

ESG Transformation in the Real Estate Industry and Urban Environmental Sustainability: Strategic Re-engineering from Green Buildings to Social Co-benefits

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ABSTRACT

Against the backdrop of global climate change response and the advancement of urban sustainable development, the real estate sector, as a key high-energy-consumption and high-emission industry, has a profound impact on urban system resilience, resource efficiency, and social equity through its environmental, social, and governance (ESG) transformation. From a policy-driven transformation perspective, this paper selects typical real estate enterprises from China, Japan, and Singapore (Vanke, Mitsubishi Estate, and CapitalLand) for comparative case studies and mechanism analysis. It explores how these companies translate corporate ESG practices—through green building, carbon emission reduction, community engagement, and governance structure innovation—into improved environmental performance and social well-being at the urban level. The study finds that although the implementation pathways differ among the three companies, they all reflect a transmission logic of "environmental intervention as the starting point, social benefits as spillovers, and governance systems as support," and demonstrate synergistic effects of "technology – governance – finance" under policy guidance. This research deepens the understanding of the mechanisms behind real estate ESG transformation from an urban sustainability perspective and provides cross-scale references for related policy design and corporate practice.

KEYWORDS

ESG transformation; Real estate; Urban sustainability; Carbon emission reduction; Resource efficiency; Social resilience

1 Introduction

Since the 20th century, sustainable development has become a globally significant issue. With the progression of globalization and capital markets, an increasing number of enterprises have begun to examine the impact of their operations on the external environment and society from the perspective of Environmental, Social, and Governance (ESG). By publishing sustainability reports or ESG disclosures, they actively showcase their practices and performance in environmental protection, social responsibility, and corporate governance. This trend not only reflects the deepening of corporate social responsibility concepts but also signifies that "green, inclusive, and resilient" has become the main theme of global economic development. Meanwhile, ESG has gradually evolved into an important standard for measuring corporate sustainable competitiveness and is widely applied in international investment decisions, financial regulation, and public policy formulation. In this context, the real estate industry, as a major source of energy consumption and carbon emissions, holds pivotal significance in achieving global climate goals. Building activities account for approximately 40% of global energy-related carbon emissions. Therefore, promoting ESG transformation in the real estate industry is not only an embodiment of corporate social responsibility but also a critical pathway for implementing global sustainable development strategies.

With deepening urbanization, the role of real estate developers has gradually shifted from purely economic actors to important forces driving urban sustainable development and social well-being. Through practices such as green building, low-carbon design, and community co-construction, real estate enterprises not only improve the urban ecological environment but also exert profound influence on community resilience, public health, and social equity. Notably, unlike Western countries that rely on market mechanisms and investor pressure to drive ESG, East Asian countries (such as China, Japan, and Singapore) generally exhibit a policy-led ESG transformation model. Governments guide the sustainable practices of real estate enterprises through top-level designs such as green building standards, fiscal incentives, and carbon neutrality policies, aligning corporate ESG behaviors with national development goals. This characteristic of "government leadership – corporate response – society co-construction" forms an institutional pathway distinct from the Western market-oriented model, making East Asia an ideal research region for exploring policy-driven ESG governance models.

Based on the above, this paper focuses on the ESG transformation processes in the real estate industries of China, Japan, and Singapore. It aims to explore how real estate enterprises promote urban environmental performance improvement and the realization of social co-benefits through ESG strategies and practices—including green building,

green finance, and community co-construction. Through a comparative analysis of representative enterprises from the three countries (such as Vanke from China, Mitsubishi Estate from Japan, and CapitaLand from Singapore) and their relevant policy frameworks, this paper seeks to reveal how corporate behaviors drive sustainable governance at the urban level within the East Asian institutional context. This research not only expands the application of ESG theory in the field of urban sustainable development but also provides a new perspective for understanding the key role of the real estate industry in the processes of "carbon neutrality" and "sustainable urban transformation."

2 ESG Concept and Development Status

The concept of ESG (Environmental, Social, Governance) first emerged from the practice of Socially Responsible Investment (SRI) and was formally proposed by the United Nations Global Compact in 2004 as a new framework to promote corporate fulfillment of environmental and social responsibilities and enhance corporate governance. ESG encompasses three dimensions: environment, society, and corporate governance. Its core idea is to deeply integrate environmental responsibility, social responsibility, and governance norms into business operations, combining the concept of sustainable development with corporate value creation. Compared with traditional Corporate Social Responsibility (CSR), which focuses more on philanthropy and compliance, ESG emphasizes quantifying the performance of these three aspects into an investable indicator system, gradually evolving into an important standard for measuring long-term corporate value and sustainable development capabilities.

Over the past two decades, the ESG concept has developed rapidly and become institutionalized globally. The launch of the UN-supported Principles for Responsible Investment (PRI) in 2006 marked the entry of ESG investment into mainstream finance. By 2020, the global broad sustainable investment scale had grown to approximately US\$35 trillion, demonstrating that ESG has become a significant consideration in international capital markets. Regulatory agencies in various countries have also promoted the institutionalization of ESG: developed markets such as the United Kingdom have legislated to incorporate ESG requirements into pension investments, corporate information disclosure, and investor due diligence, accelerating the legalization of ESG. Since the Shenzhen and Shanghai Stock Exchanges issued guidelines on corporate responsibility and environmental information disclosure in 2006, China has recently introduced draft mandatory environmental information disclosure regulations, gradually establishing unified sustainable disclosure standards to align with international norms. Thus, the ESG framework is transitioning from voluntary initiatives to criteria that enterprises and investment institutions must follow, regarded as a key lever for achieving global sustainable development.

3 The Impact of ESG on Enterprises and Its Relationship with the Real Estate Industry

Extensive research indicates that ESG performance has a profound impact on corporate operations and financial performance. Strong ESG performance is often accompanied by superior financial performance and market value because sustainable development practices enhance corporate reputation and stakeholder trust. Moreover, improvements in ESG ratings can significantly reduce a company's cost of capital. Empirical studies have found that after implementing ESG ratings, a company's equity cost of capital noticeably decreases. The mechanism lies in that excellent ESG performance alleviates information asymmetry between investors and the company, reduces operational risks, and thus lowers the risk premium demanded by investors. Additionally, integrating ESG concepts into corporate strategy and governance structures helps optimize decision-making: management pays more attention to long-term sustainable development goals in strategic planning, strengthening the anticipation and management of environmental and social risks, thereby improving corporate governance effectiveness and risk resilience. Practical cases show that high-quality ESG information disclosure can also reduce agency costs, enhance human capital, alleviate financing pressures to some extent, improve corporate reputation and revenue, and ultimately have a positive impact on corporate value.

In the real estate industry, ESG holds particular significance. After China clearly proposed the "dual carbon" goals of peaking carbon emissions and achieving carbon neutrality in 2020, sustainable development has placed higher demands on real estate enterprises. As a pillar industry of the national economy, real estate is also characterized by high energy consumption, high emissions, and high risks. In recent years, it has faced financing difficulties and transformation pressures due to stringent regulations, compelling enterprises to seek a new balance between economic and social benefits. ESG provides a key lever for the green transformation of real estate enterprises: by implementing measures such as green building and energy conservation, real estate companies can not only reduce energy costs but also avoid risks such as fines or reputational damage from violating environmental regulations. By utilizing green financial instruments (such as issuing green bonds), real estate enterprises can broaden financing channels for sustainable development, lower financing costs, and promote the green transformation of the entire industry. In the context of the "dual carbon" strategy,

ESG performance has become the "second report card" for assessing the comprehensive value of real estate enterprises, and its role as a risk buffer under pressures like financing constraints and rising operational costs is increasingly prominent. Practical experience also confirms the multiple benefits that ESG brings to real estate enterprises: companies emphasizing ESG practices and information disclosure have improved in financing capability, risk management, and brand value. High-level ESG performance helps alleviate financing pressure, enhance corporate credit, improve corporate image and market competitiveness, thereby achieving higher corporate value. This trend provides useful references and support for subsequent case studies of the real estate industry in East Asian countries.

4 China: Vanke

Vanke's ESG trajectory over the past five years demonstrates a chain-like evolution of "normalization in engineering, energy conservation in operations, and institutionalization in governance." On the environmental (E) front, the company has upgraded green building from "demonstration projects" to default configurations: 100% of new projects in 2023 met national green building evaluation standards. That year, newly added area meeting green building standards reached 19,636,600 m², of which high-grade (including Two-Star, Three-Star, and LEED) area accounted for 10,546,100 m², with 42 new Three-Star projects added. This marks a shift from "pilot" to "scale" and "high standardization." In 2024, Vanke further conducted climate scenario and financial impact analyses following TCFD, elevating "project-level green building" to "group-level climate governance," achieving systematic optimization from design and construction to operation. On the social (S) front, in 2023, employee training coverage reached 100%, with average training hours per employee at 25.63 hours and 2,166 courses offered annually. Simultaneously, it established a spillover channel from projects to communities through "rural ecological revitalization–community co-construction–environmental protection and public health." On the governance (G) front, Vanke strengthened comparability and auditability through board structure, compliance, anti-fraud, and information security controls, coupled with TCFD disclosures, forming an institutional support of "measurable – verifiable" between engineering and disclosure.

Supporting external research shows: event studies centered on Vanke indicate that the cumulative abnormal return within 5 days after ESG disclosure was significantly positive, with the market releasing a positive signal upon disclosure, confirming the mechanism that "high-quality disclosure can be priced by the capital market." Furthermore, longitudinal studies on Vanke provide evidence that as ESG development and disclosure quality improved, the company's equity cost of capital showed an overall declining trend, demonstrating improvement in the "disclosure – trust – financing" chain, thereby providing more stable financial support for green construction and community investment. This aligns with domestic empirical conclusions that "ESG performance can reduce the equity cost of capital and enhance corporate value," further strengthening the transmission logic of "corporate ESG → urban benefits and social co-benefits." It also corroborates the view that improvements in ESG ratings can reduce the equity cost of capital and enhance long-term corporate value. This illustrates that under the framework of "E as the lever, S as the spillover, G as the guarantee," a real estate company's energy consumption reduction in engineering and co-benefits in communities can be translated into capital support through governance and disclosure mechanisms, thereby contributing measurably to urban energy efficiency and public benefits.

5 Japan: Mitsubishi Estate

Mitsubishi Estate's ESG evolution emphasizes "quantified emission reduction + multi-system certification + nature-related governance in parallel." On the E front, using 2019 as the baseline, it set 2030/2050 targets (approved by SBTi). In FY2023, Scope 1+2 absolute emissions were 312,198 tCO₂, a 34.5% reduction compared to 2019; total emissions including Scope 3 were approximately 2.52 million tCO₂, a 37.2% reduction compared to 2019. In green building, cumulative BELS certifications covered 10 buildings/195,000 m², and ABINC biodiversity certifications numbered 31 items. The S front emphasizes cross-city social mobilization and employee engagement: health check-ups and safety training coverage reached 100%, LTIFR≈1.85, employee engagement (Wevox) score was 73. In the core Otemachi–Marunouchi–Yurakucho area (120 hectares / 106 buildings / 4,300 institutions / 280,000 jobs), it promoted 100% coverage of accessibility and "support for stranded commuters," transforming project improvements into district accessibility and public benefits. The G front incorporates TCFD (climate) and TNFD (nature-related) into board and ERM, establishing a closed loop of "investment decision – risk identification – disclosure – assurance." Mechanistically, Mitsubishi Estate binds measurable E improvements (emission reduction/certification) with institutionalized G guarantees (TCFD/TNFD/ERM), enabling the stable, auditable spillover of S benefits—such as accessibility, public space, and employment support—to the urban level. This "quantification–certification–governance" path aligns with the argument proposed in this paper—"E as the lever, S as the spillover, G as the guarantee"—and also provides a replicable technology–governance–data framework for "asset–

portfolio–district"-level management oriented toward urban renewal and district regeneration.

6 Singapore: CapitaLand / CLI

CLI's core characteristic is governing ESG through portfolio-level governance. On the E front, the group's SMP2030 master plan manages carbon, energy, water, and green building coverage with portfolio-level KPIs, showing continuous intensity declines from 2019 – 2023. Science-based targets align with SBTi (2030), and emission reduction is pursued through renewable electricity procurement and on-site renewables. In 2023, portfolio green building certification coverage reached about 60% (Green Mark/LEED/BREEAM, etc.), reflecting a dual-driver approach of "existing upgrades + new high standards." The S front achieves cross-city volunteering and community linkage (e.g., #GivingAsOne), with 1,300+ employee participants and 7,300+ beneficiaries (2023). It also standardizes operations in tenant and community health, safety, contractor management, and emergency response. The G front integrates SMP2030 as a "battle map" into the regular assessment of the board/committees and has aligned with TCFD. Starting FY2025, disclosures follow SGX/ISSB (IFRS S1/S2) standards, significantly enhancing comparability and auditability. These practices are further coupled with CLI's platform-based asset management mechanism of "REITs + Private Equity (PE Funds)," connecting group KPIs with fund/investment committee gateways to form a consistent channel of "governance – investment – operation". External research and market data indicate that CapitaLand achieves cross-market replication and scaled implementation through "securitization/fundization + governance KPIs": platform-based asset management, on one hand, brings risk diversification and stable cash flow; on the other hand, amplifies the execution capability of ESG goals across multiple regions and business types. Leveraging this, corporate-level energy efficiency, health & safety, and green building coverage are continuously translated into intensity reductions and public benefit improvements at the urban level—consistent with this paper's proposition of "corporate ESG → urban emission reduction and social co-benefits."

7 Case Differences and Commonalities

Longitudinally comparing the three companies, Vanke, Mitsubishi Estate, and CapitaLand have formed differentiated yet mutually corroborating ESG evolution paths along the same main line of "policy guidance–corporate response–urban co-benefits." Vanke started with engineering normalization, stringing together "100% of new projects meeting green building standards, continuous increase in Three-Star projects, elevating TCFD scenario analysis to group governance" into an "engineering–disclosure–governance" closed loop. External evidence shows its ESG disclosures received positive market reactions, and the equity cost of capital decreased with improvements in disclosure and practice, indicating that engineering improvements can be translated into capital support through transparent disclosure, thereby strengthening the sustainability of urban energy efficiency and public benefit improvements. In contrast, Mitsubishi Estate emphasizes institutionalization and quantification: using a baseline – target – certification (BELS/ABINC) – governance (TCFD/TNFD×ERM) closed loop to "harden" E-end emission reduction and nature-related performance, and spilling S-end benefits to district-level accessibility and inclusivity through accessibility and public space improvements (the mechanism chain is consistently presented in company annual reports/websites and this study's data). CapitaLand Group excels in portfolio-level governance + capital platforms: connecting board/investment committee KPIs with asset-end energy efficiency, green building, and tenant health & safety standardization through "REITs+PE Funds," achieving replication and scaled implementation of ESG across multiple regions and business types. Its platform-based asset management diversifies risks and stabilizes cash flow while amplifying the spillover of E/S goals to urban-level intensity reduction and social co-benefits.

Overall, their commonalities lie in using E as the lever (emission reduction/green building/energy efficiency), S as the spillover (employee and community resilience), and G as the guarantee (governance integrated into KPIs, auditable disclosure), stably translating corporate actions into urban environmental performance and social co-benefits. The differences are that the Chinese case emphasizes rapid translation via "engineering – disclosure – capital pricing," the Japanese case highlights the institutional depth of "climate × nature" integrated governance, and the Singaporean case uses capital platforms for cross-regional replication and scaling. This suggests that in policy-led markets, the optimal path is not a single technical choice but a technology–governance–finance synergistically driven systematic solution.

8 Conclusion

In summary, against the backdrop of East Asian policy-led contexts and centered on the analytical thread of "E as the lever, S as the spillover, G as the guarantee," this paper elucidates how the ESG transformation of real estate enterprises extends from the corporate level to urban-level environmental performance and social co-benefits. The E front reduces

energy and emission intensity to measurable, auditable levels through green building and emission reduction. The S front transforms employee and community resilience building into improvements in public health, accessibility, and equity. The G front institutionalizes these improvements into sustainable organizational capabilities and capital-market-recognizable signals through board governance, risk management, and disclosure systems. Vanke's "engineering–disclosure–pricing" closed loop, Mitsubishi Estate's "quantification – certification – nature-related governance" path, and CapitaLand's "portfolio-level governance + capital platform replication" collectively demonstrate that, under policy guidance, the synergy of technology, governance, and finance is the key mechanism for the real estate industry to achieve urban emission reduction and social co-benefits. The article moves from the macro international/regional institutional context to the quantifiable linkage between corporate practice and urban outcomes, maintaining coherence and focusing on the core proposition of "ESG transformation in the real estate industry and urban environmental sustainability." Future research could expand validation over longer time series and finer asset categories and incorporate indicators such as TNFD, biodiversity, and climate adaptation to further delineate the transmission effects and structural differences among the "enterprise–asset–city" three-tier levels.

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