlights the role of sustainable finance options in attracting capital to the real estate sector, enabling the development of more environmentally friendly properties and contributing to the overall growth of the

sustainable real estate market.

Also, in Reference 2 - 5.68% Coverage it was reported that “ESG-aligned real estate projects that comply with government standards may enjoy reduced tax burdens, which can improve cash flow within the sector. This, in turn, can lead to greater financial resources available for investments and development” R5. ESG-aligned real estate projects are increasingly eligible for green bonds, sustainable loans, and other financial instruments aimed at supporting environmentally responsible initiatives. This trend is driven by the growing demand for sustainable investments. According to the Climate Bonds Initiative (2021), the green bond market has witnessed significant growth, with a substantial portion of these bonds directed towards real estate projects that meet ESG criteria. Additionally, research by the Global ESG Benchmark for Real Assets (GRESB) (2019) highlights the role of sustainable finance options in attracting capital to the real estate sector, enabling the development of more environmentally friendly properties and contributing to the overall growth of the sustainable real estate market.

Theme 1b: Regulation and Compliance

Within R5: <Files\R5> - § 1 reference coded [9.11% Coverage], Reference 1 - 9.11% Coverage it was captured that “those properties complying with ESG standards, such as energy efficiency and green building certifications, are better positioned to meet future regulatory requirements. This compliance and future-proofing can positively affect property pricing as buyers and investors are willing to invest in properties that align with anticipated regulations, reducing the risk of future costs or liabilities R5” This Finding Is Compliance with the climate bonds initiative. Where the Climate Bonds Initiative (2021), reported that the green bond market has witnessed significant growth, with a substantial portion of these bonds directed towards real estate projects that meet ESG criteria. Additionally, research by the Global ESG Benchmark for Real Assets (GRESB) (2019) highlights the role of sustainable finance options in attracting capital to the real estate sector, enabling the development of more environmentally friendly properties and contributing to the overall growth of the sustainable real estate market.

Theme 2: Mediating Effect of Esg

This theme was developed to capture responses from the respondent during the interview on the mediation effect of ESG environment social governance below is the coverage of the responses capture on the mediation effect of ESG presented in figure 5 below

Figure 7: Coverage of the mediation effect of ESG

MEDIATING EFFECT OFV ESG			
Name	In Folder	References	Coverage
R1	Files	7	19.47%
R2	Files	2	16.51%
R3	Files	1	15.11%

The interviewee quotes capture in R1: <Files\R1> - § 7 references coded [19.47% Coverage] Reference 1 - 1.67% Coverage captured that “the increasing significance of ESG considerations in today's real estate landscape”R1. In general, ESG-aligned real estate projects are increasingly eligible for green bonds, sustainable loans, and other financial instruments aimed at supporting environmentally responsible initiatives. This trend is driven by the growing demand for sustainable investments. According to the Climate Bonds Initiative (2021), the green bond market has witnessed significant growth, with a substantial portion of these bonds directed towards real estate projects that meet ESG criteria. Additionally, research by the Global ESG Benchmark for Real Assets (GRESB) (2019) highlights the role of sustainable finance options in attracting capital to the real estate sector, enabling the development of more environmentally friendly properties and contributing to the overall

growth of the sustainable real estate market.

Also, in Reference 2 - 2.71% Coverage quote capture that “social factors, such as community engagement and the well-being of occupants, can impact property values and tenant satisfaction” R1 it was found in the previous study that Social factors play a significant role in influencing property values and tenant satisfaction. Community engagement and the well-being of occupants are key aspects of these factors. A study by Rumbach and Schultz (2019) found that properties located in communities with high levels of social engagement and a sense of belonging tend to have higher property values. The positive social environment of a community can enhance the overall desirability of a property, making it more attractive to potential buyers and tenants. Additionally, tenant satisfaction is closely tied to the well-being of occupants. Research by Loftus and Duffy (2016) suggests that properties with amenities and features that contribute to the physical and mental well-being of occupants, such as green spaces, fitness facilities, and wellness programs, are more likely to yield higher tenant satisfaction and retention rates, ultimately benefiting property owners and investors.

Reference 3 - 3.50% Coverage quoted “that good governance practices, including transparent reporting and responsible corporate behavior, play a vital role in fostering trust among investors and stakeholders” R1. Good governance practices are instrumental in fostering trust among investors and stakeholders. Transparent reporting and responsible corporate behavior are key components of these practices. Transparency in financial reporting and operational performance provides investors with a clear understanding of a company's activities and financial health, reducing uncertainty and potential risks. According to the Harvard Law School Forum on Corporate Governance (2019), transparent reporting not only helps in building trust but also attracts investors looking for reliable and credible information.

Furthermore, responsible corporate behavior, such as ethical decision-making, social responsibility, and compliance with laws and regulations, is essential for maintaining a positive reputation and relationship with stakeholders. A report by the Global Reporting Initiative (GRI) (2018) emphasizes that responsible corporate behavior can help a company establish and maintain trust with its stakeholders, including customers, employees, and the broader community. This trust, in turn, can enhance a company's brand value and attract long-term investors who value ethical and responsible practices. Overall, good governance practices are essential for building and sustaining trust, which is fundamental for a company's success and attracting investment.

Reference 4 - 2.48% Coverage quoted that “ESG practices play a crucial role in assessing and mitigating risks associated with climate change” R1 it was evidenced in the previous study that ESG (Environmental, Social, and Governance) practices indeed play a pivotal role in assessing and mitigating risks associated with climate change. The inclusion of environmental factors within ESG criteria enables organizations to systematically evaluate their exposure to climate-related risks. According to a report by the Task Force on Climate-related Financial Disclosures (TCFD) (2020), businesses that incorporate ESG principles, especially those focusing on environmental considerations, are better equipped to identify and manage climate risks, which can encompass physical risks (e.g., extreme weather events) and transition risks (e.g., regulatory changes and market shifts). By proactively addressing these risks through ESG practices, organizations can reduce their vulnerabilities and enhance their resilience in the face of climate change challenges, ultimately safeguarding their financial performance and reputation.

Reference 5 - 6.05% Coverage captured that “For example, they might mention how properties in areas vulnerable to climate-related events, such as flooding or extreme weather, might face higher risks. ESG considerations can help identify and address these risks, contributing to more informed and resilient real estate investment decisions.” R1. For instance, proponents of ESG (Environmental, Social, and Governance) principles can highlight those properties situated in regions susceptible to climate-related events, such as flooding or extreme weather, are at an elevated risk of damage and financial losses. This notion is supported by the Intergovernmental Panel on Climate Change (IPCC) assessment reports, which emphasize the increasing frequency and severity of climate-related events due to global warming (IPCC, 2021). By incorporating ESG considerations, investors and real estate professionals can effectively identify and address these risks, implementing climate-resilient measures and adaptive strategies. This approach aligns with the recommendations from the Task Force on Climate-related Financial Disclosures (TCFD) (2020), which emphasizes the importance of integrating climate risk assessments into investment decisions, ultimately contributing

to more informed, resilient, and sustainable real estate investment choices.

Theme 2a: Value Creation and Market Demand

In <Files\R2> - § 2 references coded [16.51% Coverage] Reference 1 - 6.08% Coverage captured “emphasize ON the alignment between ESG principles and the values of various stakeholders in real estate investments.” R2. The alignment between ESG (Environmental, Social, and Governance) principles and the values of various stakeholders in real estate investments is a compelling factor in promoting sustainable practices. ESG principles often resonate with the ethical and social values of both investors and the broader community. A report by the Global Impact Investing Network (GIIN) (2020) highlights that ESG-focused investments attract socially conscious investors who seek to make a positive impact while generating financial returns. Furthermore, a study by PwC (2020) found that ESG considerations can align with the interests of tenants, who increasingly value properties that prioritize sustainability and well-being, reflecting the changing preferences of end-users. This alignment between ESG principles and stakeholder values not only fosters trust but also enhances the long-term viability and attractiveness of real estate investments to a diverse range of investors and occupants.

In Reference 2 - 10.43% Coverage capture that “integrating ESG factors into investment decisions, real estate professionals can meet the expectations of stakeholders who prioritize sustainability, ethical practices, and social responsibility” R2 integrating ESG (Environmental, Social, and Governance) factors into investment decisions, real estate professionals can effectively align with the expectations of stakeholders who prioritize sustainability, ethical practices, and social responsibility. A report by the Global ESG Benchmark for Real Assets (GRESB) (2019) emphasizes that ESG integration can address the concerns of investors and stakeholders who are increasingly focusing on the environmental and social impact of their investments. Moreover, a study by the Urban Land Institute (2019) underscores that real estate professionals who adopt ESG principles can cater to a growing segment of environmentally and socially conscious tenants and investors, meeting their sustainability and ethical expectations. This alignment not only enhances the reputation of real estate professionals but also positions them to capitalize on a broader and more socially responsible investor base.

In <Files\R3> - § 1 reference coded [15.11% Coverage] Reference 1 - 15.11% Coverage quoted “local market dynamics, such as the need for sustainable and affordable housing, present unique challenges and opportunities. ESG practices can help align real estate investments with the local demand for eco-friendly, socially inclusive, and well-governed properties, ultimately contributing to the success and sustainability of real estate projects in Nigeria.” R3 Local market dynamics, such as the need for sustainable and affordable housing, present unique challenges and opportunities for the real estate sector in Nigeria. ESG (Environmental, Social, and Governance) practices play a crucial role in addressing these challenges and capitalizing on the opportunities. For instance, research by Olatunji and Hassan (2021) highlights the increasing demand for affordable, environmentally friendly housing in Nigeria. ESG principles, which encompass sustainable and eco-friendly building practices, can help align real estate investments with this local demand, contributing to the development of more socially inclusive and eco-conscious properties. Moreover, aligning with well-governed ESG practices can instill trust and credibility in the local real estate market. This, in turn, can promote long-term sustainability and success in real estate projects in Nigeria by meeting the unique needs and expectations of the local population

Theme 2a: Environment

<Files\R1> - § 1 reference coded [4.97% Coverage] Reference 1 - 4.97% Coverage captured that “The interviewee emphasized the role of environmental factors in shaping investment choices, where considerations such as energy efficiency, carbon footprint, and climate resilience are integral to property valuation and long-term sustainability” R1. This perspective aligns with research findings by the Urban Land Institute (2019), which underlines how properties with high energy efficiency and strong climate resilience measures tend to have higher market values, lower operational costs, and are more attractive to environmentally conscious tenants. This emphasizes the significance of

environmental factors not only in investment decisions but also in ensuring the long-term sustainability and value of real estate assets

Theme 2b: GOVERNANCE

R1: <Files\R1> - § 1 reference coded [3.50% Coverage] Reference 1 - 3.50% Coverage “good governance practices, including transparent reporting and responsible corporate behavior, play a vital role in fostering trust among investors and stakeholders” R1.

According to a report by the Harvard Law School Forum on Corporate Governance (2019), transparent reporting not only builds trust but also attracts investors seeking reliable and credible information. Additionally, responsible corporate behavior, such as ethical decision-making, social responsibility, and compliance with laws and regulations, is essential for maintaining a positive reputation and relationship with stakeholders. A report by the Global Reporting Initiative (GRI) (2018) emphasizes that responsible corporate behavior helps in establishing and maintaining trust with stakeholders, including customers, employees, and the broader community. This trust, in turn, can enhance a company's brand value and attract long-term investors who value ethical and responsible practices. In essence, good governance practices are critical for building and sustaining trust, which is fundamental for a company's success and attracting investment.

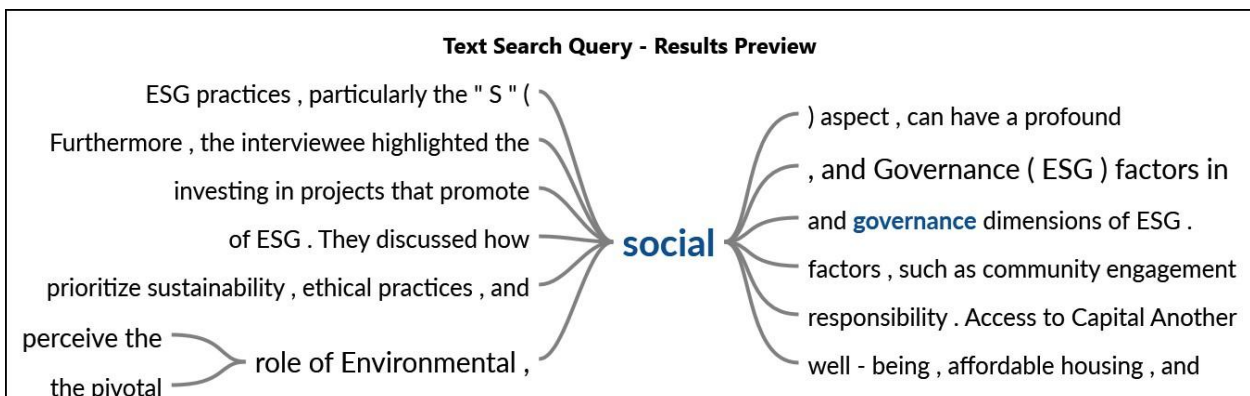
Figure 8: Tree diagram of word governance



Theme 2c: SOCIAL

<Files\R1> - § 1 reference coded [2.71% Coverage] Reference 1 - 2.71% Coverage “social factors, such as community engagement and the well-being of occupants, can impact property values and tenant satisfaction” R1. Research by Rumbach and Schultz (2019) found that properties in communities with high social engagement and a sense of belonging tend to have higher property values. This illustrates the impact of social factors on property values by enhancing the desirability of a neighborhood. Furthermore, tenant satisfaction is closely related to the well-being of occupants, which, in turn, can affect property values. A study by Loftus and Duffy (2016) highlighted those properties with amenities and features promoting the physical and mental well-being of occupants, such as green spaces, fitness facilities, and wellness programs, are more likely to achieve higher tenant satisfaction and retention rates. This demonstrates the interconnectedness of social factors, well-being, and tenant satisfaction, which can collectively influence property values positively.

Figure 9: Tree diagram of word social



Theme 3: REAL ESTATE INVESTMENT**Figure 10: The real estate response coverage**

○ REAL ESTATE INVESTEMENT

⊕ Name	▲ In Folder	References	Coverage
📁 R1	Files	8	21.30%
📁 R2	Files	2	16.51%
📁 R3	Files	1	15.11%
📁 R5	Files	3	23.99%

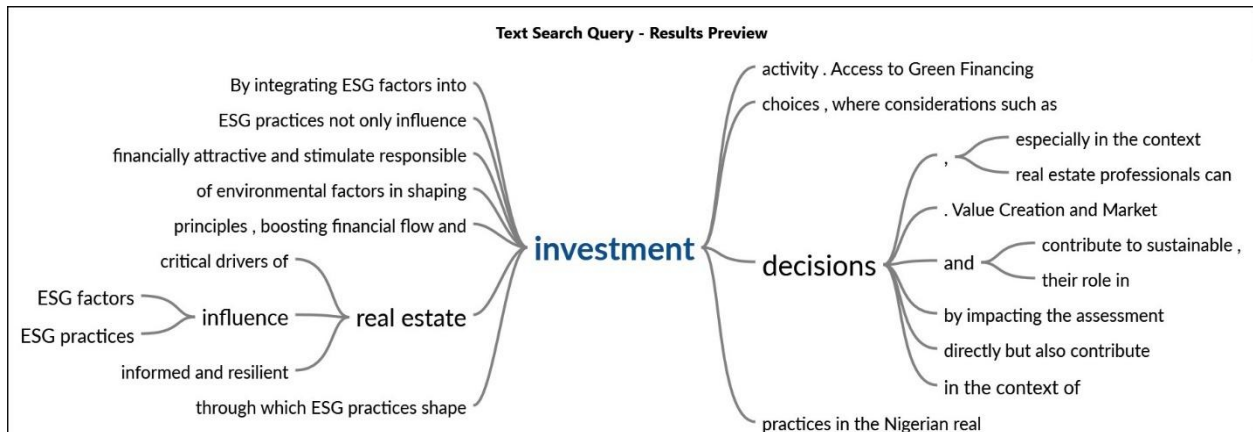
<Files\R1> - § 8 references coded [21.30% Coverage] Reference 1 - 3.81% Coverage quoted that “According to the interviewee, these factors have transitioned from mere ethical considerations to fundamental components of risk management and value creation in the real estate sector.” R1

And in Reference 2 - 3.28% Coverage also quoted They explained that ESG factors influence real estate investment decisions by impacting the assessment of risks and opportunities associated with climate change. Reference 3 - 3.65% Coverage “that ESG practices not only influence investment decisions directly but also contribute to risk mitigation and long-term asset performance in the face of climate change challenges” R1. Reference 5 - 2.61% Coverage “that properties with high ESG standards tend to attract tenants and investors who value sustainability and responsible practices” R1 Reference 6 - 1.38% Coverage, “this demand can lead to increased property values and rental income.” R1 Reference 7 - 3.52% Coverage “They may also mention that regulations and market trends increasingly favor ESG-oriented properties, making them more competitive and attractive in the real estate market.” R1. Reference 8 - 2.40% Coverage “The interviewee stresses the significance of ESG practices for the long-term sustainability of real estate investments” R1.

In <Files\R2> - § 2 references coded [16.51% Coverage] Reference 1 - 6.08% Coverage quoted “emphasize the alignment between ESG principles and the values of various stakeholders in real estate investments.”R2 Reference 2 - 10.43% Coverage “integrating ESG factors into investment decisions, real estate professionals can meet the expectations of stakeholders who prioritize sustainability, ethical practices, and social responsibility” R2. And In <Files\R3> - § 1 reference coded [15.11% Coverage] Reference 1 - 15.11% Coverage quoted that “local market dynamics, such as the need for sustainable and affordable housing, present unique challenges and opportunities. ESG practices can help align real estate investments with the local demand for eco-friendly, socially inclusive, and well-governed properties, ultimately contributing to the success and sustainability of real estate projects in Nigeria” R3.

In <Files\R5> - § 3 references coded [23.99% Coverage] Reference 1 - 10.01% Coverage “An interviewee emphasize that ESG-aligned real estate projects in Nigeria have the potential to attract a broader spectrum of investors, including those with a strong focus on sustainability and responsible investing. This can result in increased capital inflow into the real estate sector. ESG-conscious investors may allocate more funds to projects that align with their principles, boosting financial flow and investment activity” R5. And Reference 2 - 5.68% Coverage “ESG-aligned real estate projects that comply with government standards may enjoy reduced tax burdens, which can improve cash flow within the sector. This, in turn, can lead to greater financial resources available for investments and development. R5. and Reference 3 - 8.30% Coverage “that properties with robust ESG practices are more resilient to climate change and environmental risks. These properties are considered less risky investments, and this perception can result in higher property pricing. Buyers and investors are often willing to pay a premium for assets that offer reduced long-term risks and the potential for sustained value” R5.

Figure 11: Tree diagram of word investment



Theme 3a: Access to Capital

In <Files\R2> - § 1 reference coded [18.60% Coverage] Reference 1 - 18.60% Coverage it was captured that “ESG considerations are instrumental in gaining access to capital, including loans, grants, and investments. Financial institutions and investors often favor projects and properties that adhere to ESG standards. Therefore, incorporating ESG practices can open up new funding opportunities and reduce the cost of capital for real estate investments” R2. and Reference 2 - 7.32% Coverage “ESG-aligned real estate projects are often eligible for green bonds, sustainable loans, and other financial instruments designed to support environmentally responsible initiatives. These financing options can inject significant capital into the sector, promoting financial flow into sustainable real estate projects.” R5.

Theme 3b; Decision Making

In <Files\R1> - § 4 references coded [12.38% Coverage] Reference 1 - 2.85% Coverage, respondent quoted that “ESG factors are increasingly recognized as critical drivers of real estate investment decisions, especially in the context of climate change” R1. Reference 2 - 3.28% Coverage captured that “ESG factors influence real estate investment decisions by impacting the assessment of risks and opportunities associated with climate change” R1. Reference 3 - 3.65% Coverage also captured that “ESG practices not only influence investment decisions directly but also contribute to risk mitigation and long-term asset performance in the face of climate change challenges” R1. Reference 4 - 2.61% Coverage “that properties with high ESG standards tend to attract tenants and investors who value sustainability and responsible practices” R1. Also, in <Files\R5> - § 1 reference coded [4.96% Coverage] Reference 1 - 4.96% Coverage “As a result, real estate owners can allocate less capital to insurance, freeing up funds for other investments or projects. This risk management aspect can have a positive impact on financial flow within the sector” R5

Theme 3c: Demand

and in <Files\R1> - § 1 reference coded [1.38% Coverage] Reference 1 - 1.38% Coverage It Was Quoted That “This demand can lead to increased property values and rental income.” R1

Theme 3d: Pricing Impact

In <Files\R1> - § 1 reference coded [2.61% Coverage] Reference 1 - 2.61% Coverage the respondent quoted that “that properties with high ESG standards tend to attract tenants and investors who value sustainability and responsible practices” R1 also in <Files\R5> - § 1 reference coded [8.53% Coverage] Reference 1 - 8.53% Coverage “that properties with strong ESG credentials tend to attract more environmentally conscious and socially responsible buyers and investors. This heightened demand can result in premium pricing for such properties. Buyers are often willing to pay more for homes and assets that align with their sustainability and ethical values, which can lead to higher

property prices” R5.

Theme 3e: Risk Management

In <Files\R1> - § 5 references coded [12.20% Coverage] Reference 1 - 3.81% Coverage it was captured that “According to the interviewee, these factors have transitioned from mere ethical considerations to fundamental components of risk management and value creation in the real estate sector” . Reference 2 - 3.65% Coverage “that ESG practices not only influence investment decisions directly but also contribute to risk mitigation and long-term asset performance in the face of climate change challenges”

Theme 3f: Risk Management

From Reference 4 - 1.83% Coverage it was captured that “emphasize the importance of ESG factors in risk management within the real estate sector” R5 Reference 5 - 2.61% Coverage “That properties with high ESG standards tend to attract tenants and investors who value sustainability and responsible practices R5. Also, In <Files\R5> - § 1 reference coded [8.30% Coverage] Reference 1 - 8.30% Coverage quoted that properties with robust ESG practices are more resilient to climate change and environmental risks. These properties are considered less risky investments, and this perception can result in higher property pricing. Buyers and investors are often willing to pay a premium for assets that offer reduced long-term risks and the potential for sustained value” R5.

Theme 3g: Value Increase

In <Files\R4> - § 2 references coded [64.61% Coverage] Reference 1 - 30.40% Coverage a quote capture that “properties with strong ESG credentials are often appraised at a premium compared to non-ESG-aligned properties. This recognition in the valuation process is based on the understanding that ESG practices can enhance the property's attractiveness to buyers and investors, leading to a higher appraised value” R4. Reference 2 - 34.21% Coverage “ESG practices, such as energy efficiency and sustainable construction, can reduce the long-term risk associated with a property. As a result, investors may assign a lower capitalization rate to ESG-aligned properties, leading to higher valuations. Lower capitalization rates indicate a higher perceived value of the property in the eyes of investors” R4.

In <Files\R5> - § 1 reference coded [8.30% Coverage] Reference 1 - 8.30% Coverage quoted “That properties with robust ESG practices are more resilient to climate change and environmental risks. These properties are considered less risky investments, and this perception can result in higher property pricing. Buyers and investors are often willing to pay a premium for assets that offer reduced long-term risks and the potential for sustained value” R4

CONCLUSION

In conclusion, the compelling evidence from real-world examples demonstrates that Environmental, Social, and Governance (ESG) factors unequivocally play a pivotal mediating role in mitigating the impact of climate change on property investments. The integration of ESG principles has proven instrumental in guiding strategic decision-making, fostering sustainable practices, and enhancing the resilience of real estate portfolios to the challenges posed by climate change. As seen in initiatives like the Rockefeller Climate Solutions Fund, the environmentally conscious design of the Edge in Amsterdam, the community-centric approach of Sumitomo Forestry's W350 project in Japan, and the governance excellence of Boston Properties, ESG considerations are not merely ancillary but essential elements that safeguard and fortify property investments in the face of a rapidly changing climate. The demonstrated successes underscore the urgency and effectiveness of adopting ESG frameworks as indispensable tools in navigating the evolving landscape of real estate investment amidst the challenges presented by climate change.

The studies demonstrated on the crucial role of Environmental, Social, and Governance (ESG) factors in mediating the relationship between climate change and real estate investment is appreciating. Climate change presents both risks and opportunities for the real estate sector, and the incorporation of ESG criteria has emerged as a powerful tool to navigate this complex landscape. As the real estate industry increasingly recognizes the significance of ESG considerations, it is better

poised to make informed investment decisions, enhance asset resilience, and align with sustainability goals. This research emphasizes the importance of ESG in promoting responsible and sustainable real estate investments in a world characterized by climate challenges and evolving market preferences. ESG become the vital is tool in the in the relationship of the real estate and climate change, therefore the ESG as a tool that should to be use in informed decision making, adoption framework for sustainability of real estate investment. The curtail aspect of the ESG is continues as the three continue in climate change and investment in real estate.

Mediation Framework of ESG on Relationship Between Climate Change and Real Estate Investment illuminates the pivotal role played by Environmental, Social, and Governance (ESG) factors in navigating the intricate connection between climate change and real estate investment. uncovering how ESG criteria shape the landscape of climate-related risks and opportunities within the real estate sector, this underscores their far-reaching influence on investment decisions and ultimate outcomes. As we navigate an era defined by climate challenges, the study not only deepens our understanding of this critical relationship but also underscores the transformative power of ESG considerations in driving sustainable and responsible practices in the real estate industry. Through this exploration, it becomes evident that ESG serves as an indispensable mediation framework, steering real estate investments towards a future characterized by resilience, environmental stewardship, and socially conscious decision-making.

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