

Research Article

Mandating Materiality: A Policy Framework for Mandatory Climate Risk Disclosure in Commercial Property Acquisitions and Valuation

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Abstract

The commercial real estate sector faces a critical information gap, as climate-related risks remain inadequately disclosed and inconsistently priced in property acquisitions and valuations. This information asymmetry creates significant market inefficiencies, mispricing of climate-exposed assets, and potential systemic financial risks. This conceptual paper addresses this gap by developing a comprehensive policy framework for mandatory climate risk disclosure in commercial property acquisitions and valuation. The study employs a conceptual research methodology based on systematic literature review and theoretical synthesis across real estate economics, climate finance, and regulatory policy. The analysis reveals that emerging regulatory frameworks, including the International Sustainability Standards Board (ISSB) standards and Task Force on Climate-related Financial Disclosures (TCFD) recommendations, provide foundational elements for mandatory disclosure, yet significant gaps remain in property-level application and acquisition due diligence. The conceptual framework identifies four core pillars of mandatory disclosure: governance oversight, risk identification and assessment, materiality determination, and valuation integration. The study concludes that mandatory climate risk disclosure in commercial property transactions can enhance market efficiency, protect asset values, and support the transition to a climate-resilient built environment. This paper contributes to emerging

scholarship on climate finance and real estate regulation by providing theoretical foundations for policy development and practical guidance for market participants navigating evolving disclosure requirements.

Keywords: Climate risk disclosure; Commercial real estate; Property valuation; Mandatory reporting; TCFD; ISSB; Materiality; Due diligence; Financial stability; Regulatory policy

Introduction

The commercial real estate sector confronts an unprecedented imperative to disclose and price climate-related risks, yet current practices remain fragmented, inconsistent, and inadequate for informed investment decision-making (Vanhuyse et al., 2023). Climate change poses both physical risks to property assets and transition risks as regulatory frameworks evolve, creating material financial implications for commercial property owners, investors, lenders, and occupiers (Addoum et al., 2024). The built environment contributes approximately 40% of global carbon emissions, making the sector central to climate mitigation efforts while simultaneously facing escalating climate vulnerability (Coulson et al., 2024). Despite growing recognition of climate risks, commercial property markets suffer from significant information asymmetries, as climate risk exposure remains poorly disclosed, inconsistently assessed, and inadequately incorporated into property valuations (Warren-Myers & Hurlimann, 2022). This information gap creates market inefficiencies, mispricing of climate-exposed assets, and potential systemic financial risks (Clayton et al., 2021).

The emergence of mandatory climate risk disclosure frameworks represents a critical development in addressing market failures and enhancing financial stability (IFRS Foundation, 2023). The Task Force on Climate-related Financial Disclosures (TCFD) established foundational recommendations for climate disclosure, which have now been consolidated into the International Sustainability Standards Board (ISSB) standards (TCFD, 2017). These frameworks require organizations to disclose governance, strategy, risk management, and metrics related to climate risks and opportunities (IFRS Foundation, 2023). Australia has implemented mandatory climate-related financial disclosures through the Treasury Laws Amendment Bill, requiring large and medium-sized companies to report on climate-related risks, opportunities, and greenhouse gas emissions (CBRE, 2025). These legislative developments reflect a global trend toward mandatory climate disclosure, yet significant gaps remain in property-level application and acquisition due diligence (Savills, 2025).

The International Valuation Standards (IVS) 2025 have reinforced the imperative for climate risk integration, requiring ESG factors to be identified, analyzed, and explicitly disclosed in valuation reports (Preston Rowe Paterson, 2026). This regulatory evolution means that valuation is no longer simply about what an asset is worth today, but increasingly about how resilient that value is in a transitioning world (Preston Rowe Paterson, 2026). Property fund managers now face growing requirements for asset-level ESG data, retrofit strategies, and scenario modeling capability, with ESG performance directly influencing valuation outcomes,

investor perception, and capital flows (Preston Rowe Paterson, 2026). However, the practical implementation of mandatory climate risk disclosure in commercial property acquisitions and valuation remains challenging, with data availability, methodological consistency, and professional capacity representing significant barriers (Vanhuyse et al., 2023).

This conceptual paper addresses these challenges by developing a comprehensive policy framework for mandatory climate risk disclosure in commercial property acquisitions and valuation (Warren-Myers & Hurlimann, 2022). The framework integrates insights from real estate economics, climate finance, regulatory policy, and professional practice to identify the key elements of effective mandatory disclosure (Coulson et al., 2024). The analysis examines both the theoretical foundations for mandatory disclosure and the practical implementation requirements for market participants (Bienert, 2016). The study contributes to emerging scholarship on climate finance and real estate regulation by providing theoretical foundations for policy development and practical guidance for market participants navigating evolving disclosure requirements (Akhtyrskaya & Fuerst, 2024). Ultimately, mandatory climate risk disclosure in commercial property transactions is essential for enhancing market efficiency, protecting asset values, and supporting the transition to a climate-resilient built environment (Boland et al., 2022).

Literature Review

1. Climate Risk and Commercial Property Valuation

The relationship between climate risk and commercial property valuation has attracted substantial academic attention, with researchers documenting the multifaceted impacts of climate hazards on property values (Addoum et al., 2024). Physical climate risks directly threaten commercial properties through structural damage, operational disruption, and tenant displacement, creating significant financial exposure for owners and investors (Dong, 2024). Empirical studies demonstrate that commercial properties in flood-prone areas trade at significant discounts, with price effects varying based on risk severity, market conditions, and property characteristics (Coulson et al., 2024). Evidence from Hurricane Sandy indicates that climate events produce lasting effects on commercial real estate valuations, with affected properties experiencing significant and persistent price adjustments following disaster events (Addoum et al., 2024). Similar effects have been documented for properties exposed to sea-level rise, extreme heat, and wildfire risk, suggesting that climate risks are increasingly capitalized into commercial property values (Huang et al., 2025).

However, the capitalization of climate risks into property values remains inconsistent and incomplete, reflecting information asymmetries and methodological challenges (Clayton et al., 2021). Research suggests that market participants often have imperfect information about climate risk exposure, with risk perception frequently lagging behind actual vulnerability (Sirmans et al., 2025). The pricing of climate risks in commercial real estate is further complicated by the temporal dynamics of climate impacts, with risks materializing over extended time horizons that challenge traditional valuation approaches (Giglio et al., 2021). The lack of standardized methodologies for incorporating climate risks into property valuations has been identified as a significant barrier to effective risk pricing and investment decision-

making (Vanhuyse et al., 2023). These gaps underscore the need for mandatory disclosure frameworks that can enhance market transparency and enable more efficient pricing of climate risks (Warren-Myers & Hurlimann, 2022).

2. Regulatory Frameworks for Climate Disclosure

The evolution of regulatory frameworks for climate disclosure represents a critical development in addressing market failures and enhancing financial stability (IFRS Foundation, 2023). The Task Force on Climate-related Financial Disclosures (TCFD) established foundational recommendations for climate disclosure across four pillars: governance, strategy, risk management, and metrics and targets (TCFD, 2017). These recommendations require organizations to describe board oversight of climate-related risks, management's role in assessing and managing risks, the impact of climate risks on business strategy and financial planning, processes for identifying and managing climate risks, and metrics used to assess climate-related risks and opportunities (TCFD, 2017). The TCFD framework has been widely adopted and provides the basis for emerging mandatory disclosure requirements globally (IFRS Foundation, 2023).

The International Sustainability Standards Board (ISSB) has consolidated and enhanced the TCFD framework through IFRS S1 and IFRS S2, establishing global baseline standards for sustainability and climate-related financial disclosures (IFRS Foundation, 2023). IFRS S2 specifically addresses climate-related disclosures, requiring entities to disclose information about climate-related risks and opportunities that could reasonably be expected to affect the entity's cash flows, access to finance, or cost of capital over the short, medium, or long term (IFRS Foundation, 2023). The ISSB standards include industry-specific guidance for the real estate sector, identifying sustainability factors that are material to short, medium, and long-term enterprise value (IFRS Foundation, 2023). These developments reflect a global trend toward mandatory climate disclosure, with jurisdictions including Australia, the European Union, and the United Kingdom implementing legislative requirements (CBRE, 2025).

However, significant gaps remain in the application of mandatory disclosure to commercial property acquisitions and valuation (Savills, 2025). While corporate-level disclosure provides important information for investors, property-level disclosure is essential for asset-specific risk assessment and acquisition due diligence (Preston Rowe Paterson, 2026). The International Valuation Standards (IVS) 2025 require ESG factors to be identified, analyzed, and explicitly disclosed in valuation reports, yet professional practice in this area remains inconsistent (Preston Rowe Paterson, 2026). The integration of climate risk into property valuation requires asset-level data, scenario analysis capability, and methodological consistency that is often lacking in current practice (Vanhuyse et al., 2023). These gaps highlight the need for policy frameworks that explicitly address property-level disclosure in commercial property acquisitions and valuation (Warren-Myers & Hurlimann, 2022).

3. Materiality and Financial Risk Assessment

The concept of materiality is central to effective climate risk disclosure, as not all climate-related risks are of equal financial significance (PIRC, 2025). Material climate-related risks are

those that could reasonably be expected to affect an entity's cash flows, access to finance, or cost of capital over the short, medium, or long term (IFRS Foundation, 2023). In the real estate sector, material climate risks include physical risks such as flooding, sea-level rise, extreme temperatures, and wildfires, as well as transition risks including policy changes, technological disruption, and shifting market demand (TCFD, 2017). The assessment of materiality requires scenario analysis that considers different climate futures and their potential impact on property values and investment returns (Giglio et al., 2021).

The assessment of climate-related financial risk in commercial property requires sophisticated modeling approaches that integrate physical climate data, property vulnerability assessment, and financial valuation (MSCI, 2023). Real estate investors are increasingly using climate risk analytics platforms that evaluate the impact of multiple hazards on assets, including extreme temperatures, drought, coastal flooding, fluvial flooding, water stress, tropical cyclones, and wildfires (MSCI, 2023). These platforms quantify physical risks in financial terms, calculating average annual loss as a percentage of asset value across different greenhouse gas concentration scenarios and time horizons (MSCI, 2023). The integration of climate risk analytics into property acquisition due diligence and valuation represents an emerging best practice that can support informed investment decision-making (S&P Global, 2022).

However, significant challenges remain in the practical application of materiality assessment and financial risk quantification (Vanhuyse et al., 2023). Data availability and reliability represent key barriers, as comprehensive property-level climate risk data is often lacking or of inconsistent quality (Hirsch et al., 2015). Methodological complexity and computational resource requirements create additional barriers, particularly for smaller market participants (Bienert, 2016). The translation of climate risk analytics into property valuations and investment decisions requires professional judgment and expertise that is often in short supply (Preston Rowe Paterson, 2026). These challenges underscore the need for policy frameworks that support capacity building, methodological development, and professional education in climate risk assessment and disclosure (Warren-Myers & Hurlimann, 2022).

4. Disclosure Implementation and Professional Practice

The implementation of mandatory climate risk disclosure in commercial property acquisitions and valuation requires significant changes in professional practice and organizational capacity (Savills, 2025). Property owners, investors, and lenders must develop governance structures that enable effective climate risk oversight, including board-level accountability and management-level responsibility (TCFD, 2017). Risk management processes must be adapted to identify, assess, and manage climate-related risks, with integration into overall enterprise risk management (IFRS Foundation, 2023). Data collection and reporting systems must be established to capture and report climate-related metrics, including greenhouse gas emissions, energy consumption, and water use (GRESB, 2023).

Valuation professionals face particular challenges in incorporating climate risks into property valuations (Preston Rowe Paterson, 2026). The International Valuation Standards (IVS) 2025 require valuers to identify, analyze, and explicitly disclose ESG factors in valuation reports, including climate-related risks and opportunities (Preston Rowe Paterson, 2026). This requires valuers to understand climate scenarios, engage with client ESG data, and articulate the

implications of climate risks for property values (Preston Rowe Paterson, 2026). The integration of climate risk into valuation requires collaboration between valuers, clients, and other professionals, with careful discussion of assumptions and methodologies (Preston Rowe Paterson, 2026). However, consistency in valuation practice remains a challenge, with significant variation in how climate risks are assessed and incorporated into property valuations (Vanhuyse et al., 2023).

Professional education and capacity building are essential for effective implementation of mandatory climate risk disclosure (Bienert, 2016). Valuation professionals, property managers, and investment analysts require training in climate risk assessment, scenario analysis, and sustainability metrics (Hirsch et al., 2015). Industry bodies and professional associations have a critical role in developing guidance, standards, and best practices for climate risk disclosure in commercial property transactions (Warren-Myers & Hurlimann, 2022). The development of continuing professional development programs and specialized certifications can support the development of climate risk expertise across the real estate profession (Bienert, 2016). These capacity-building efforts are essential for ensuring that mandatory disclosure requirements achieve their intended objectives of enhancing market transparency and enabling informed investment decision-making (Akhtyrskaya & Fuerst, 2024).

Methodology

This study adopts a conceptual research methodology based on comprehensive review and theoretical synthesis of literature across multiple disciplines (Leavy, 2022). The conceptual research design enables the systematic integration of diverse literature streams to generate new theoretical insights and practical frameworks, which is particularly appropriate for emerging topics requiring theoretical elaboration before empirical investigation can proceed (Salter, 2023). This study employs a comprehensive review of existing theoretical and empirical literature, drawing from real estate economics, climate finance, regulatory policy, and professional practice (Addoum et al., 2024; Coulson et al., 2024; Warren-Myers & Hurlimann, 2022). The conceptual framework is developed through iterative synthesis of key concepts, mechanisms, and relationships identified in the literature, with particular attention to regulatory requirements and professional practice standards (Hunziker & Blankenagel, 2024). Secondary data from published research, policy documents, and industry reports inform the conceptual development process (Barkham et al., 2022). The resulting framework identifies four core pillars of mandatory disclosure and proposes practical implementation mechanisms for market participants, providing a foundation for subsequent empirical validation and practical application (Takona, 2024). This methodology aligns with established practices in conceptual research, where the goal is theory building rather than empirical testing (Leavy, 2022; Salter, 2023).

Results and Discussion

1. Conceptual Framework: Four Pillars of Mandatory Disclosure

The conceptual analysis reveals four core pillars essential for effective mandatory climate risk disclosure in commercial property acquisitions and valuation. Governance oversight constitutes the first pillar, requiring clear accountability structures for climate risk management at board and management levels. The TCFD framework establishes that organizations should describe the board's oversight of climate-related risks and opportunities, including processes and frequency by which the board and board committees are informed about climate-related issues, how climate-related issues are considered in strategy development and major decisions, and how progress against goals and targets is monitored and overseen (TCFD, 2017). In the commercial property context, governance oversight requires that climate risk considerations be integrated into investment committees, asset management functions, and acquisition approval processes, with regular reporting to senior leadership and board-level accountability for climate risk management (China Merchants Commercial REIT, 2024).

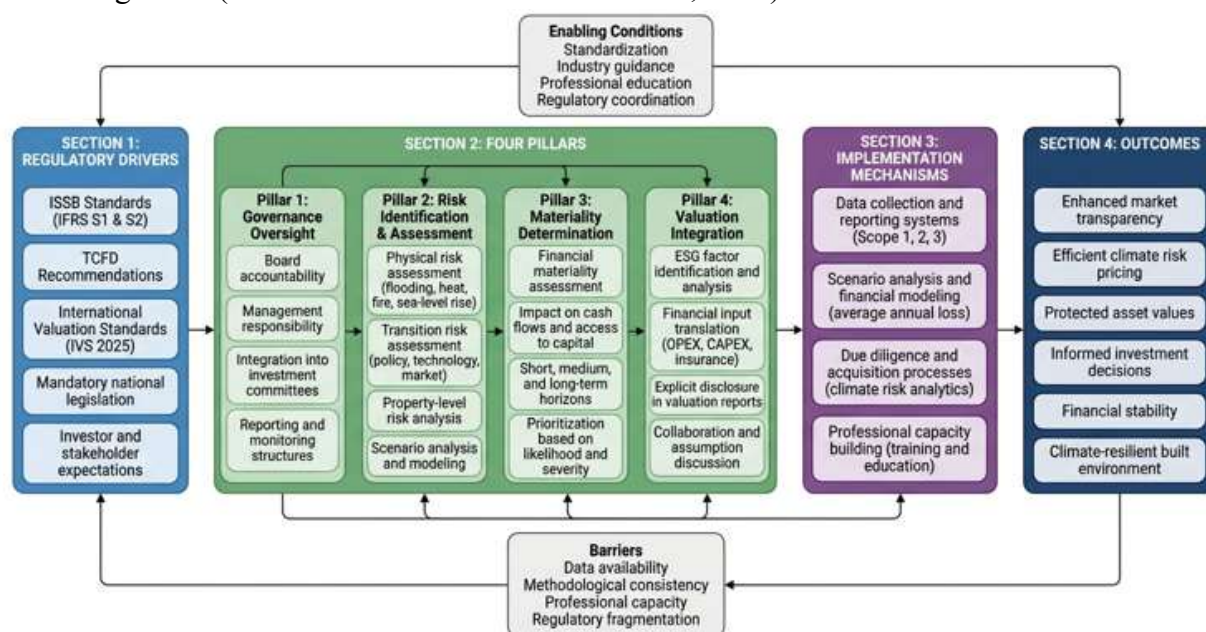


Figure 1: Conceptual Framework for Mandatory Climate Risk Disclosure in Commercial Property Acquisitions and Valuation

Risk identification and assessment constitute the second pillar, requiring systematic processes for identifying and assessing climate-related risks and opportunities. Organizations should describe their processes for identifying and assessing climate-related risks, including whether they consider existing and emerging regulatory requirements, the processes for assessing the potential size and scope of identified risks, and definitions of risk terminology used (TCFD, 2017). For commercial property acquisitions, risk identification and assessment requires property-level analysis of physical climate hazards, including flooding, sea-level rise, extreme temperatures, and wildfires, as well as transition risks including policy changes and market shifts (S&P Global, 2022). Materiality determination constitutes the third pillar, requiring the identification and prioritization of climate-related risks that could have a material financial impact on the organization. Materiality determination requires scenario analysis that considers different climate futures and their potential impact on property values and investment returns (IFRS Foundation, 2023). For commercial property, materiality assessment must consider both physical and transition risks across different time horizons and climate scenarios, with

prioritization based on likelihood and potential severity of impacts (CapitaLand China Trust, 2025).

Valuation integration constitutes the fourth pillar, requiring the explicit incorporation of climate risks and opportunities into property valuations. The International Valuation Standards (IVS) 2025 require ESG factors to be identified, analyzed, and explicitly disclosed in valuation reports, with valuers expected to understand climate scenarios and engage with client ESG data (Preston Rowe Paterson, 2026). Valuation integration requires that climate risks be translated into financial inputs, including operating costs, capital expenditure requirements, insurance premiums, and discount rates, with explicit disclosure of assumptions and methodologies (Vanhuyse et al., 2023). The integration of climate risk into valuation represents a fundamental shift in professional practice, requiring collaboration between valuers, clients, and other professionals, with careful discussion of assumptions and methodologies (Preston Rowe Paterson, 2026).

2. Implementation Mechanisms and Practical Requirements

The conceptual analysis identifies several implementation mechanisms essential for effective mandatory climate risk disclosure in commercial property acquisitions and valuation. Data collection and reporting systems constitute the first implementation mechanism, requiring organizations to capture and report climate-related metrics at both corporate and property levels. Mandatory disclosure requirements typically require the collection and reporting of Scope 1, Scope 2, and Scope 3 greenhouse gas emissions, with disclosed sustainability data subject to assurance requirements (CBRE, 2025). For commercial property, data collection must include asset-level energy consumption, water use, and waste management, as well as property-level climate risk exposure data (GRESB, 2023). The accuracy, consistency, and traceability of data are essential for regulatory compliance and effective risk management, with links to source data for auditors enabling efficient reporting and scaling with increasing assurance requirements (CBRE, 2025).

Scenario analysis and financial modeling constitute the second implementation mechanism, requiring organizations to assess the resilience of their strategies across different climate futures. Organizations should describe how resilient their strategies are to climate-related risks and opportunities, taking into consideration a transition to a lower-carbon economy consistent with a 2°C or lower scenario and, where relevant, scenarios consistent with increased physical climate-related risks (TCFD, 2017). For commercial property, scenario analysis requires modeling of property performance across different climate futures, including varying greenhouse gas concentration scenarios and time horizons (S&P Global, 2022). The quantification of financial risk requires modeling average annual loss as a percentage of asset value, with disaggregation by hazard type and expense category, and integration into financial models for property ownership and operation (S&P Global, 2022).

Due diligence and acquisition processes constitute the third implementation mechanism, requiring the integration of climate risk assessment into property acquisition workflows. Real estate investors are increasingly using climate risk analytics platforms to evaluate the impact of climate hazards on potential acquisitions, with assessment of physical risks across the portfolio supporting due diligence, strategic decision-making, and comprehensive understanding of

climate-related investment risk (S&P Global, 2022). The integration of climate risk assessment into due diligence requires that property-level climate risk data be collected and analyzed as part of the acquisition process, with findings incorporated into investment recommendations and approval decisions (China Merchants Commercial REIT, 2024). The due diligence process should also consider transition risks including policy changes, technological disruption, and shifting market demand, with assessment of regulatory compliance requirements and emerging sustainability standards (Savills, 2025).

3. Barriers and Enabling Conditions

The conceptual analysis identifies significant barriers to effective implementation of mandatory climate risk disclosure in commercial property acquisitions and valuation. Data availability and reliability constitute the primary barrier, as comprehensive property-level climate risk data is often lacking or of inconsistent quality, with significant variation in data availability across property types, geographic markets, and regulatory jurisdictions (Vanhuyse et al., 2023). Methodological consistency represents a second barrier, as different approaches to climate risk assessment and valuation can produce significantly different results, creating challenges for comparability and informed decision-making (Preston Rowe Paterson, 2026). Professional capacity constitutes a third barrier, as the integration of climate risk into property valuation requires specialized expertise that is often in short supply, with need for training and professional development across the real estate profession (Bienert, 2016). Regulatory fragmentation constitutes a fourth barrier, as inconsistent disclosure requirements across jurisdictions create complexity and compliance burden for multinational organizations (Akhtyrskaya & Fuerst, 2024).

Enabling conditions for effective mandatory disclosure include standardization of climate risk metrics and methodologies, development of industry guidance and best practices, professional education and capacity building, and regulatory coordination and harmonization. Standardization can enhance the comparability and reliability of climate risk disclosures, enabling more efficient market pricing of climate risks (IFRS Foundation, 2023). Industry guidance and best practices can support consistent application of disclosure requirements and integration of climate risk into professional practice (GRESB, 2023). Professional education and capacity building can address skill gaps and enhance the quality of climate risk assessment and valuation (Bienert, 2016). Regulatory coordination and harmonization can reduce compliance burden and enhance the effectiveness of disclosure frameworks (Akhtyrskaya & Fuerst, 2024).

4. Implications for Market Participants

The conceptual framework has significant implications for various market participants in commercial real estate transactions. For property owners and investors, mandatory climate risk disclosure requires development of governance structures, risk management processes, and data collection systems that enable effective climate risk oversight and reporting (China Merchants Commercial REIT, 2024). Property owners and investors must integrate climate risk considerations into acquisition due diligence, asset management, and portfolio strategy, with

explicit consideration of both physical and transition risks (Savills, 2025). The financial implications of climate risk disclosure include potential impacts on property values, insurance costs, financing terms, and investment returns, requiring proactive management of climate-related risks and opportunities (Boland et al., 2022).

For lenders and financial institutions, mandatory climate risk disclosure requires integration of climate risk assessment into lending and investment decisions, with consideration of both physical and transition risks in credit assessment and loan pricing (Cvijanovic & Van de Minne, 2023). Banks increasingly require sustainability-linked data before financing, with lower-performing buildings facing higher rates or denial of funding altogether (Savills, 2025). The assessment of climate risk in lending requires access to property-level climate risk data and scenario analysis capability, with implications for portfolio risk management and regulatory compliance (Bauer & Rudebusch, 2023). For valuers and valuation professionals, mandatory disclosure requires the integration of climate risk into property valuations, with ESG factors identified, analyzed, and explicitly disclosed in valuation reports (Preston Rowe Paterson, 2026). Valuers must understand climate scenarios, engage with client ESG data, and articulate the implications of climate risks for property values, with careful discussion of assumptions and methodologies (Preston Rowe Paterson, 2026). The integration of climate risk into valuation represents a fundamental shift in professional practice, requiring capacity building and methodological development (Vanhuyse et al., 2023).

Conclusion

This conceptual paper has developed a comprehensive policy framework for mandatory climate risk disclosure in commercial property acquisitions and valuation, addressing a critical gap in theory and practice. The analysis reveals that emerging regulatory frameworks, including the ISSB standards and TCFD recommendations, provide foundational elements for mandatory disclosure, yet significant gaps remain in property-level application and acquisition due diligence. The conceptual framework identifies four core pillars of mandatory disclosure: governance oversight, risk identification and assessment, materiality determination, and valuation integration. Implementation mechanisms including data collection and reporting systems, scenario analysis and financial modeling, and due diligence and acquisition processes are essential for effective disclosure. Significant barriers including data availability, methodological consistency, professional capacity, and regulatory fragmentation must be addressed through enabling conditions including standardization, industry guidance, professional education, and regulatory coordination. The framework has significant implications for property owners, investors, lenders, and valuation professionals, requiring fundamental changes in governance, risk management, and professional practice. This paper contributes to emerging scholarship on climate finance and real estate regulation by providing theoretical foundations for policy development and practical guidance for market participants navigating evolving disclosure requirements. Ultimately, mandatory climate risk disclosure in commercial property transactions is essential for enhancing market efficiency, protecting asset values, and supporting the transition to a climate-resilient built environment.

Recommendations

Based on the conceptual analysis, several recommendations emerge for advancing mandatory climate risk disclosure in commercial property acquisitions and valuation. First, policymakers should mandate climate risk disclosure for commercial property transactions, requiring property-level assessment and reporting of physical and transition risks as part of acquisition due diligence and valuation. Second, regulators should develop standardized methodologies for climate risk assessment and valuation, with explicit guidance for property-level application and scenario analysis IFRS Foundation, 2023. Third, industry bodies should develop best practice guidance and professional standards for integrating climate risk into property valuation, with continuing professional development programs to build capacity GRESB, 2023. Fourth, professional associations should mandate climate risk training for valuation professionals, with specialized certifications and qualifications in climate risk assessment and disclosure Fifth, data providers should develop comprehensive property-level climate risk data platforms, with standardized metrics and transparent methodologies Sixth, financial regulators should incorporate climate risk disclosure into supervisory frameworks, with integration into prudential regulation and financial stability monitoring. Seventh, international organizations should develop guidance and best practices for mandatory climate risk disclosure, promoting knowledge exchange and regulatory coordination across jurisdictions Finally, researchers should conduct empirical studies validating the conceptual framework across different property types, geographic markets, and regulatory contexts, strengthening the evidence base for policy development.

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Competing interests

The author(s) declare no competing interests.

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