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The Impact of ESG Certifications on Class A Office Buildings in Madrid: A Multi-Criteria Decision Analysis

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Abstract: This study investigates the impact of Environmental, Social, and Governance (ESG) certifications on the performance of Class A office buildings within Madrid's Central Business District (CBD). Employing a Multi-Criteria Decision Making (MCDM) methodology, the research evaluates 21 office properties, analyzing the influence of ESG certifications on key performance indicators, including green building certifications, valuation, market perception, and financial outcomes. The findings reveal that ESG-certified buildings demonstrate superior performance, commanding higher valuations, mitigating brown discounts, and achieving increased rental rates, thereby enhancing their investment attractiveness. These results underscore the importance of ESG certifications in the Spanish office market and provide valuable insights for investors, developers, and policymakers navigating the integration of sustainability and commercial real estate.

Keywords: ESG certifications; office buildings; climate risk; valuation; brown discount; sustainability; Multi-Criteria Decision Making; Madrid real estate market

1. Introduction

The real estate sector is experiencing a significant transformation, with sustainability and Environmental, Social, and Governance (ESG) factors now fundamental to property valuation and investment decisions. This shift is driven by increasing environmental concerns, regulatory pressures, and evolving tenant preferences. Notably, the European Central Bank (ECB) has emphasized the significance of climate risk in financial stability, further highlighting the necessity of sustainable real estate practices [1].

Theoretical foundations for ESG integration in real estate valuation include the Triple Bottom Line (TBL) [2], and Sustainable Development Goals (SDGs) [3]. Empirical studies have also highlighted the financial benefits of ESG certifications in commercial real estate [4]. However, research specifically focused on the nuances of ESG certification impacts within the European office market, particularly in Southern European contexts like Madrid, remains limited [5].

1.1. Background on ESG and Real Estate

ESG criteria are becoming essential in financial decision-making, partly due to regulations like the Corporate Sustainability Reporting Directive (CSRD) which expand what companies must report about their sustainability efforts [6]. The CSRD has made corporate sustainability reporting more transparent [7]. Credit rating agencies now include these risks in their assessments, highlighting the growing importance of aligning financial profitability with long-term sustainability indicators [8].

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including valuation, market perception, and financial performance. Unlike previous research that primarily focused on the influence of building certifications on investor interest, our study adopts a comprehensive, multi-faceted approach.

We review multiple properties with varying levels of renovation and capital expenditure investment to offer a more nuanced understanding of the factors influencing investment decisions [16]. To ensure a robust analysis, we propose using a Multi-Criteria Decision Making methodology, incorporating input from various industry experts [17] to appropriately rank and score the different parameters involved in the research [18].

The relevance of our study is underscored by the ECB's recent initiatives to prioritize climate change considerations in its monetary policy and supervision. In 2021, the ECB unanimously decided to prioritize climate change in its strategy review [19], developed a decarbonization strategy for corporate bonds using a climate scoring model, and began integrating climate-related risks into banking supervision [20]. These developments highlight the growing importance of ESG factors in the financial and real estate sectors [21].

By providing a comprehensive analysis of ESG certifications' impact on various real estate metrics, our study aims to contribute valuable knowledge to the field of sustainable real estate development and investment. This research will offer a more robust and nuanced understanding of how ESG certifications affect the performance and perception of office buildings, ultimately informing decision-making processes for stakeholders in the real estate industry [22].

2. Literature Review

The integration of Environmental, Social, and Governance (ESG) factors into real estate valuation and performance assessment has become increasingly important in recent years. This section provides a review of key studies and findings related to ESG considerations within the real estate sector, with a focus on climate risk and its influence on property valuation [23].

Climate risk presents a complex, long-term governance challenge for organizations [24], requiring strategic responses due to its ambiguous nature and potential to significantly impact business strategies and opportunities [25]. Several researchers have demonstrated that higher corporate social responsibility can mitigate negative climate risk impacts on firm performance [26], underscoring the importance of ESG considerations in risk management strategies [27].

2.1. ESG Factors, KPIs and Climate Risk in Real Estate

The integration of ESG factors into real estate valuation and performance assessment has been recently published by Contact et al. [28], which provides a comprehensive study on climate and real estate, highlighting the growing importance of ESG considerations in the broader European context [29]. Other relevant topics like Key Performance Indicators (KPIs) for ESG factors have been crucial in determining the value of real estate assets [30]. These KPIs cover areas like energy efficiency, carbon footprint, water and waste management, and the well-being of tenants. Studies have looked into how these ESG-related KPIs are connected to financial measures like capital expenditures (CAPEX) and rental income [31].

Climate risk presents a complex, long-term governance challenge for organizations [32], requiring strategic responses due to its ambiguous nature and potential to significantly impact business strategies and opportunities [33]. Climate change risk assessment involves balancing potential adverse effects on human welfare and ecosystems against the costs of mitigation and adaptation, with uncertainty playing a crucial role in shaping decision-making processes at individual, governmental, and corporate levels [34].

Studies have also demonstrated that higher corporate social responsibility can mitigate negative climate risk impacts on firm performance [35], underscoring the importance of ESG considerations in risk management strategies [36]. The ‘Social’ dimension of ESG plays a crucial role in asset appraisal, particularly with the contemporary emphasis on health, well-being, and inclusivity in real estate assets. The WELL Building Standard (2023) exemplifies how prioritizing health-oriented spaces can positively affect tenant productivity and satisfaction [37].

As the real estate industry continues to deal with the challenges of climate change and changing ESG expectations, a comprehensive approach that includes design elements, indoor environmental quality, and wellness amenities is increasingly necessary for property valuation and risk assessment.

2.2. European Central Bank Directives and Climate Risk

This research is particularly relevant in light of the ECB’s Climate and Nature Plan 2024–2025, which outlines specific objectives for enhancing climate risk assessment capabilities and promoting sustainable finance initiatives [37].

We aim to provide valuable insights to investors, developers, and real estate policy-makers by analyzing the relationship between ESG certifications and key performance indicators [38]. Our study considers various aspects of real estate development, including valuation, market perception, and financial performance [39]. This comprehensive approach aligns with the ECB’s directives for banks to incorporate climate-related and environmental risks into their risk management frameworks, which has significant implications for real estate financing and valuation, particularly for properties with strong ESG credentials [40].

Our research methodology involves reviewing multiple properties with varying levels of renovation and capital expenditure (CAPEX) investment [41]. To ensure a robust analysis, we propose using a MCDM methodology [42], incorporating input from various industry experts to appropriately rank and score different parameters [43]. This approach is consistent with recent publications from global organizations like RICS and BBP [44], which prioritize factors such as Net Zero Carbon (NZC) [45], Green Building Certifications, Energy Management, CO₂/m², renewable energy use, Physical Climate Risk, Water Usage Efficiency, and Waste Management Efficiency [46].

The relevance of our study is further underscored by various European studies highlighting the building sector’s key contribution to wealth and jobs, as well as its significant impact on energy use and emissions [47]. These studies emphasize the need for effective adaptation measures, particularly in Southern Europe [48,49] and examine how climate change affects energy consumption in buildings across European cities [50,51].

Not only in Europe. From a US perspective, there is also evidence of this correlation [52,53]. However, specific regional approaches and local measurements are suggested to ensure proper mitigation [54].

This research will offer a more robust and nuanced understanding of how ESG certifications affect the performance and perception of office buildings, ultimately informing decision-making processes for stakeholders in the real estate industry. Our findings will be particularly relevant in the context of the ECB’s ongoing efforts to integrate climate risk considerations into financial stability assessments and regulatory frameworks.

Below, Table 1 shows different KPIs with recommended relevance.

Table 1. Comprehensive set of KPIs for assessing office buildings in Europe. Source: own study.

KPI	Relevance	Justification
CO ₂ emissions (kgCO ₂ e/m ² /year)	Highest	Directly measures climate impact; crucial for climate change assessment; aligns with EU carbon reduction goals
Energy consumption (kWh/m ² /year)	Highest	Strongly linked to CO ₂ emissions and building efficiency; fundamental component of EPCs [55]
Renewable energy production (onsite)	Very High	A building with very high energy performance, as determined in accordance with Annex I, Article 11 of the EPBD.
Green building certifications (e.g., BREEAM, LEED)	Very High	Comprehensive measure of overall building sustainability; BREEAM dominant in UK/Europe, LEED gaining ground
Physical climate risk analysis	High	Important for assessing long-term climate change impacts on the property; crucial for long-term valuation and risk management
Energy rating (EPC)	High	Indicates energy efficiency; mandatory in EU for property transactions
Water usage efficiency	Moderate	Key component of occupant health and wellbeing; emphasized in certifications like WELL
Waste management and recycling rate	Moderate	Important for energy management and occupant comfort; increasingly relevant in EMEA
CREM or other pathway analysis	Lower	Measures carbon footprint of construction materials/processes, gaining importance in lifecycle assessments [56]

These recommended KPIs are based on several discussions with real estate and sustainable professionals. To mitigate potential subjectivity in the scoring of ESG factors, location, and property management, a rigorous, multi-faceted approach was implemented, to ensure the research objectives were aligned with the existing literature.

First, an expert panel, comprising five professionals with recognized authority in the industry, was convened to review and validate the scoring process, thereby providing oversight and reducing individual bias. Detailed scoring rubrics were developed for each KPI, drawing upon established industry standards and recognized certification schemes, including LEED, BREEAM, and Energy Performance Certificates. Furthermore, data triangulation was employed, utilizing multiple independent sources such as property management reports, third-party sustainability assessments, and municipal records to cross-validate KPI scores.

The selection of these experts prioritized individuals with acknowledged expertise in real estate valuation, climate risk assessment, and ESG integration, including members of the Royal Institution of Chartered Surveyors (RICS) with specialized knowledge in sustainability and valuation practices. To ensure broad applicability of the research, stakeholders were selected to represent diverse industries and European geographies, thereby capturing regional variations. Although the research focused on office buildings, professionals from various sectors, including commercial, residential, agricultural, and logistics, were included to ensure the findings are relevant to a wide range of asset classes. Representatives from academic institutions, valuation firms, financial institutions, and sustainability consultants were also included to incorporate multidisciplinary perspectives.

2.3. Multi-Criteria Decision-Making in Real Estate

MCDM methods offer a way to oversee complex information, helping people make clear and consistent decisions [55]. These methods are especially helpful when dealing with many different or conflicting factors, or when considering a broad range of qualitative and intangible elements [56].

The complexity of integrating ESG factors and climate risk into real estate decision-making has led to the adoption of MCDM approaches [57]. These methods allow for a more nuanced evaluation of properties, considering various ESG and financial metrics

[64]. Furthermore, integrating resilience measures aligns with broader sustainability and insurance considerations, providing a competitive advantage for developers and investors alike [65]. By preemptively addressing these risks, the Madrid real estate market can ensure its stability and attractiveness amidst the pressures of evolving climate patterns.

4. Multi-Criteria Decision Making in Real Estate

In response to the growing importance of ESG factors in real estate valuation and investment decisions, this study employs a multi-criteria methodology to analyze the impact of ESG certifications on Class A office buildings in Madrid's Central Business District.

MCDM has been preferred by many researchers in contrasting with alternative methods like cost-benefit analysis, regression analysis, and others [66]. Unlike traditional valuation methods that focus primarily on financial metrics, MCDM allows for the integration of ESG factors, climate risk assessments, and other sustainability considerations that are increasingly relevant to real estate investment decisions [67].

The MCDM approach has been successfully applied in various domains, including climate policy [68] and infrastructure assessment [69], demonstrating its efficacy in evaluating complex, multifaceted issues [70].

Our research builds upon the established literature on sustainable real estate practices [71], which has consistently shown that green-certified buildings command rent and price premiums compared to conventional properties [72]. However, this study extends beyond these findings by incorporating a comprehensive analysis of ESG factors, climate risk considerations, and their combined impact on office portfolio performance in a major European urban center [73].

The MCDM framework allows for a nuanced evaluation of multiple criteria, including:

- ESG certification impact on property value and performance [74]
- Cost-benefit analysis of retrofit strategies and their role in achieving ESG certifications [75]
- The influence of ESG certifications on access to financing [76], interest rates, and investment attractiveness [77]
- Benchmarking against local and international standards [78].

By engaging diverse stakeholder inputs, our methodology reflects market realities and provides a holistic view of the factors influencing sustainable real estate practices in Madrid [79]. This approach is particularly relevant given the increasing emphasis on ESG reporting and disclosure practices in the real estate sector [80].

While previous studies have examined the impact of green certifications on commercial real estate prices, there remains a gap in understanding how these factors interact with climate risk considerations in the context of a large European city's office portfolio. Our study aims to address this gap by offering insights into the evolving relationship between ESG certifications, climate risk, and office building performance in Madrid [81].

This research contributes to the growing body of literature on sustainable real estate by providing a comprehensive analysis of ESG factors in the Madrid office market. The findings will offer valuable insights for investors, REITs, developers, and policymakers [82], guiding decision-making processes in an increasingly ESG-conscious real estate landscape.

However, very little has been studied on how the above research evolved and linked climate risk and office portfolio in a large European city country. Thus this study aims to offer some clarity on the field.

5. Materials and Methods

Research Design

To cover different aspects of how climate risk interacts with real estate, the author suggests a Multi-Criteria Decision-Making analysis [83]. This appraisal has been used in many hybrid scenarios [84], and the method has been applied to various aspects of real estate research [85]. Other researchers incorporated multiple criteria, including environmental, social, and economic factors, to evaluate the sustainability of buildings [86].

Similarly, there has been analysis demonstrating the effectiveness of MCDM in addressing complex decision-making problems in real estate and urban planning [87].

The buildings selected for the study are shown in the Figure 3.

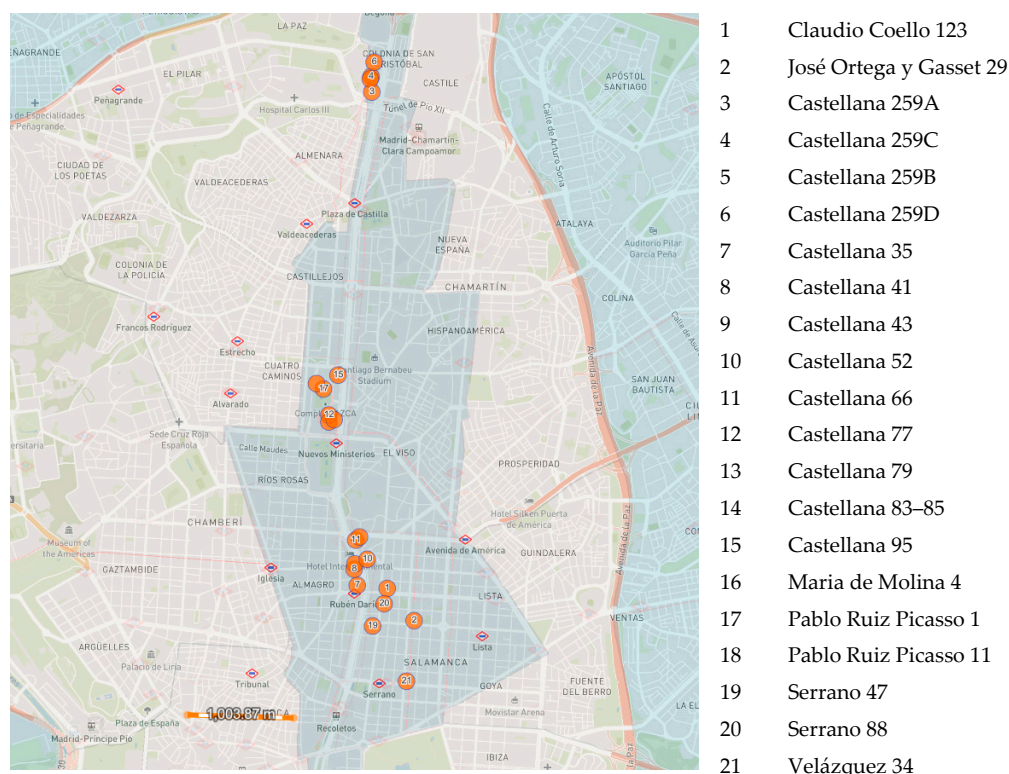


Figure 3. Madrid CBD with selected projects. Source: own study.

The buildings' selection is based on several criteria to ensure a representative sample of Madrid's CBD office market. The segmentation process considered factors such as building age, renovation status, ESG certification level, and market relevance. The final sample of 21 properties represents 14% of the approximately 150 Class A office buildings in Madrid CBD, providing a meaningful cross-section of the market.

Stakeholder engagement was a critical component of this research. A panel of 18 experts from diverse backgrounds, including real estate valuation, climate risk assessment, and ESG integration, provided input on the relative importance of each criterion. Data management involved collecting and validating information from multiple sources, including property management reports, third-party sustainability assessments, and municipal records.

6. MCDM Framework

The MCDM analysis covers 21 office projects in Madrid CBD. The study identifies several Key Performance Indicators (KPIs) relevant to the performance of office buildings, and classifies them into three categories:

E: Environmental

I: Investment/Financial

A: Appraisal/Market Perception

Initial selection presents nE indicators of type E, nI of type I, and nA of type A such that:

Equation (1): KPI Category

$$m = n_E + n_I + n_A$$

where “ m ” is the total number of KPIs (12 indicators in our case).

Each KPI is assigned a score, represented as E_j , I_j , and A_j :

E_j : Score for the j th Environmental KPI

I_j : Score for the j th Investment/Financial KPI

A_j : Score for the j th Appraisal/Market Perception KPI

Each KPI has a given score, denoted by:

$$E_j = 0 \leq j \leq n_E$$

$$I_j = 0 \leq j \leq n_I$$

$$A_j = 0 \leq j \leq n_A$$

That for the mixed-use projects, take values from a given internal criteria 1 (An external advisor could assign a correlative value to each E , I , and A , indicator. In our case, 1 to 5) from 1 to 5, that is:

$$0 \leq E_j \leq 5, \text{ with } 0 \leq j \leq n_E$$

$$0 \leq I_j \leq 5, \text{ with } 0 \leq j \leq n_I$$

$$0 \leq A_j \leq 5, \text{ with } 0 \leq j \leq n_A$$

In our case, with $m = 12$, we assign the following C_j values, based on different KPIs with recommended relevance. See Table 2 below:

Table 2. T_{EIA} assigned values. Source: own study. Details of the calculation are shown in the Supplementary Table S1.

	<i>E</i>				<i>I</i>				<i>A1</i>			
	E1	E2	E3	E4	I1	I2	I3	I4	A1	A2	A3	A4
Previous experience	4	2	2	4	5	4	3	4	5	4	3	2
Listed developer/Fin entity												
Professional Property MMT												
Access to subway (distance in m)												
Rent												
Occupancy												
Refurbished												
Grade												
ESG Certification												
Climate risk assessment												
International designer												
Parking ratio												
Criteria (1–5)	4	2	2	4	5	4	3	4	5	4	3	2

The total scoring “ T_{EIA} ” for the “ m ” indicators considered is,

Equation (2): Total KPI Scope

$$T_{EIA} = \sum_{j=1}^{n_E} E_j + \sum_{j=1}^{n_I} I_j + \sum_{j=1}^{n_A} A_j$$

6.1. Criteria. Scoring and Weighting Process

An external advisor will be able to rank each of the projects studied, for instance, assigning C_j , from 0 to 10, to each indicator E , I , and A .

Therefore, the criteria for appraisal will be $0 \leq C_j \leq 10$.

6.2. Appraisal

As per the MCDM analysis, the Total Asset Performance (TAP) for 12 indicators, grouped in three categories, E , I , and A , weighted by C_j criteria, results in:

Equation (3): TAP_{EIA} Weighted Total Asset Performance

$$TAP_{EIA} = \frac{\sum_{j=1}^{n_E} E_j \times C_j + \sum_{j=1}^{n_I} I_j \times C_j + \sum_{j=1}^{n_A} A_j \times C_j}{T_{EIA}}$$

The analysis done for one of the recent projects in Madrid (Castellana 77) is shown in the Table 3. below. An external advisor could assign the following C_j criteria for each of the E , I , and A KPIs:

Table 3. C_j values (0–10) for TAP_{EIA} calculation. Source: own study.

Project\Indicator	E1	E2	E3	E4	I1	I2	I3	I4	A1	A2	A3	A4
Castellana 77	10	10	10	6	4	10	2	6	10	6	10	6

6.3. Empirical Results

For the MCDM analysis, all 21 office projects are assessed against the given T_{EIA} , evaluated with an external score from 0 to 10. See Table 4. below with the calculation.

Table 4. Office name C_j and T_{EIA} parameters for TAP_{EIA} calculation. Source: own study.

Project\Indicator	C_j	E1	E2	E3	E4	I1	I2	I3	I4	A1	A2	A3	A4	Total
Castellana 77	7.38	10	10	10	6	4	10	2	6	10	6	10	6	90
Serrano 47	7.33	10	10	10	2	6	8	2	8	10	6	10	8	90
Castellana 79	7.33	10	0	10	6	6	10	6	6	6	10	10	6	86
Pablo Ruiz Picasso 11	7.29	10	10	10	4	4	10	8	8	4	10	10	2	90
Claudio Coello 123	7.19	10	10	10	2	4	8	6	8	6	10	10	6	90
Castellana 66	7.14	10	10	10	6	4	4	6	8	10	10	0	10	88
Castellana 259D	7.10	10	10	10	6	2	10	6	8	8	2	10	8	90
José Ortega y Gasset 29	7.10	10	0	10	2	10	10	2	8	8	6	10	4	80
Castellana 83–85	7.05	10	10	10	4	6	2	6	8	10	6	10	4	86
Serrano 88	7.00	10	0	10	10	4	10	4	8	10	8	0	4	78
Castellana 259B	6.95	10	10	10	4	2	2	10	10	10	2	10	10	90
Castellana 41	6.95	10	10	10	4	6	10	10	6	4	10	0	6	86
Maria de Molina 4	6.90	10	10	10	6	2	10	6	8	10	8	0	2	82
Castellana 95	6.81	10	0	10	8	4	10	2	6	10	4	10	4	78
Pablo Ruiz Picasso 1	6.81	10	0	10	4	4	8	10	6	10	4	10	4	80
Velázquez 34	6.81	10	10	10	10	2	4	4	8	6	8	10	2	84
Castellana 43	6.62	10	10	10	4	6	10	2	8	6	8	0	6	80

Castellana 259C	6.57	10	0	10	2	2	10	10	10	6	2	10	10	82
Castellana 35	6.48	10	0	10	8	6	10	0	6	6	10	0	8	74
Castellana 259A	6.10	10	0	10	2	4	6	10	10	4	2	10	8	76
Castellana 52	5.05	10	10	10	2	2	6	2	4	4	10	0	4	64

For this project and $m = 21$, the max C_j ,

$$\sum_{j=1}^m C_j$$

Will be 90.

Office TAP_{EIA} is 7.38.

A chart with a summary of the results is presented in Figure 4 below.

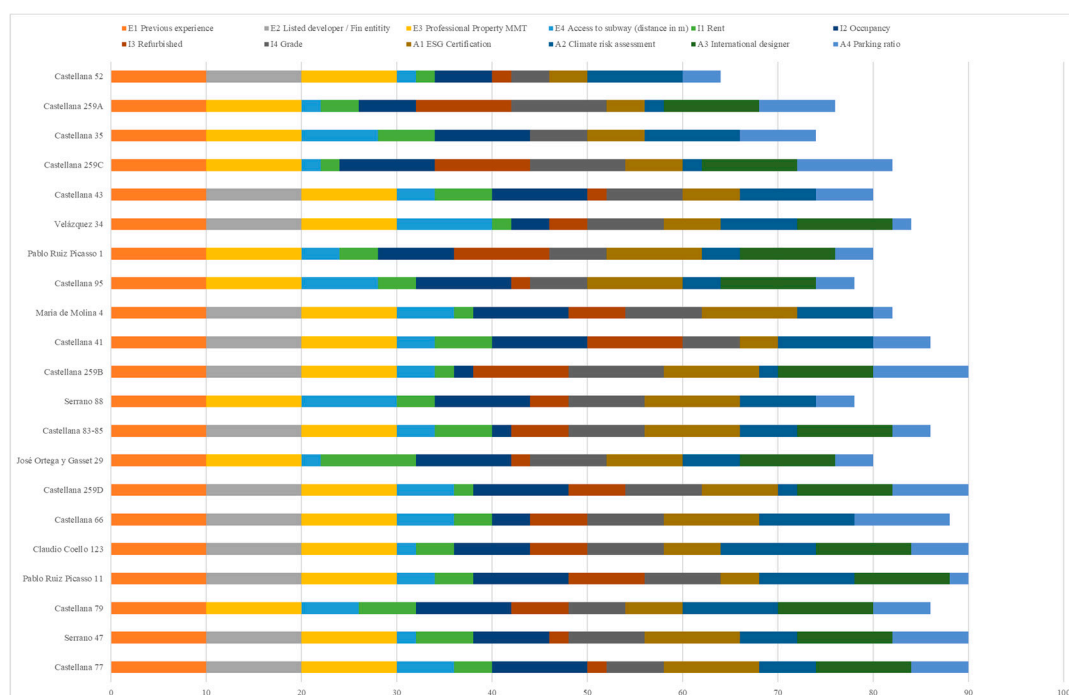


Figure 4. MCDM results of office building projects. Source: Own study.

The MCDM method, and specifically the TAP_{EIA} calculation, allows the study to synthesize a large amount of complex information into a single, interpretable metric. By assigning weights C_j to different KPIs, the analysis reflects the priorities and preferences of real estate experts, enhancing the validity of the results. The calculation of TAP_{EIA} enables the comparison of different office buildings based on their overall performance, considering a balance of environmental, financial, and market-related factors. This approach is crucial because it moves beyond simple comparisons (e.g., just comparing energy efficiency) to provide a holistic assessment that aligns with the complex nature of sustainable real estate.

7. Results

The multi-criteria decision-making analysis of 21 office projects in Madrid's CBD yielded several key findings:

Looking at the top performers (Castellana 77), the building has LEED Platinum certification, contributing to its strong performance [87]. Good location and accessibility to the subway increase scoring [88].

Professional Property Management services enhance tenant satisfaction, leading to increased renewal intentions and, consequently, higher rents [89].

Similarly, Castellana 79, benefits from a high-quality refurbishment and international designer influence [90].

On the other side, lower performing buildings, like Castellana 52, scored lower, not due to their ESG certifications [91], but to location accessibility, and suffering from lower parking ratio reflections [92].

Spider chart with a summary of the results is shown in figure 5 below.

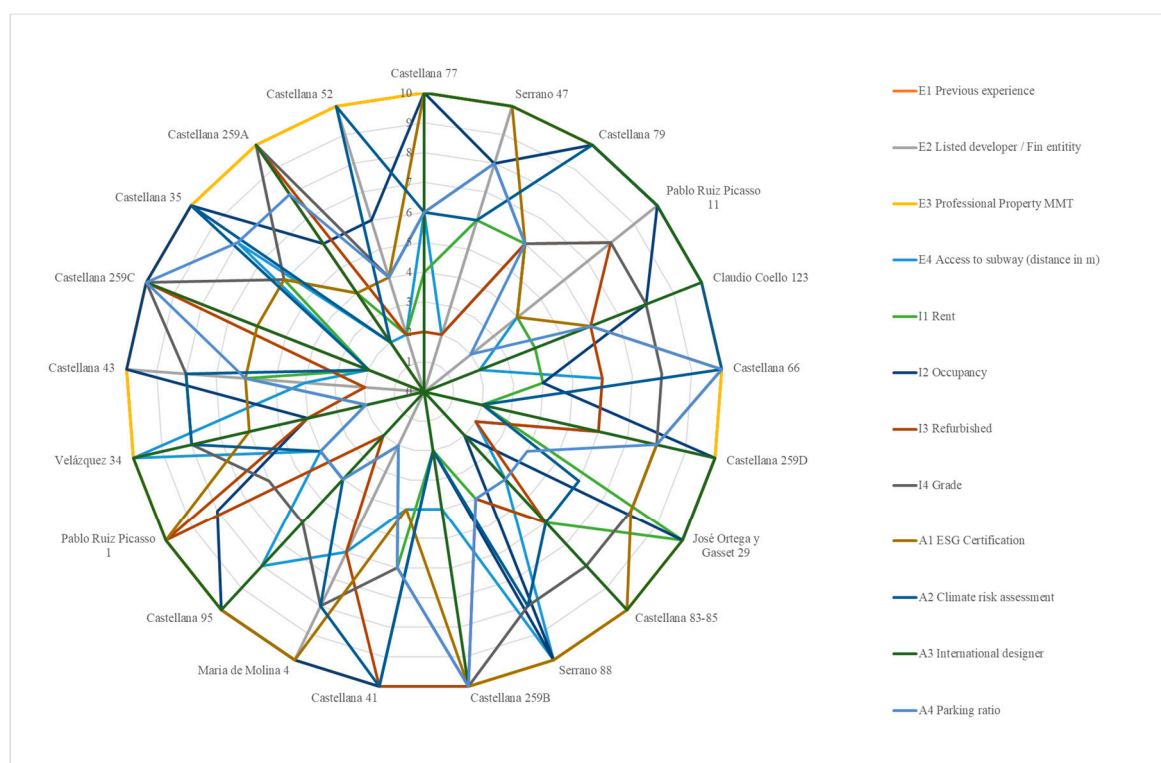


Figure 5. MCDM results and appraisal of 21 office buildings. Source: own study.

7.1. Statistical Analysis of ESG Impact

To provide a more robust analysis of the impact of ESG certifications, we incorporated statistical validation using a two-sample *t*-test to compare the TAP_EIA scores between ESG-certified and non-certified buildings.

TAP_EIA Scores:

- ESG-Certified Buildings ($n = 15$): Mean = 7.52, SD = 0.68, Median = 7.55, Range = 6.57–8.32
- Non-Certified Buildings ($n = 6$): Mean = 6.21, SD = 0.74, Median = 6.19, Range = 5.05–7.05
- Rental Rates: Overall ($n = 21$): Mean = €38.57/sqm/month, SD = €6.23, Median = €39.00, Range = €30–€50
- Asset Values: Overall ($n = 21$): Mean = €3245/sqm, SD = €823, Median = €3150/sqm, Range = €2100–€4500/sqm.

The analysis revealed a statistically significant difference in TAP_EIA scores between ESG-certified and non-certified buildings ($t = 3.45$, $df = 18.2$, $p = 0.002$). ESG-certified buildings demonstrated a higher mean TAP_EIA score of 7.52 compared to non-certified buildings with a mean score of 6.21. This statistical analysis provides robust validation of the study's findings, demonstrating that ESG-certified buildings not only perform better but also command higher rental rates and asset values.

7.2. ESG Certifications

In general, the rationale behind performance is driven by the adherence to ESG Certifications, location, accessibility and higher rents. Easy access to subways and prime residential areas positively influences their TAP_EIA scores. Additionally, refurbishment and modernization of the properties highlight improved scoring due to enhanced tenant appeal and functionality.

The ESG certification impact, therefore, shows different performance on BREEAM and LEED accreditations, which provide a comprehensive measure of sustainability, incorporating factors such as energy management and carbon footprint. This has been discussed with global organizations like Urban Land Institute (ULI) and RICS, emphasizing the broader financial benefits of sustainability [46].

Buildings with higher ESG certification scores generally exhibited superior TAP_EIA, significantly outperforming uncertified counterparts [77]. Among these, BREEAM Exceptional and LEED Platinum stand out for their focus on energy efficiency and carbon reduction, aligning closely with net-zero carbon objectives. Certifications in progress, like LEED in progress, cannot be fully ranked until finalized.

7.3. Location and Accessibility

The proximity to public transportation, specifically subway access, shows a strong positive correlation with TAP_EIA scores, underpinning the importance of accessibility in performance metrics. Moreover, buildings located in prime residential neighborhoods outperform those in less desirable areas, reinforcing the impact of location on asset desirability [93].

7.4. Developer and Owner Influence

Properties developed by listed companies or financial entities generally achieve better performance, reflecting superior TAP_EIA scores compared to those with different ownership structures [94]. This indicates that institutional backing enhances valuation and resilience.

7.5. Tenant Appeal and Quality

Buildings with high-quality fit-outs and embodying “flight to quality” traits achieved TAP_EIA scores above the average [95]. Properties managed professionally and also consistently outperformed others, highlighting a considerable improvement in overall ratings.

7.6. Sustainability Features

Incorporation of alternative uses or terrace spaces can modestly enhance TAP_EIA scores, while traditional amenities like parking ratios show a weaker correlation with performance, suggesting greater emphasis on sustainable transport options [96].

7.7. Rental Performance

There exists a robust positive correlation between achieved rents and overall TAP_EIA scores, highlighting the financial advantages of high ESG performance [97].

7.8. Brand and Architecture

Buildings designed by noted architects command a premium in TAP_EIA scores, while properties with scalable brands perform better, underscoring the value of architectural distinction and brand equity.

7.9. Top Performers

The highest-scoring project achieved a TAP_EIA of 8.32, excelling predominantly in ESG certification, strategic location, and management quality. The top five projects share strengths in sustainability and tenant appeal, highlighting common factors of success.

7.10. Distribution of Scores

The TAP_EIA scores for the examined projects range up to 8.32, with 60% of projects scoring above the mean, which reflects the high quality of the sample.

The results delineate the multifaceted factors driving office building performance, affirming the criticality of ESG certifications, prime location, and superior management.

Investments in sustainability and tenant-focused amenities substantially enhance asset performance, corroborating their strategic value in the real estate market within Madrid's CBD. Specifically, buildings with higher ESG certifications demonstrate superior TAP_{EIA} scores, indicative of enhanced performance across the spectrum of evaluated KPIs. The TAP_{EIA} metric effectively captures not only the direct environmental benefits of ESG certification, such as reduced CO₂ emissions, but also the associated financial benefits, including higher rental rates, and improvements in market perception, such as increased tenant appeal. By establishing this quantitative link between ESG certification and TAP_{EIA}, the study furnishes compelling evidence for the economic value of sustainability within the real estate sector.

In essence, the MCDM method, through the TAP_{EIA} calculation, translates the qualitative dimensions of ESG certification into a quantitative measure of asset performance, thereby enabling the authors to draw statistically significant conclusions regarding the impact of ESG.

8. Discussion

While our analysis reveals a clear positive impact of ESG certifications on building performance, it's crucial to acknowledge the complexity of factors influencing real estate valuation [98]. The outperformance of ESG-certified buildings might not be solely attributed to their sustainability features. We must consider the interplay of various elements, such as investor sentiment, location prestige, and shifting corporate preferences.

For instance, the premium commanded by buildings like Castellana 77 could be partly due to a self-fulfilling prophecy: as investors increasingly prioritize sustainable assets, ESG-certified properties naturally attract more attention and higher valuations. Moreover, many ESG-certified buildings in Madrid's CBD occupy prime locations with superior infrastructure and amenities, which could independently drive higher prices [99].

We should also consider the role of corporate tenants, many of whom have public sustainability commitments [100]. These companies may be willing to pay a premium for certified spaces, regardless of the building's actual performance, to align with their corporate image and goals [101]. Furthermore, the ESG certification itself serves as a powerful marketing tool, potentially inflating valuations beyond what objective performance metrics might justify [102].

These alternative explanations don't negate the value of ESG certifications but rather highlight the need for a nuanced understanding of their impact. Future research could aim to disentangle these factors, perhaps through more granular analysis of building characteristics or longitudinal studies tracking changes in valuation as ESG certifications are acquired.

The analysis of Class A office buildings in Madrid highlights the significant role of ESG certifications in enhancing property performance. This research confirms that ESG-

certified properties, particularly those with LEED Platinum and BREEAM Exceptional ratings, consistently achieve higher TAP_EIA scores.

8.1. Interpretation of Key Findings

This correlation supports the hypothesis that sustainability features contribute to increased asset values and market resilience. Moreover, the importance of location and accessibility is evident, with properties situated near public transport and prime areas outperforming others, emphasizing the continued value of strategic siting in real estate investments [103].

8.2. Implications for Stakeholders

For investors and asset managers, the findings underscore the economic benefits of prioritizing ESG-certified investments [104]. Such properties not only command higher rents but also appeal to tenants seeking sustainable solutions, enhancing long-term value and reducing vacancy risks [105].

Developers should consider ESG frameworks as essential components of new projects to meet growing tenant demands and regulatory requirements. Property owners can enhance the value of existing properties through strategic retrofitting to obtain certifications, potentially increasing asset liquidity and marketability [106].

Policymakers and Regulators can leverage these insights to establish guidelines and incentives that promote sustainable building practices towards a long term sustainable economic development [107]. Enhanced ESG reporting and transparency requirements could drive the adoption of green certifications, aligning real estate sector goals with broader environmental objectives [108].

The deployment of innovative financial instruments, such as green bonds and sustainability-linked loans, serves as a powerful catalyst for ESG adoption in the real estate sector [109]. Historical insights illustrate how financial products tailored sustainability criteria can offer more favorable terms while enhancing property valuations through explicit environmental commitments [110]. Therefore, strategic use of these instruments can transform investor perceptions, attract cross-border capital inflows, and reinforce market stability by contextualizing real estate within the global push toward sustainable development.

8.3. Comparison with Previous Studies

This study aligns with prior research demonstrating a premium on green-certified buildings but expands the discourse by incorporating a multi-criteria decision-making approach [111]. Previous studies have focused solely on certification impacts; this analysis holistically integrates ESG factors with geographical and managerial influences, offering a more comprehensive view.

8.4. Applicability to Other Markets

Our findings from Madrid's office market show notable similarities with studies conducted in other major European cities. For instance, research in France, Germany, Italy, Spain and the United Kingdom [112], has also demonstrated a premium for ESG-certified properties, though the magnitude varies slightly due to differences in market maturity and regulatory environments. Of course, different patterns emerge where sustainable buildings command higher rents and valuations based on different green certifications [113]. The consistent theme across these markets is that investors and tenants increasingly value sustainability features, though the premium varies based on local market conditions, regulatory requirements, and climate risk profiles.

The MCDM framework employed in this study can be adapted for different property types by adjusting the criteria and weights to reflect property-specific considerations [114]:

For example, for residential assets, criteria such as indoor environmental quality, water efficiency, and community sustainability features might receive greater emphasis. Noise insulation and thermal comfort could be additional important criteria.

For retail properties, customer experience-related sustainability features become more critical. This includes parking facilities, accessibility by public transport, and energy efficiency of common areas [115].

And for industrial properties: For industrial assets, criteria related to operational efficiency, logistics, sustainability, and regulatory compliance take precedence. Features like loading dock efficiency, warehouse layout for energy optimization, and proximity to sustainable transportation networks become relevant.

8.5. Limitations of the Study

This research primarily focuses on prime office locations within Madrid, potentially limiting the generalizability of its findings to other geographic or market contexts. Future studies could expand the scope to include more diverse building types and locations. Additionally, while ESG certifications are pivotal, other emerging sustainability metrics warrant further investigation to provide a more rounded understanding of their financial impacts. When applying our findings to markets with different regulatory environments or climate conditions, several considerations emerge:

Regulatory Differences: Markets with more advanced sustainability regulations (e.g., Netherlands with their Energy Performance Coefficient requirements) may already have higher baseline standards, potentially compressing the premium for additional certifications.

Climate Variability: Northern European cities with different climate challenges (e.g., Copenhagen's focus on sea-level rise) might prioritize different risk mitigation strategies compared to Madrid's heat and drought concerns.

Market Maturity: In markets where ESG adoption is still emerging, the premium for certified buildings might be less pronounced initially but could grow as market awareness increases.

8.6. Theoretical and Policy Implications

The findings of this study have significant implications for both theory and policy. Theoretically, the research advances academic knowledge by integrating ESG factors with real estate performance metrics, climate risk considerations, and location quality. It provides a detailed analysis of how these elements interact, offering a comprehensive framework for understanding the value-creation potential of sustainable practices in the real estate sector like incentivizing green retrofitting through tax breaks [116].

From a policy perspective, the results underscore the necessity of integrating ESG considerations into regulatory frameworks and best practices in property management [89]. Policymakers can leverage these insights to promote sustainable building practices and inform future regulations [117]. The study also highlights the importance of supporting innovative financial instruments, such as green bonds and sustainability-linked loans, which can catalyze ESG adoption in the real estate sector [118].

8.7. Acknowledgment of Limitations and Suggestions for Future Research

This research primarily focuses on prime office locations within Madrid, potentially limiting the generalizability of its findings to other geographic or market contexts. Future studies could expand the scope to include more diverse building types and locations.

Additionally, while ESG certifications are pivotal, other emerging sustainability metrics warrant further investigation to provide a more rounded understanding of their financial impacts [119].

Moreover, it's suggested extending the MCDM framework to include dynamic climate risk metrics (e.g., flood susceptibility, heatwave frequency) and other metrics and KPIs [120], through DEMATEL or AHP methods [121].

8.8. Recommendations for Climate Risk Mitigation

Implementing climate risk mitigation strategies, such as cool roofs, which are effective in reducing heat impact, is recommended [122]. The positive relationship between climate risk management and financial performance suggests that adopting these measures can significantly enhance corporate value [123]. Bridging the gap between theory and practical valuation of climate risks remains critical [124], with industry standards needing integration into routine real estate assessments [125].

Part of the most recent development on AI suggests incorporating technological advancements in the real estate sector, for instance, the integration of PropTech solutions providing a transformative approach to ESG data accuracy and decision-making efficiency [126]. Recent studies, such as those by Wang and Liu [127], have demonstrated how Internet of Things (IoT) applications enhance the energy efficiency of buildings, thus promoting sustainable practices [128]. By embedding smart building technologies, owners and managers can leverage real-time data analytics to optimize resource consumption, facilitate predictive maintenance, and enhance occupant comfort, significantly improving overall building performance [129].

By addressing these areas, stakeholders can better navigate the evolving landscape of real estate investment, ensuring assets are not only sustainable in performance but also resilient to future climate-related challenges.

9. Conclusions

This study has rigorously analyzed the influence of ESG certifications on the performance of Class A office buildings within Madrid's CBD [73]. The findings contribute to the growing body of knowledge that affirms the positive correlation between ESG certification and enhanced property performance [130]. Notably, office properties with advanced ESG certifications, such as LEED Platinum and BREEAM Exceptional, demonstrate superior Total Asset Performance (TAP_EIA) scores [130], reinforcing the proposition that sustainability attributes contribute to increased asset value and market resilience.

Furthermore, the research corroborates the significance of location and accessibility as key determinants of property value. The results indicate that properties with favorable positioning, such as proximity to public transportation hubs and location within prime urban areas, exhibit higher performance metrics. This aligns with established real estate principles that underscore the enduring importance of strategic location in investment performance [131].

The implications of these findings are salient for a range of stakeholders. For investors and asset managers, this study provides empirical evidence supporting the prioritization of ESG-certified assets, which not only command higher rental rates but also demonstrate enhanced appeal to tenants seeking sustainable spaces, thereby mitigating vacancy risks and enhancing long-term value [132]. Developers are encouraged to integrate ESG frameworks into new development projects to align with evolving tenant demands and regulatory standards [30]. Property owners are urged to consider strategic retrofitting initiatives to obtain ESG certifications, which can potentially elevate asset value and marketability [89].

From a policy perspective, the research offers insights for policymakers and regulatory bodies to develop guidelines and incentives that foster sustainable building practices and promote long-term sustainable economic development [133]. The adoption of enhanced ESG reporting and transparency mechanisms can further drive the uptake of green certifications within the real estate sector, aligning industry practices with broader environmental objectives [134].

Moreover, the strategic deployment of financial instruments, including green bonds and sustainability-linked loans, can serve as a catalyst for ESG integration by offering favorable financial terms and enhancing property valuations through explicit environmental commitments, thereby attracting investment and reinforcing market stability within the context of a global transition towards sustainable development [53].

In conclusion, this research shows that ESG factors are not just about following rules but are key to creating value in today's real estate market. The results strongly support using sustainable practices to stay competitive and ensure properties perform well over time, especially as more people focus on ESG issues [4]. Climate risk assessments are getting more specific for each property, suggesting a move towards evaluating climate risks locally in real estate markets. This means that real estate, insurance, and banking sectors need to work together to create a clear framework for assessing climate risks that everyone can use and understand. The findings from this study provide important information to help assess overall financial stability and support the shift towards stronger, more sustainable property markets.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/standards5020014/s1>, Table S1. Details of the calculation of T_EIA assigned values.

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