Green building certification in South Africa: evaluating adoption, greenwashing and location clusters trends.

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Abstract

Green building has become a global response to environmental concerns about the impact of buildings on the environment. However sparse information exists regarding associated risks of greenwashing in developing countries like South Africa. This study evaluated the Green Building Council of South Africa's green building certification growth trends including greenwashing and location clustering risk. This study adopts a quantitative descriptive analysis of the Green Building Council South Africa (GBCSA) certification archives. The researchers conducted a purposive sampling of 510 case studies from the archives based on uniform reporting styles. The data which spanned 12 years between 2011-2023 was analysed using Google spreadsheet and SPSS. The study found a significant growth in green certification in South Africa following the introduction of existing building ratings. The results also reveal that the growth is characterised by low demand for the highest rating levels and clustering in major cities. However, there was evidence of greater dispersion to smaller cities. The results are important to property stakeholders, investors, owners, and regulators in understanding how to mitigate greenwashing risks in developing green building markets.

Keywords: *Green certification, Case Studies, Green buildings, Green Building Certification, South Africa, Trends, Green Buildings, Existing Building.*

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1. Introduction

Environmental impacts like air pollution, water scarcity, rising sea levels, increased occurrence of extreme weather events and greenhouse gas (GHG) emissions are a growing concern towards achieving sustainable economic development globally (Du Plessis, Irurah, and Scholes, 2003). In the construction sector, green buildings and the concept of green affordable housing have been introduced as part of the sustainable development strategies by which carbon and GHG emissions can be reduced or controlled in the housing sector Liu *et al,* (2022). Green buildings achieve this by using smart innovative technology and building practices that reduce harm to humanity and the environment (Kurnaz, 2021) through energy savings, and water and material conservation. However, research (Addae-Dapaah and Chieh, 2011; Schoeman, 2018; Kurnaz, 2021) has shown that the confusion that often exists in the housing market on what can be considered a green building due to differing attributes that characterise green buildings necessitates certification. However, developers might tend to pursue the commercial or financial benefits of green certifications without implementing the best green practices. This is known as greenwashing.

Nygaard, (2023) described greenwashing through the theoretical framework of eco-opportunism as an obstacle that hinders achieving sustainability by using green promises deceitfully. Furthermore, while certifications have been designed to standardise and regulate this process of identifying green buildings, Nygaard, (2023) found that they might not always be sufficient. Therefore, greenwashing in housing as a form of eco-opportunism refers to capitalising on the growing demand for green buildings with hidden self-interest-seeking behaviour that undermines the transition toward sustainability through intentional deceit. This study argues that South Africa's Green Star rating provides critical information on greenwashing risks and opportunities for mitigation in developing green building markets across the African continent.

The green star rating tool recognises 1–6-star ratings.

- **1 Star** – *"On the journey to a better, greener building"*
- **2 Star** – *"On the journey to a better, greener building"*
- **3 Star** – *"Good Practice"*
- **4 Star** – *"Best Practice"*

- **5 Star** – *"South African Excellence"*
- **6 Star** – *"World Leadership"*

According to the GBCSA, green star rating tools are made up of the following focus areas: Existing building performance, New building & major refurbishments, Interiors , Sustainable urban precincts, Socio-economic category, Green Star Custom and Green Star Africa .The Green Star rating systems assign points in nine categories to assess a building or fit-out's total environmental impact. The greening certification rating system, which has been operational for about 16 years, is the platform by which South Africa's green revolution is executed in the property sector.

By exploring the data on green star certifications, recommendations can be made to stakeholders to address greenwashing risks in developing markets like South Africa.

Globally the demand for green buildings and certifications has continued to grow in response to the concerns for environmentally sustainable interventions. As Chegut, Eichholtz, and Kok (2014) reported, In the United Kingdom (UK), government and special interest groups have expanded their efforts to improve energy efficiency across the property sector in general over the last decade. In the London office market, BRE Environmental Assessment Method (BREEAM) certification led to a 19.7% increase in rents and a 14.7% increase in sales transactions compared to non-certified buildings in the same neighbourhood. Bond and Devine, (2016) also found in their investigation of the premium on Leadership in Energy and Environmental Design (LEED) certifications in the United States, that there is a 4% extra premium attached to green certification compared to mere claims of green action in building.

There's anecdotal evidence that the adoption of green building certification has also grown rapidly in South Africa. However, this growing awareness of the financial incentives and marketability that go with certification is known to drive greenwashing risks in green building markets (Addae-Dapaah and Chieh, 2011; Schoeman, 2018; Nygaard, 2023). According to Addae-Dapaah and Chieh, (2011), this growth in green building demand is accompanied by greenwashing trends including:

- Location clusters
- Growing demand despite confusion on what different certification tiers represent.

- Developers prioritise the lowest certification possible.

Recognising greenwashing in the market is particularly important as investment in the green building sector by banks, and international development finance institutions continues to grow (Nchofoung, Marilyn, and Monkam, 2023). Investors and stakeholders risk discovering that their financial commitments are not truly achieving sustainability objectives or the reduction of carbon emissions in the sector.

According to the Cape Business News, (2024), the International Finance Corporation (IFC) is providing a $250-million loan to FirstRand, for green buildings that include the affordable housing segment. This partnership will directly impact the growth of green-certified construction loans and home mortgages in South Africa. This would not only increase the market awareness and adoption of green building certification but could increase the risk of greenwashing. Therefore, it is important to not only study the trends and patterns in South Africa's green certification adoption but also to determine if developers pursue best practices instead of using the marketability of green buildings as a cover for greenwashing.

1.1. Research questions:

This study seeks to answer the question of whether the growth trends in South Africa's green building certification are vulnerable to greenwashing and location clustering risks. This would be achieved through the following sub-questions:

- What are the growth trends in market adoption of green building certification in South Africa?
- What's the difference between the proportion of basic level certifications to highest level certifications?
- Are there indications of location clustering in the geographical distribution of certifications?

1.2. Aims and objectives:

This study aims to determine if the growth trends in South Africa's green building certification are vulnerable to greenwashing and location clustering risks. This aim is achieved through the following objectives:

- Investigate the growth trends in market adoption of green building certification in South Africa.

- Compare the level of demand for basic to the highest level of certifications.
- Investigate location clustering trends in the geographical distribution of certifications.

2. Literature review

In their study, Hackenesch *et al.,* (2021) recommend investment in projects to increase energy efficiency in the building and construction sector. While other similar studies (Thornbush, 2016; Death, 2014) have acknowledged the importance of greening economies and transitioning to sustainable development for Europe and the United States, South Africa is also considered a top emitter. Therefore, the participation of South Africa in achieving a greener economy is critical to achieving sustainable development in Africa. Nisbet, (2009) reports that the United States, being one of the biggest emitters, should lead the charge in greening industries. Similarly, South Africa's heavy dependence on fossil fuel (coal) for energy-intensive development makes it one of the developing nations at par with the U.S. in emission levels.

South Africa's drive for a sustainable construction sector aligns with a global agenda which inspired the establishment of the Green Building Council South Africa (GBCSA) to regulate and promote green building practices through the green star certification (Agbajor and Mewomo 2024). The South African economy, and particularly the construction sector, is heavily dependent on fossil fuels for energy and this makes it one of the African countries with the highest carbon emissions (Moghayedi, Hübner, and Michell, 2023). Therefore, South Africa is a significant stakeholder in green building adoption in Africa. Consequently, Nisbet, (2009) identified the Green Building Council South Africa (GBCSA)'s launch of a green rating tool as an ideal strategy for South Africa to reduce energy consumption by 30% to 70% through green buildings.

On the one hand, Moghayedi, Hübner, and Michell, (2023) describe South Africa's building regulatory efforts as aligning with sustainable development which involves developing a building in an eco-friendly manner that does not erode natural resources. On the other hand, Schoeman, (2018) states that while 60% of South Africa's planned new buildings claimed to be green buildings the Green Star rating tool is susceptible to greenwashing. This literature review attempts to provide a synthesis of the existing body of research on green building certification and the associated greenwashing risk.

2.1. Green Building Certifications

Green certifications play a critical role in rewarding green development and unlocking finance for green buildings. Similar certification and rating systems have been adopted in the United States, Singapore, United Kingdom, Ghana, and across the globe (Addae-Dapaah and Chieh, 2011; Bond and Devine, 2016; Ampratwum et al., 2021; Ahmad, 2023) to standardise green building adoption. The certifications covered in this review include:

- British Research Establishment Environmental Assessment Method (BREEAM).
- Leadership in Energy and Environmental Design (LEED).
- Green Star Certification.

2.1.1. British Research Establishment Environmental Assessment Method (BREEAM)

According to Chegut, Eichholtz, and Kok, (2014), the UK was the first to introduce a private third-party assessment tool to measure a building's environmental impact. Furthermore, BREEAM and LEED are the two private frameworks that the UK market employs in defining the environmental information of buildings. Chegut, Eichholtz, and Kok, (2014) discovered that an important consideration for real estate and institutional investors is the need to make their portfolios green by reducing their carbon footprint. Similarly, renters in the UK demand green buildings to communicate their commitment to environmentally friendly business operations.

Therefore, while green building adoption has been strong in the UK there is still evidence of location clustering and financial premiums that drive greenwashing. Green building location clusters focus on major cities like London, Manchester, Bristol, and Leeds where profitability might be best achievable.

2.1.2. Leadership in Energy and Environmental Design (LEED)

In the United States, the LEED certification is the framework that guides the rating of green or sustainable buildings. Bond and Devine, (2016) associated the adoption of LEED green certification with evidence of rental premiums, renter demographics that prioritise environmental efficiency, possible operational cost reductions and energy savings. They also opined that the presence of a green premium creates significant concerns about greenwashing which results from property owners seeking profitability and market acceptability without making their property green. Furthermore, the study suggests that LEED location clusters in

U.S. urban areas might also indicate that green products fail to offer inclusivity benefits as they pursue maximum financial benefits.

2.1.3. *Green Star Certification*

The introduction of the Green Star certification in South Africa in 2008 has been designed as one of the strategies for rehabilitating the property development and construction sector. According to Schoeman, (2019), the South African Green Star environmental rating adopts a framework like the Green Star Australia grading system, with approval from the Australian Green Building Council. Although the system is primarily based on the Australian system, there are components of the Leadership in Energy and Environmental Design (LEED) from the USA and the British Research Establishment Environmental Assessment Method (BREEAM). According to the GBCSA, this standardized rating system, language and tools are valuable to property developers, banks, development financiers, owners, and occupants. It provides a clear process to assess the cost-benefit and lifetime value of greening strategies deployed throughout the lifecycle of a building.

Agbajor and Mewomo, (2024) describe green building certification and rating schemes as a complement to enacted standards and indispensable enablers including social, financial, and economic considerations that foster green building promotion. Additionally, they emphasise that certifications are important to combating the societal degradation caused by rapid urbanisation while also producing a safe environment. They form a significant part of efforts to adopt and develop long-lasting inventions that can bolster the sustainability of buildings and other civil infrastructure in the form of standards. Similar studies across the globe (Addae-Dapaah and Chieh, 2011; Windapo, 2014; Bond and Devine, 2016) have identified green building certification as a strategy for reducing energy consumption and carbon emissions of buildings. They recommend the use of green star ratings or similar certifications as interventions for making buildings more sustainable.

More so, without a standardised rating system, the industry runs the risk of greenwashing where it seems like the sector is greener, but it is not (Nygaard, 2023). Green star rating enables stakeholders to minimise the environmental impact of their developments as well as get recognized for their design initiatives (Nisbet, 2009; Moghayedi *et al.,* 2022; Moghayedi, Hübner, and Michell, 2023). However, as evidenced in the literature on the three certifications

reviewed above, green certification might not eliminate vulnerability to greenwashing and limited dispersion patterns in the adoption of green standards.

2.2. Green Building Certification Growth Trends

While some studies have investigated the value and premium attached to green certification (Rogerson and Sims, 2012; Rogerson, 2014; Ampratwum, Agyekum, Adinyira, and Duah, 2021), there is little empirical information in the literature regarding the trends for the adoption of green buildings and certifications in the South African property market since 2014.

In Ghana, Ampratwum *et al.,* (2021), noted that green certifications are still in the infancy stages with emerging trends in government and professional body participation. They note that there is a lack of clarity on how green certifications can be attained and subsequently proposed a 6-step framework. According to Addae-Dapaah, and Chieh, (2011), in the Singapore green residential market, there are four ratings which are Green Mark Certified (GMC), Green Mark Gold (GMG), Green Mark Gold Plus (GMGP), and Green Mark Platinum (GMPL). They also noted a poor understanding of the different certification levels and the tendency for developers to choose the lowest level of certification in a profit-seeking manner. Therefore, while clarity in the green building certification process might be an important adoption driver, a tendency to seek the lowest possible certification could be a strong greenwashing indicator in the market.

Also, in the U.S. Bond and Devine, (2016) evaluated the market premium associated with greenwashed projects against LEED-certified projects. They found that even though LEED certifications command almost double the premium on the rent value of greenwashed projects, there is also a premium for greenwashing a project. This means that the mere mention of green features without certification offers U.S. property owners financial benefits in terms of a premium on rent compared to non-green buildings. This situation creates a considerable risk for greenwashing. Therefore, it is critical to explore green growth trends from the lens of certification to understand the trends in adopting and standardising green projects in the South African property sector.

2.3. Greenwashing Risk in Green Certification Growth

Greenwashing happens when a company uses green certification to make a property or asset seem green or eco-friendly when it is not (Schoeman, 2018). Consequently, property developers and owners with the aid of green certification might prioritise the marketability benefits that green buildings attract with no real intentions to reduce their carbon footprint. For

example, in Singapore, Addae-Dapaah and Chieh, (2011) found that it is more profitable, for investors and developers to aim for the basic GMC rating. While getting green certification is a great step in making buildings green, an appetite for the most basic rating levels or mere use of the term in marketing is symptomatic of greenwashing and not in the best interest of sustainability as the highest tier rating is supposed to be the most energy efficient. The vulnerability of the construction and property industry to greenwashing has been established in the literature investigating certifications (Rogerson and Sims, 2012; Schoeman, 2019; Moghayedi *et al.,* 2022).

Particularly, Schoeman, (2019) explains that the vulnerability of green building businesses to greenwashing is also linked to the fact that numerous qualities define a green building. These features span from the types of materials used in the construction phase to the water and power usage to how the natural resources have been exploited to construct the green building. This multiplicity of what can be considered or rated as green gives rise to exploitative green practices that use minimal efforts to pass off products that are not sufficiently green as though they have adopted best practices. By exploring green building certification trends, this study provides insight into the green growth efforts in the South African property sector which can lay the foundation for exploring weaknesses, eliminating the lack of clarity and opportunities for standardising through green building certification growth.
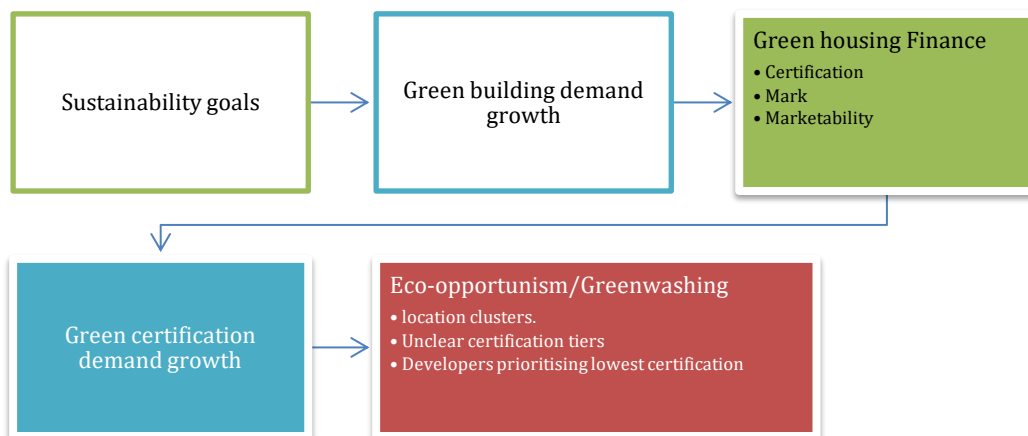
Figure 1: Illustration of the Greenwashing Process in Construction
Source: Author's work, (2024)

For example, Rogerson and Sims, (2012) found that the sample of urban hotels they investigated in Gauteng primarily implemented greening methods to increase earnings or improve public relations. Therefore, the commitment to green development for tourism projects, particularly hotels, did not include an interest in best practices. Furthermore, they note that despite the national government's understanding of the importance of greening in developing a more competitive low-carbon tourism industry, the existing voluntary nature of tourism enterprises implementing green building practices results in a complacent interest in greening.

2.4. Location Clustering in Green Building Growth Trends

Another huge risk that comes with greenwashing trends in the property industry is the tendency for green buildings to cluster within locations that are high-income or more economically well-off. For example, Rogerson, (2014), 6 years after the inception of the Green Star certification in South Africa, found that there were only fifty green buildings certified and that they were clustered in major cities like Johannesburg and Pretoria. They reported a lack of focus on existing buildings as a major challenge to the growth and dispersion of green buildings. Their study reported that the greatest individual clusters were found in Johannesburg, South Africa's business capital, which had seventeen green buildings. Pretoria, which is the administrative capital, had eleven structures. They also found that Cape Town and Durban were next in prominence, with nine and six green structures, respectively.

Notably, at the time of their study, these four cities represented 86% of the country's existing certified green buildings. Similarly, Rogerson, (2014), identified the risk of location clustering as a challenge to making green buildings inclusive. Location clustering happens when green and sustainable projects focus only on highly profitable locations and city hubs which might only be accessible to certain economic classes. Greenwashing in location clusters is a common indicator where only the most profitable locations adopt the rating system.

As a strategy to increase the growth and dispersion of certification, Aghimien and Aigbavboa, (2019) recommended introducing existing building certification. Other studies support the need to promote retrofitting of existing buildings and green upgrades as a viable approach to reducing carbon emissions and energy demands (Boshoff and Mey, 2020; Agbajor and Mewomo, 2024). Therefore, this study attempted to investigate green building certification growth trends and greenwashing risks in South Africa.

3. Methodology

This study sought to investigate growth trends in South Africa's green building certification and the patterns of greenwashing and location clustering risks in the market. This study deployed a quantitative method which can unearth empirical characteristics and trends of a population. This study agrees with Loeb *et al.,* (2017) that quantitative descriptive research has the potential to inform policy, practice, and research is even more significant, given the recent availability of large and complex datasets. According to Marshall and Jonker, (2010), Descriptive statistics also known as 'explorative statistics' in certain contexts is perfectly suited for collating and summarising quantitative data. These provide the needed context for explaining inferences or phenomena that might be identified in causal studies. This study provides the first comprehensive exploration of empirical data on South Africa's green building certification. While this limits the study's analysis and does not investigate the causal relationship between variables, it provides an in-depth exploration of the trends within the green certification market in South Africa.

Using data extracted from the GBCSA's certification database, the study takes a purposive sample of case study reports. 510 case studies are selected from the total database of 897 building certifications. The sample size was deemed to be valid considering previous similar research on South Africa's green certification (Rogerson, 2014) that has used even smaller sample sizes. The data collected spans between 2011 to 2023, and this is a sufficient period considering that the most recent study of the GBCSA rating tool was done in 2014.

A descriptive analysis characterizes the world or a phenomenon by identifying patterns in data to answer questions about who, what, where, when, and to what extent (Loeb et al., 2017). A descriptive analysis also provides the basis for understanding the population to determine what further inferential research can be done. This study visualizes the data using time series, bar charts, stacked bar charts, and other descriptive analyses in Google Spreadsheet and SPSS.

Stages	Process
1.	Collect 897 case study files from the Green Building Council South Africa website
2.	Extract quantitative data points from a sample of 510 cases.
3.	Exclude variables with incomplete data extraction.
4.	Code the certification categories into numeric data for ease of analysis.
5.	Organize data using pivot tables.
6.	Carry out descriptive analysis using Google spreadsheet and SPSS.

Table 1: Data analysis framework

4. Findings

While Rogerson (2014) noted about fifty green buildings in South Africa, this study found that there has been a 1694% jump to over 897 buildings. In this results and findings section, we provide further insights into this growth. This result indicates growing marketability and demand for green building certification, which can be interpreted as increasing demand for green buildings.
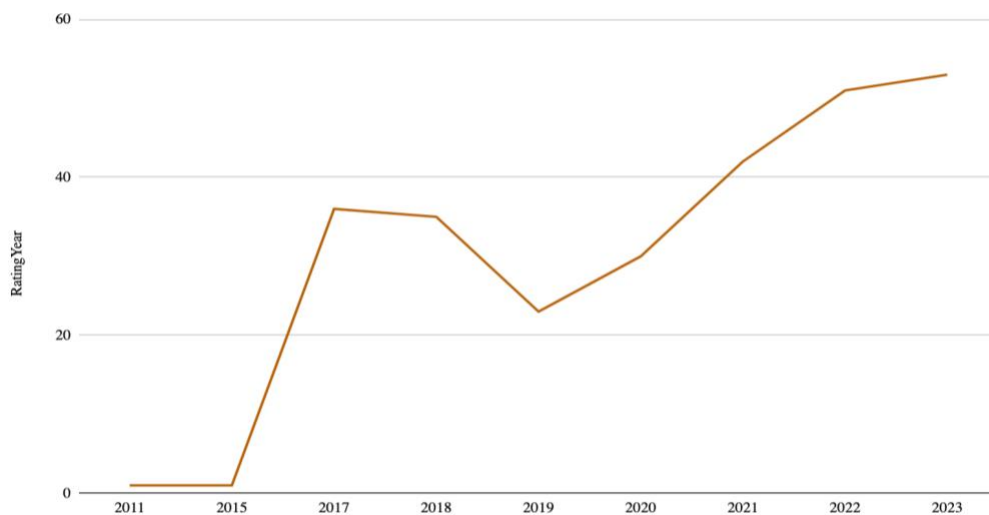

Figure 2: Line Chart of Green Certification by Year (Time Series 2011-2023)
Source: Author's work, (2024)

4.1. Market growth trends

In Figure 2, there is a huge leap in green building certifications between 2015-2017. Subsequently, the data shows no increases and then a significant drop between 2019 and 2020 (During the COVID-19 pandemic). However, the data then demonstrates a steady growth from 2020 onwards. Overall, the time series illustrates growth in green building certification numbers between 2011-2023. This data demonstrates that green building adoption through the certification process has grown in South Africa. This is indicative of a growing market appetite for green products in the property sector.
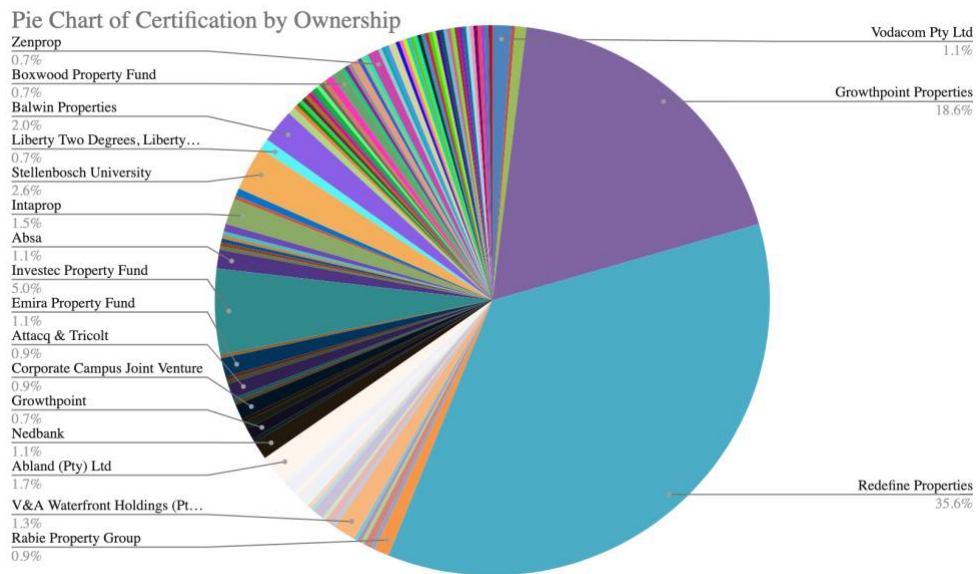

Figure 3: Ownership of Green Buildings
Source: Author's work, (2024)

Figure 3 illustrates the distribution of Green Building certificates by ownership. The top three owners of Green Building certificates include Redefine Properties (35.6%), Growthpoint Properties (18.6%), and Investec Property Fund (5.0%). There are other smaller owners with the smallest three being Stellenbosch University (0.7%), Zenprop (0.7%), and Boxwood Property Fund (0.7%). This data provides further evidence of a growing appetite for green building practices in real estate investment portfolios. Furthermore, it agrees with Chegut, Eichholtz, and Kok, (2014) that banking and commercial property investment are early adopters. This trend within each of these sectors could be explained by the strong financial sector, retail, and office markets in South Africa. It is interesting to note that educational

institutions also feature as early adopters of green buildings. These are pointers to the growing demand for green buildings in student residences and tertiary education facilities.
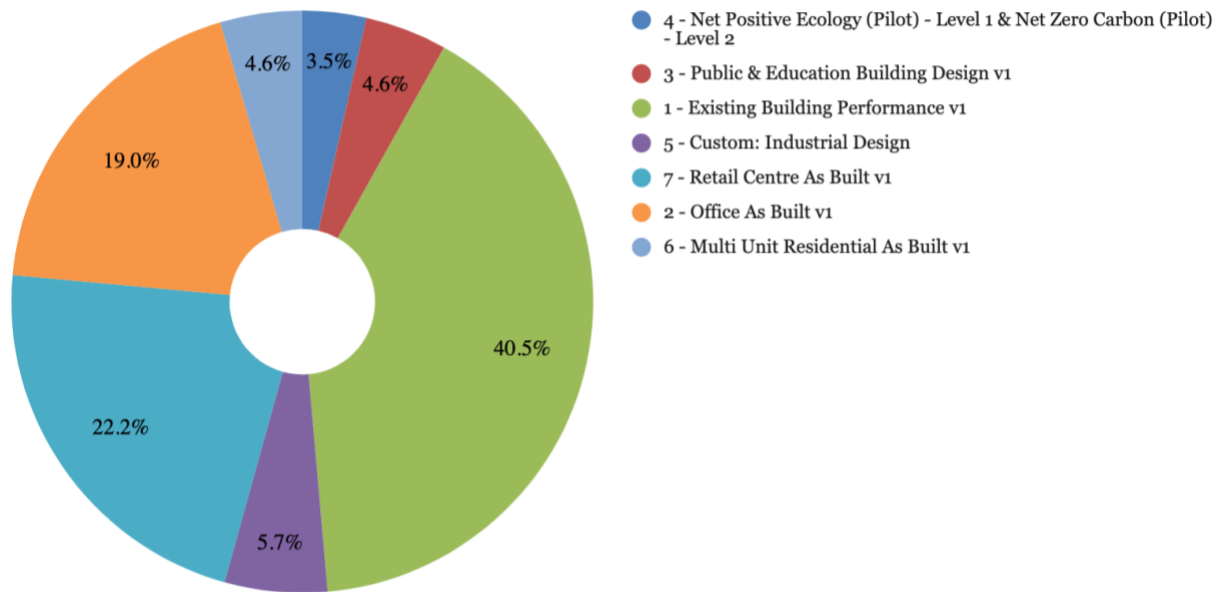

Figure 4: Donut Pie Chart of Rating Categories.

Source: Author's work, (2024)

As seen in Figure 4, there are 6 green star rating categories monitored by the GBCSA. The largest rating category is the Existing Building Performance v1 category (40.5%). This is followed by the Retail Centre as Built v1 category (22.2%), Office as Built v1 (19.0%), Custom: Industrial Design (5.7%), Multi-Unit Residential as Built v1 & Public and Education Building Design v1 (both 4.6%), and the Net Positive Ecology and Net Zero Carbon Pilots (3.5%). According to the result, the introduction of building retrofit or green building upgrades to existing buildings contributes to the growth of green building adoption. This means that while it might be more difficult to drive green building adoption for new buildings, upgrading existing buildings with green features might be more attractive to the market in South Africa.

4.2.Greenwashing risks
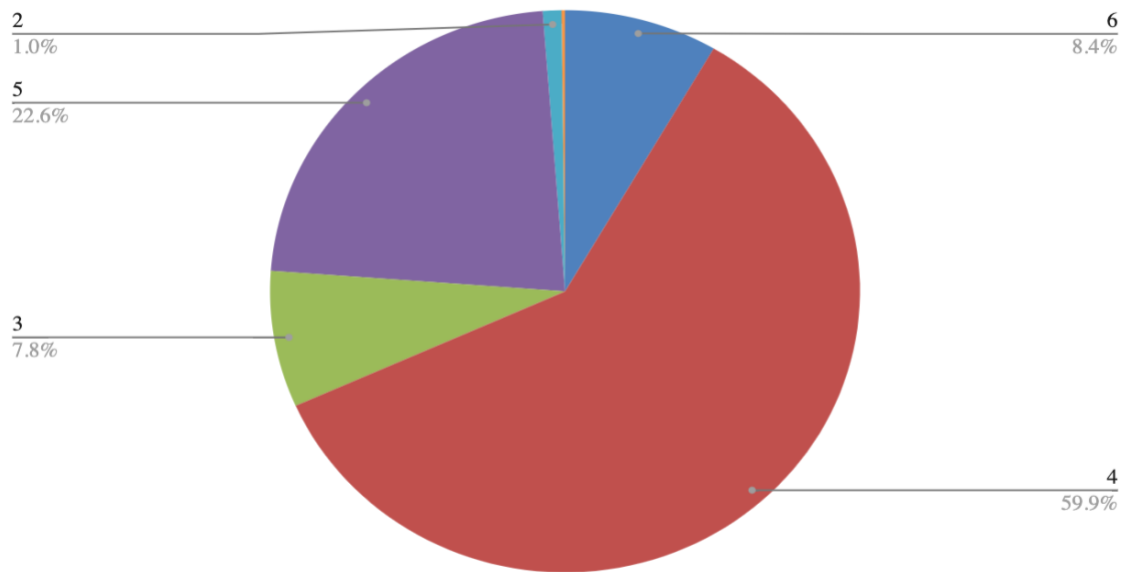
Star Rating:

1 – 1 Star Rating

2 – 2 Star Rating

3 – 3 Star Rating

4 – 4 Star Rating

5 – 5 Star Rating

6 – 6 Star Rating

Figure 5: Pie Chart of Star Rating Levels
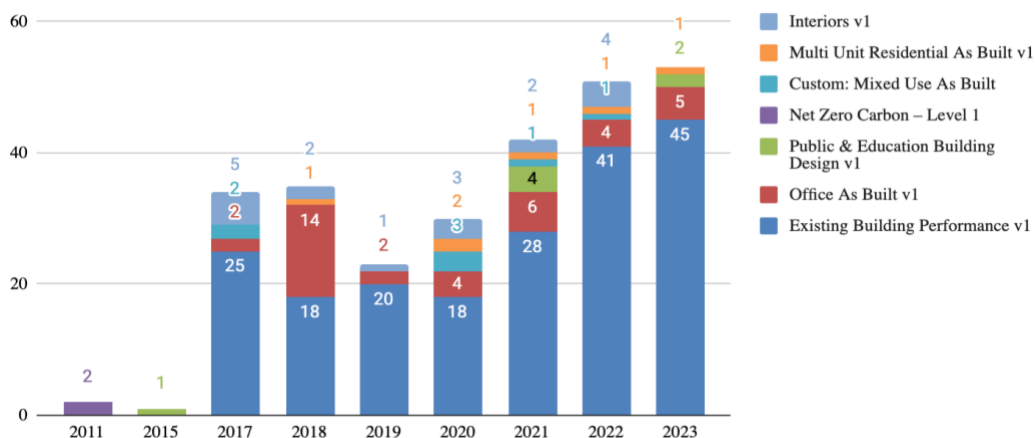
Source: Author's work, (2024)

From the pie chart in Figure 5, 59.9% of the sample buildings are 4-star rated, 22.6% are 5-star rated, 8.4% are 6-star rated, 7.8% are 3-star rated, and 1.0% are 2-star rated. The largest star rating level in terms of frequency is the 4-star rating while the smallest is the 2-star rating. Below median rating (below 3-star) constitutes just 8.8% while above media rating (above 3-star) constitutes 90.9%. This data provides compelling evidence that green building demand by the majority commits to above-average standards. This contrasts with the situation in Ghana reported by Addae-Dapaah, and Chieh, (2011). However, the demand for the highest level of certification is small.
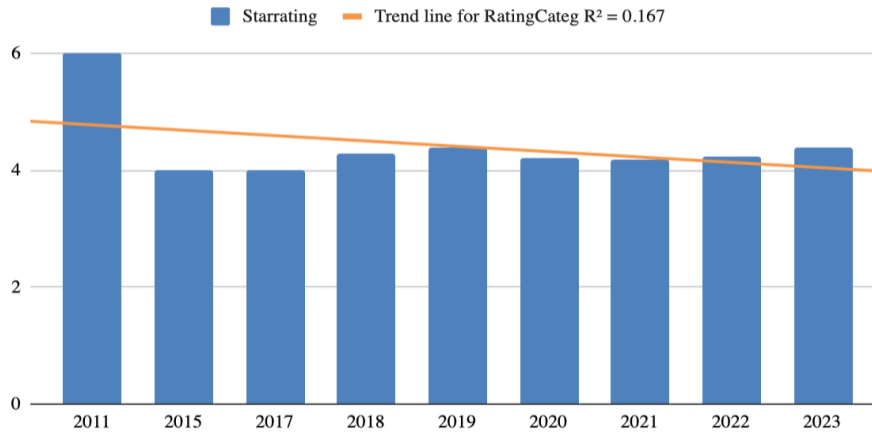
Figure 6: Star rating level bar chart 2011-2023

Source: Author's work, (2024)

As seen in Figure 6, the average star rating in 2011 was 6-star. However, this drops below the 4-star rating level in 2015 and 2017. The average star rating from 2018 onwards remains above the 4-star rating level. There are on average many green buildings that meet the best practices standard across the sample size between 2011-2023. However, at the initial stages of introducing the green building certification, there was a higher average 6-star rating. This average declined and later stabilised at slightly above 4-star. This indicates that over the years, there has been an even distribution of lower star ratings which lowered the average rating level. This is important to note as reasonable evidence of greenwashing practices accompanying growth in the market over time. It is also important to note that this coincides with the introduction of the existing building certification.
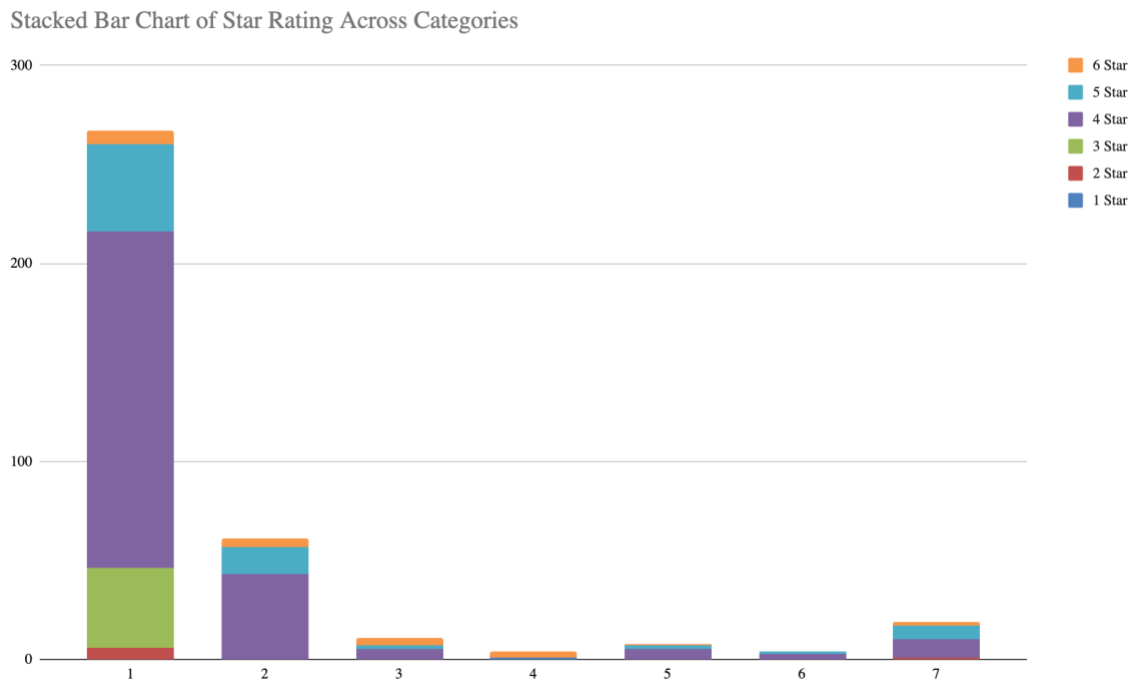

Y-axis – frequency, x-axis – year.

Figure 7: Stacked Bar Chart of Rating Categories Across Years

Source: Author's work, (2024)

In Figure 7, the Existing Building Performance v1 category represents a substantial proportion of the categories after 2015 and till 2023. The second largest category in many years was the Office as Built v1 category. However, the Office as Built v1 has had a major decrease since 2019 and has not grown significantly since then. Interiors v1 are larger in 2017 and 2022. This result illustrates that the growth in green building adoption is a result of green star rating for existing buildings rather than new buildings. Therefore, even markets where demand for new green buildings are low can still perform well in the retrofitting of existing buildings to promote green practices in the sector. However, this result further suggests that existing building certification increases the vulnerability to greenwashing.

y-axis – frequency, x-axis – rating category.

Category 1 - Existing Building Performance v1

Category 2 - Office As Built v1

Category 3 - Public & Education Building Design v1

Category 4 - Net Zero Carbon – Level 1

Category 5 - Custom: Mixed Use

Category 6 - Multi-Unit Residential As Built v1

Category 7 – Others

Figure 8: Stacked Bar Chart of Star Rating Across Categories

Source: Author's work, (2024)

In Figure 8, 4-star ratings represent a substantial proportion of all categories. Furthermore, category 1 (Existing Building Performance v1) has the highest proportion of 3-star, 4-star, and 5-star ratings. The 6-star rating is spread across all categories in small proportions. 2-star ratings are represented in Category 1 (Existing Building Performance v1) and Category 7 (Interiors v1). The only category with a 1-star rating is category 6 (Multi-unit Residential as Built v1). Most below-average ratings (less than 3-star) are found in the existing building category. This further supports the data in Figures 5 and 6 which suggest that greenwashing practices accompanied the growth of the green building adoption in South Africa. It also demonstrates that including the existing building category opened the market to a significant increase in demand for less than the mid-level rating (greenwashing risks).
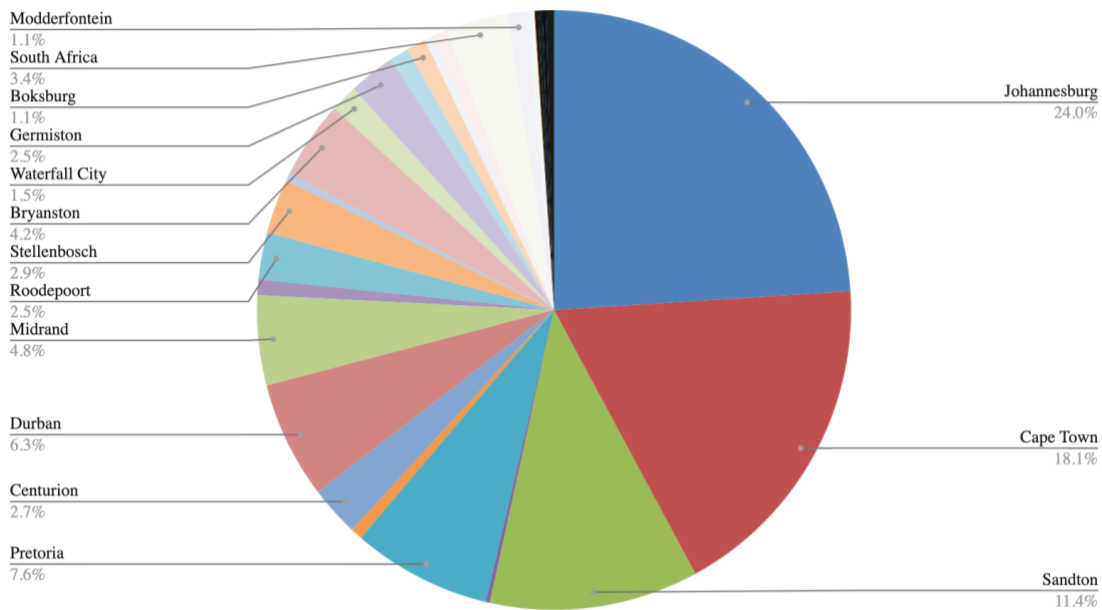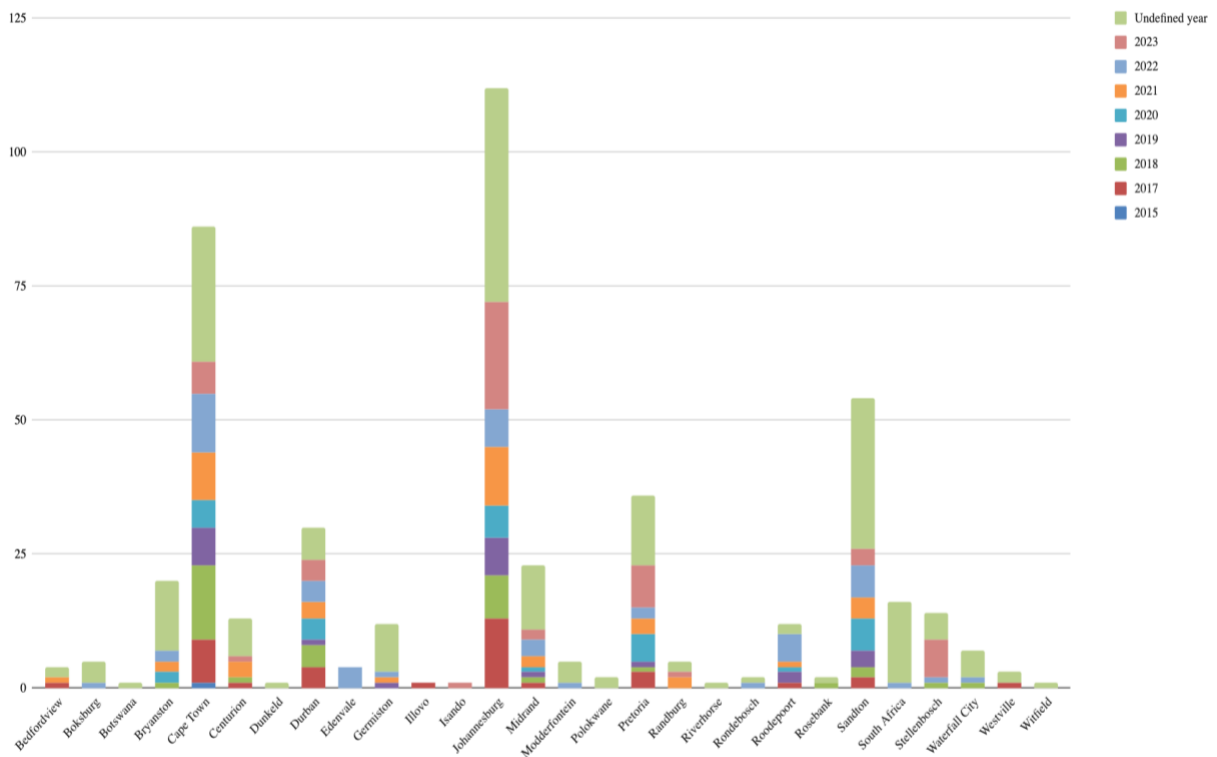

Figure 9: Pie Chart of Certification by Location

Source: Author's work, (2024)

4.3. Location clustering patterns

The distribution of green building certification in South Africa, as seen in Figure 9, includes several cities of varying sizes. The three top locations are Johannesburg (24%), Cape Town (18.1%), and Sandton (11.4%). However, more than fifteen cities are represented in the sample. Furthermore, three out of the nine provinces in South Africa are represented in the location chart. These provinces include Kwazulu Natal, Gauteng, and the Western Cape.

While location clustering effects can still be found in major cities, the green building market in South Africa has dispersed further into smaller cities like Ilovo, Polokwane, and Centurion. These results show that the Green Star rating system offers elements of inclusivity and extended reach outside urban hubs and city centres. It is possible to attribute this growing dispersion to the introduction of the existing building certification which constitutes the highest number of certifications as seen in Figure 5.

y-axis – frequency, x-axis – city.

Figure 10: Stacked Bar Chart of Certification Years (2011-2023) Organized by Location

Source: Author's work, (2024)

In Figure 10, stacked charts show the frequency of certifications per year in each city. The cities with the largest certifications have a greater percentage that was not defined by the year in which the certification was done. However, in 2023 all the top cities and some of the smaller cities like Ilovo and Isando have evidence of certifications. This is also the case for the years 2021 and 2022. This data demonstrates that over time South Africa's green building market has significantly dispersed. While this has not eliminated location clustering, it has extended green buildings to less expensive cities.

5. Discussion

In this section, the discussions set out the results of the data analysis in the previous section in alignment with the objectives, which are to:

- Investigate the growth trends in market adoption of green building certification in South Africa.
- Compare the level of demand for basic to the highest level of certifications.
- Investigate location clustering trends in the geographical distribution of certifications.

The analysis aimed to determine whether the growth trends in South Africa's green building certification demonstrate greenwashing and location clustering risks.

First, the analysis evaluates market growth trends in green building adoption across South Africa. The results demonstrate growth in the frequency of Green Star certification which is indicative of a positive market response to green building adoption between 2011-2023. Notably, there was a significant drop in certifications during the COVID-19 pandemic, influenced by increased concerns about sustainability during the economic growth of the real estate sector in that period. This suggests that the adoption of green strategies might become even more important to investors during and after an uncertain global crisis, pointing to a potential area for further empirical investigation. It is also interesting to note that the ownership of green buildings has become more diverse over the timeline investigated.

There's majority ownership among the top three real estate companies (Redefine Properties (35.6%), Growthpoint Properties (18.6%), and Investec Property Fund (5.0%)). However, there are several other smaller owners with the smallest three being Stellenbosch University (0.7%), Zenprop (0.7%), and Boxwood Property Fund (0.7%). The ownership has also grown to include

multiple sectors like government, financial services, retail, real estate, pension funds, and other private sector owners.

Second, the study evaluates the risks of greenwashing within the South African green building market. Most certified buildings fall within the 4-6 star rating category, indicating that most green buildings in South Africa adhere to some good green practices rather than merely meeting the minimum standards. However, the small proportion of the 6-star rating demonstrates a growth in greenwashing risk. This further confirms the concerns expressed by experts (Nisbet, 2009; Rogerson and Sims, 2012; Schoeman, 2019; and Moghayedi *et al.*, 2022) that the financial premiums that green buildings attract might introduce greenwashing practices in the property sector. While above mid-level (more than three stars) ratings were maintained, there was a significant drop which might indicate that there was increased demand for lower rating certificates. The introduction of existing building certification categories coincides with this drop, but further research is needed to establish causality.

Finally, the study examines the location clustering patterns within the green building market. The results show that South Africa's green building market has significantly dispersed. The patterns demonstrate that green building adoption has extended to less expensive cities and this demonstrates a decrease in location clustering. The findings also suggest a more balanced distribution of green building certifications across various cities, as evidenced by the certifications in both top cities and smaller cities. The results suggest the growing efforts to promote green buildings have increased reach and inclusive distribution across the country. This provides anecdotal evidence that introducing existing building certification can promote dispersion outside the most profitable cities and consequently reduce greenwashing risk.

6. Conclusion

This study sought to investigate the growth patterns and trends in Green Star certification as well as greenwashing risks. Extracting quantitative data from the GBCSA's archives, the study spanned 12 years between 2011 and 2023. First, the study concludes that there is a growing appetite for green buildings in the South African property market. Moreover, a more diverse ownership has evolved since the inception of the Green Star certification which suggests that certification promotes awareness and clarity around green buildings. Secondly, the study's investigation of greenwashing practices in the market concludes that introducing the existing

building certification coincides with a lower average rating star in demand. However, this average remains consistently above mid-level (3-star) which suggests that most green buildings are pursuing good practices. However, there's sufficient evidence to suggest that existing building certifications do not pursue the highest standards.

The study also concludes that the geographical distribution of green buildings has grown to include less expensive cities and as such a reduction in location clustering. It is possible to conclude that while introducing a green star rating for existing buildings could potentially increase the chances of greenwashing in the form of growth in demand for lower rating levels, it reduces location clustering and promotes inclusivity of green measures which have been previously critiqued as elitist and exclusionary towards the poor (Death, 2014).

It is implied through these findings that investment in green strategies is becoming more attractive to owners, investors, government institutions, and other property stakeholders in South Africa. The reach and distribution of greening efforts can be significantly multiplied with the further promotion of the existing building rating tools. Furthermore, the inclusion of several categories of rating ensures that multiple property types and diversified portfolios can benefit from greening strategies. These categorizations ensure that Commercial real estate practitioners advising on Environmental Sustainability and Governance (ESG) strategies can make further decisions regarding investors' needs for green compliance across their diverse portfolio assets.

7. Recommendations

- Developers who might be sceptical about new green buildings and the initial cost should be encouraged to test the impact of retrofitting and green upgrades on existing buildings. This would serve as a solid basis for investing in new green buildings.
- As a greenwashing mitigation approach, the highest rating levels should be encouraged for existing buildings.
- The GBCSA should increase awareness of the various star rating categories and levels to sensitise property owners and users on the benefits of achieving the best standards.
- Increased awareness of best practices and lifetime value to owners and users should complement promoting existing building ratings.

While the findings of this study are valuable for understanding the landscape of green buildings and certification, it is limited. The GBCSA does not collect the quantitative data in a form that would allow extensive inferential analysis. There's an opportunity for future studies to consider

the causal relationships between location clusters, star rating, and greenwashing. Moreover, the archives of case studies are reported in multiple layouts which makes it difficult to extract the quantitative data. Therefore, it is recommended that certifying bodies like the GBCSA should adopt a quantitative and empirical approach to the database. This would standardise the data and variables used in evaluating the growth, impact, or significance of select variables in the adoption of green buildings. The study also recommends for further areas of study, that research can be done to establish the relationship between adoption of green building certification and access to green building finance, specific impact of retrofitting on the geographical and ownership dispersion. Other similar studies can be conducted on the factors influencing the performance rating of green buildings, the impact of green certifications on rent premiums in major South African cities, and the impact of green building certification on existing building valuation.

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