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From Engineering to Economics: A Theoretical Framework for Structural Quality in Property Valuation

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Abstract
The question of whether structural engineering quality matters to property value has been settled in the affirmative by a broad body of interdisciplinary evidence. The more pressing challenge—and the focus of this review—is how to ensure that this relationship is properly and systematically accounted for in valuation theory and practice. Structural engineering quality encompasses design, materials, construction methods, and load performance; it is a fundamental determinant of building safety, durability, functionality, and adaptability, all of which bear directly on economic value. Yet contemporary valuation practice routinely subsumes structural considerations within broad categorical assessments such as "construction quality" or "building condition," obscuring their specific contributions and generating potential market inefficiencies. Drawing on scholarship from real estate valuation, structural engineering, construction economics, and investment analysis across multiple international markets, this review examines the principal valuation methodologies—the comparison, income, and cost approaches, as well as emerging hedonic, machine learning, and multi-criteria decision analysis methods—and evaluates the degree to which each captures structural quality. The paper analyses the value-creation mechanisms of key structural systems, including foundations, lateral force-resisting systems, floor systems, and structural framing materials, and explores how seismic resilience, spatial adaptability, and building lifespan translate into market premiums. A central finding is that information asymmetry, temporal mismatch between engineering horizons and market holding periods, and professional knowledge gaps collectively impede the systematic pricing of structural quality—particularly in residential markets. An integrative theoretical framework drawing on capital asset theory, real options theory, and information economics is developed, and the paper concludes with specific recommendations for valuation practice, structural engineering, professional standards bodies, and policymakers, together with priority directions for future empirical research.

Keywords: structural valuation; property valuation methodology; information asymmetry; building performance; structural resilience

1. Introduction

Property valuation is at the very center of modern-day real estate, involving everyone from investors and lenders to insurers, government agencies, and private property owners (Wyatt, 2013; Levy & Schuck, 2005; Gau, 1984). Over the last several decades, the process has moved significantly from straightforward, apples-to-apples comparisons to more complex, analytical models that attempt to identify the influence of numerous factors on a property's value (French, 2004; Pagourtzi et al., 2003; Mooya, 2016; D'Amato, 2010). However, one important aspect has been overlooked for far too long: the importance of structural engineering quality in property valuation, and how to systematically assess it (Glumac & Herrera-Gomez, 2021; Zavadskas et al., 2010).

Structural engineering quality refers to the structural design, materials, construction techniques, and performance of the structure under load (Frangopol et al., 2012; Stewart & Melchers, 1997). These are the factors that influence safety, durability, usability, and adaptability—the properties that, by all logic, influence market value (Kayan et al., 2020; Mansfield & Royston, 2007). However, in most traditional property valuation techniques, these considerations are grouped together under general headings such as "construction quality" or "building condition," which can obscure the precise influence that structural design has on a property's value (Rathnayake & Pushpakumara, 2023; Adair & Hutchison, 2005; Boyd & Irons, 2002; Gilbertson & Preston, 2005; Lizieri et al., 1997).

Knowledge of structural valuation theories has become increasingly important in the current market. Several trends are coming together to make this the case. The importance of structural resilience has been brought to the fore by climate change, and buildings are now required to withstand extreme weather conditions, earthquakes, and other environmental factors (Ansenberg, 2024; Gersonius et al., 2013; Koliou et al., 2018; Wilby, 2007; Speyrer & Ragas, 1991; Donnelly, 1989). Simultaneously, the need for sustainability has led to demands for designs that minimize the impact on the environment while increasing longevity and adaptability (Lützkendorf & Lorenz, 2009; Wilkinson et al., 2014; Langston et al., 2008; Ding, 2008; Brand, 1994; Gann & Barlow, 1996). Building regulations and performance standards are constantly being upgraded, raising the bar for structural performance (Ellingwood et al., 2016; Melchers & Beck, 2018; Shilling et al., 1989). New materials and construction methods have created new avenues for optimizing structure, potentially providing a market advantage (Khanzadi et al., 2012; Russell & Mao, 2015; Gambatese & Hallowell, 2011).

This paper provides a comprehensive examination of the theoretical foundations of structural valuation. It addresses the following questions: How do traditional theories of valuation integrate structural engineering considerations (Babawale & Ajayi, 2011; Lorenz & Lützkendorf, 2008)? How does structural quality get translated into market value (Kauko & d'Amato, 2008; Ball, 2003)? What are the most useful theoretical frameworks for explaining the relationship between structural characteristics and property value (Reed & Robinson, 2005; French & Gabrielli, 2004)? And what is the role of information asymmetry and market inefficiency in the valuation of structural quality (Crosby et al., 1996; Gwin & Maxam, 2002; Dunse et al., 2010)?

The article derives lessons from different areas of knowledge—real estate valuation, structural engineering, construction economics, and property investment (Mansfield, 2009; Ke et al., 2009; Flanagan & Norman, 1993). This multi-disciplinary approach makes clear that, although each area of knowledge has developed a strong theoretical framework, there is still much to be done to integrate them. In valuation theory, the physical properties of buildings are usually considered as exogenous variables, rather than as the results of engineering decisions with specific economic implications (D'Amato & Kauko, 2017; Mooya & Cloete, 2007). The literature on structural engineering, by contrast, usually concentrates on performance and reliability, without fully exploring the implications of these aspects in terms of market value (Frangopol & Soliman, 2016; Aktas & Bilge, 2014).

This review proceeds as follows. Section 2 presents a comprehensive literature review covering the basics of valuation, the key drivers of property value, the role of structural engineering factors in determining value, and the remaining gaps. Section 3 examines how these theoretical perspectives might be combined, addressing each of the four research questions stated above and identifying key themes and contradictions in the literature. Section 4 concludes with implications for the development of theory and application in practice, emphasizing the benefits of structural engineering quality for property valuation.

This is a narrative review. Literature was identified through systematic searches of Web of Science, Scopus, and Google Scholar using terms including "structural engineering," "property valuation," "building condition," "seismic resilience," "hedonic pricing," and "information asymmetry," supplemented by reference chain searches from key papers. The review deliberately spans multiple disciplines and international markets to capture the full scope of relevant scholarship; limitations arising from this breadth, including uneven coverage of some geographic regions, are acknowledged in Section 2.6.3.

2. Literature Review of Structural Engineering Valuation

This literature review synthesizes research examining the relationship between structural engineering characteristics and property valuation. The review draws from international scholarship spanning multiple markets including the United Kingdom, Spain, Germany, Turkey, Israel, and the United States, incorporating perspectives from real estate valuation, structural engineering, construction management, and investment analysis (Boyd & Irons, 2002; Hutchison et al., 2009; Ogunba & Ajayi, 2007; Levy & Schuck, 1999; Amidu et al., 2008; Crosby & Henneberry, 2016; Babawale, 2013; Ajibola & Ogungbemi, 2011; Haran et al., 2013).

2.1 Property Valuation Fundamentals and Theoretical Foundations

Valuation of property is a form of estimation of the current market value of a building with a number of economic uses, including the facilitation of transactions, the provision of a basis for secured lending, the underpinning of taxation systems, and the support of investment decisions. The underlying theory of valuation combines general economic concepts of value, utility, usefulness, scarcity, and effective demand with real property-specific concepts of substitution, anticipation, and contribution.

The practice of valuation has developed in tandem with changes in economic theory and analytical approaches. For most of the twentieth century, the practice relied heavily on the expertise and experience of valuers, with relatively simple modelling. In the past few decades, there has been a clear trend towards more quantitative approaches, the use of statistical methods, and computer-based models, although the extent to which these are adopted is country- and property-type-specific.

Across the world, the development of valuation practices has taken different routes. In the United Kingdom, for instance, there was the early development of structured professional institutions, such as the Royal Institution of Chartered Surveyors (RICS), which provided a standardized approach and code of ethics. In Continental Europe, particularly Germany, there was the development of more codified and formally recognized valuation approaches, which are legally based.

2.2 Primary Valuation Methodologies

The five methodologies reviewed in this section vary substantially in the degree to which they capture structural quality explicitly. Table 1 summarises these differences across key dimensions before each method is discussed in detail.

Table 1. Comparison of Valuation Methodologies on Structural Quality Capture

Method	Degree of Structural Quality Capture	Transparency	Primary Property Type Applicability	Key Limitation
Comparison (Sales Comparison)	Implicit only — structural quality subsumed in comparable prices	Low — adjustments typically subjective	Residential; income-producing where comparables exist	Cannot isolate structural value contribution
Income (Capitalization / DCF)	Moderate — structural quality may affect NOI, vacancy, cap rate	Moderate — explicit if modelled separately	Commercial and investment property	Structural impacts rarely quantified independently
Cost	High — requires specification of structural materials and systems	Moderate-high	Specialised, heritage, or thin-market properties	Depreciation estimation introduces significant subjectivity
Hedonic Pricing	Variable — depends on structural attributes included in dataset	High — coefficients are explicit	Residential; data-rich markets	Multicollinearity; structural data rarely available in public datasets
AI / ML / MCDA	Variable — depends entirely on training data coverage	Low (AI/ML "black box"); High (MCDA)	Mass appraisal; complex multi-criteria decisions	Structural data gaps; explainability concerns (AI/ML)

2.2.1 The Comparison Method (Sales Comparison Approach)

This market-based approach analyses recent transactions of comparable properties to estimate value, constituting the most direct reflection of market behaviour (Brown, 2008; Pagourtzi et al., 2003; Downie & Robson, 2007). The method dominates residential property valuation where sufficient comparable sales typically exist (Diaz & Wolverton, 1998; Gallimore & Wolverton, 2000). Theoretically, the approach rests on the principle of substitution—that rational buyers will not pay more for a property than the cost of acquiring a comparable substitute (Lusht, 1997; Ratcliff, 1972; Quan & Quigley, 1991; Vandell, 1991; Diaz, 1990a). The comparison method implicitly captures structural quality through market prices of comparable properties, though this subsumption makes explicit identification of structural value contributions challenging (Źróbek et al., 2015).

2.2.2 The Income Approach (Income Capitalization and DCF)

The income approach estimates property value by capitalizing the net operating income (NOI) that the property generates, either through direct capitalization—dividing NOI by a capitalization rate—or through discounted cash flow (DCF) analysis, which projects future income streams and a terminal value and discounts them to a present value (Baum & Crosby, 2008; Geltner et al., 2014). This approach is the dominant method for commercial and investment property where reliable income data exist (Buttimer & Ott, 2007; French & Gabrielli, 2005).

Theoretically, the income approach rests on the anticipation principle: that the value of a property reflects the present worth of future benefits it is expected to produce (Brueggeman & Fisher, 2011). Capitalization rates are derived from market evidence and adjusted for risk, including property-specific factors such as structural condition and obsolescence risk. In a DCF model, structural quality can theoretically be captured through its effects on vacancy rates, achievable rents, operating expenses (including maintenance and insurance), and the terminal capitalization rate applied at the end of the holding period (Buttimer & Ott, 2007).

In practice, however, structural quality is seldom modelled explicitly within income-approach frameworks. Generic assumptions about operating costs and vacancy are applied uniformly, irrespective of structural design quality. The result is that superior structural engineering may not be rewarded in NOI projections, and structural risk may not be adequately reflected in risk-adjusted capitalization rates unless there is visible deterioration or a known structural deficiency. This represents a systematic gap between the theoretical capacity of the income approach to capture structural value and its practical implementation (Crosby et al., 1996).

2.2.3 The Cost Approach

This method values a property by determining what it would cost to replace or reproduce it, then subtracting any depreciation that has accrued, and adding the value of the land (Sayce, 1995; Rubi & Ackerly, 2009). It is particularly useful for specialised properties where there are few sales to compare and reliable income information is hard to obtain (Rattermann, 2008; Betts & Ely, 2005). The cost approach is based on the premise that a rational buyer would not pay more for a property than it would cost to construct a new one of equivalent utility (Appraisal Institute, 2013; Boyce & Kinnard, 1984). This approach most directly addresses structural quality, as calculating replacement costs requires precise definition of the building's systems, materials, and performance characteristics (Kilpatrick, 2011; Wyatt, 2009; Smith, 2002). However, the process of estimating depreciation—particularly functional and external obsolescence affecting structural components—introduces significant subjective judgment (Rathnayake & Pushpakumara, 2023; Marshall & Williamson, 1996).

2.2.4 Emerging Methodological Approaches

Hedonic pricing involves decomposing the value of a property into its components, with the aim of identifying the marginal contribution of each attribute (Hannonen, 2008; Rosen, 1974; Court, 1939). The rationale behind these regression models is that the value of a property is the sum of the implicit prices of its attributes (Sirmans et al., 2005; Malpezzi, 2003). Real-world issues such as multicollinearity among attributes, missing variables, and functional form specification make these models difficult to implement, and structural data are rarely available in the public datasets that hedonic models typically rely upon (Goodman & Thibodeau, 2003; Can & Megbolugbe, 1997).

Artificial intelligence and machine learning have been introduced as a means of automating the valuation process and potentially improving accuracy (Iban, 2022; Yeh & Hsu, 2018; Cecchini & Aytug, 2009). They are capable of processing larger datasets and identifying complex, non-linear relationships between property attributes (Nghiep & Al, 2001; Nguyen & Cripps, 2001). However, the "black box" problem raises concerns about transparency, explainability, and professional accountability (Mullainathan & Spiess, 2017; Doshi-Velez & Kim, 2017). These models can capture structural quality only to the extent that relevant attributes are included in the training data (Limsombunchai et al., 2004).

Multi-criteria decision analysis (MCDA) is particularly useful for incorporating environmental, social, and governance (ESG) considerations alongside financial ones (Lützkendorf & Lorenz, 2009; Rathnayake & Pushpakumara, 2023; Zavadskas & Turskis, 2011). This method recognizes that value exists in more than one dimension and cannot be captured by market prices alone (Saaty, 2008; Hwang & Yoon, 1981). MCDA may provide a systematic framework for evaluating structural quality against a set of performance criteria, although there is ongoing discussion about standardizing criteria and assigning weights (Mulliner et al., 2016; Ferreira et al., 2014).

2.3 Critical Factors Influencing Property Valuation

2.3.1 Location Elements and Geographic Determinants

Factors related to location are consistently found to be among the most important value drivers in various real estate markets, thereby confirming the old real estate maxim that location is paramount. Studies across different contexts point to this conclusion, including Colwell & Dilmore (1999), Bourassa et al. (2003), Alonso (1964), Muth (1969), Mills (1972), Fik et al. (2003), and Chau et al. (2005). In a hedonic study of Spanish houses, McGreal and Taltavull de La Paz (2010) identified location-related variables as statistically significant determinants of property values, demonstrating that houses with superior accessibility to transit and urban facilities enjoyed value premiums.

Accessibility to transportation, in particular, has a strong effect on prices. Debrezion et al. (2007) conducted a meta-analysis finding that proximity to rail transit stations consistently raises residential and commercial property values, with the strength of the effect diminishing with distance in a standard distance-decay relationship, consistent with findings by Cervero & Duncan (2002), Bowes & Ihlanfeldt (2001), and Armstrong & Rodriguez (2006). This is consistent with the general literature on transportation capitalization, although the strength of the relationship varies across markets depending on the quality of transportation, the density of the area, and the degree of car usage (Hess & Almeida, 2007; Redfearn, 2009; Gibbons & Machin, 2005; Gatzlaff & Smith, 1993; McDonald & Osuji, 1995; Landis et al., 1995).

Neighborhood quality and socioeconomic composition are also important pieces of the location-value equation. Ansenberg's (2024) study examined property prices in Tel Aviv and East Jerusalem, demonstrating that neighborhood-level socioeconomic variables are very important for location values, with implications for displacement risk and housing affordability. The results are a reminder that location values have implications that extend beyond economic considerations and into social, political, and security realms (Ellen & Turner, 1997; Galster, 2012; Hwang & Sampson, 2014; Ioannides, 2003).

Urban planning and zoning regulations determine property value because they define what can be built, how it can be built, and what can be done with the property in the future. When a region is at risk for natural disasters, the combination of location and construction becomes even more important because of the interaction between geographic exposure and structural performance.

2.3.2 Physical Property Characteristics

Size and spatial configuration are fundamental physical characteristics that determine property value. McGreal and Taltavull de La Paz (2010) identified the number of rooms and total floor area as highly significant in a number of valuation equations for Spanish properties. The relationship between size and value is not linear; as total area increases, the marginal value per unit space generally decreases (Colwell & Munneke, 1997; Kain & Quigley, 1970; Malpezzi, 2003; Bourassa et al., 2010).

The age and condition of a structure are also significant determinants of value, but the relationship is complex and highly context-dependent. Typically, the older the structure, the lower its value because of depreciation, obsolescence, and physical deterioration (Clapp & Giaccotto, 1998; Harding et al., 2007; Randolph, 1988; Hulten & Wykoff, 1981a, 1981b; Chinloy, 1977; Thibodeau, 1995). There are exceptions, however, where older structures—especially those of historical significance—may be valued higher (Schaeffer & Millerick, 1991; Rosenthal, 2008). Construction quality has been identified as a significant factor in valuation across different markets (McGreal & Taltavull de La Paz, 2010), suggesting that markets are aware of quality differences and place values accordingly, although the manner by which quality is discerned by typical market participants remains unclear (Goodman & Thibodeau, 1995; Knight et al., 1994).

Architectural design and curb appeal can drive property values, but quantifying the precise contribution is difficult. Simsek and Uzun (2022) examined the role of façade characteristics in Turkish condominium property valuations and concluded that improved design quality drives market prices upward. The challenge lies in separating architectural value from interrelated variables such as construction quality, location, and building size. Moreover, architectural preferences change with cultural and temporal contexts, making it difficult to establish universal value principles.

Building integrity and engineering quality are essential but tend to be hidden in property valuations. Rathnayake and Pushpakumara (2023) emphasised that structural integrity analysis provides critical information about the longevity of a building and necessary repairs, which have direct financial implications. In many market transactions, however, this structural integrity remains invisible, resulting in a knowledge gap between those who have the information and those who do not.

2.3.3 Economic and Market Factors

Market values are determined by the interaction of supply and demand. Buttimer and Ott (2007) demonstrate that these forces manifest themselves in the value of commercial property through rents, vacancy rates, and tenant concessions. The ability of the market to absorb space also limits the degree to which quality premiums can be extracted; if there is insufficient demand for high-quality space, price differentials may narrow (DiPasquale & Wheaton, 1992; Rosen & Smith, 1983; Voith & Crone, 1988; Hendershott, 1996).

Interest rates and credit availability are very important in determining property values because they reflect changes in the cost of capital and the market's appetite for investment. When interest rates are low, property values tend to increase for two reasons: improved terms for leveraged purchases and lower discount rates applied to future income streams (Buttimer & Ott, 2007; Miles & Mahoney, 1997; Case & Shiller, 2003). The role of credit conditions is also significant; if credit conditions become more stringent, property values may remain depressed even if nominal interest rates are low (Pavlov & Wachter, 2011; Ghent & Kudlyak, 2011; Favara & Imbs, 2015).

Economic growth and employment patterns influence space demand and incomes, pulling property prices upward in more successful regions (McGreal & Taltavull de La Paz, 2010). Dobeson (2025) observes regional variations in the incorporation of economic indicators into property valuations, with German valuers being more circumspect about inflationary prospects than English valuers, reflecting differences in professional culture and regulatory frameworks. During economic downturns, properties with strong structural integrity and lower operating expenses may prove relatively more resilient, although systematic empirical evidence on this remains scarce.

2.4 Structural Engineering Quality and Value Creation Mechanisms

2.4.1 Seismic and Wind Resistance Value Implications

Structures designed to exceed the minimum seismic standards can command significant value premiums in seismically active areas through several channels of value creation. Enhanced seismic resistance reduces expected damage from future earthquakes, which in turn reduces insurance premiums, business interruption risks, and the probability of catastrophic failure (Porter, 2016; Kang & Davidson, 2013). Research in seismic markets indicates that consumers are willing to pay a premium for enhanced seismic resilience, particularly following large earthquakes that increase risk awareness (Naoi et al., 2009; Nakagawa et al., 2007; Beron et al., 1997). Seismic value premiums tend to rise sharply following an earthquake and then decline as risk perceptions recede (Bin & Polasky, 2004; Hallstrom & Smith, 2005; Atreya et al., 2013). This temporal pattern suggests that seismic quality may be systematically undervalued during quieter periods, pointing to market inefficiency (Kunreuther, 1996; McClelland et al., 1993). The determination of seismic quality is highly technical, creating information gaps because standard buyers lack the knowledge to assess it without expert assistance (Brookshire et al., 1985; Bernknopf et al., 1990). In hurricane-prone coastal regions, wind resistance similarly affects insurance costs, viability, and marketability.

2.4.2 Structural Durability and Building Lifespan

Building life is an important driver of long-term value, particularly for commercial property, where buyers consider not only the costs of ownership but also terminal value. Buttimer and Ott (2007) observe that building life directly impacts the capitalized value of the building, where longer life allows for more income generation over time. Rathnayake and Pushpakumara (2023) suggest that a comprehensive analysis of building condition provides vital information on remaining life, the type of repairs required, and remaining capacity—all of which have a direct impact on valuation. Buildings designed with durable materials and corrosion-resistant systems tend to have longer lives and lower costs of ownership (Kong & Frangopol, 2003; Liu & Frangopol, 2005; Lounis & Vanier, 2000). However, markets do not always accurately value durability, particularly when the benefits of improved performance are realized only over a long time horizon (Grussing et al., 2006; Morcous & Lounis, 2005). The relationship between durability and value is further complicated by the possibility of functional and economic obsolescence: a technically sound building can still decrease in value if its structural configuration impedes modernization or adaptation to new uses.

2.4.3 Spatial Flexibility and Structural Adaptability

Structural systems that facilitate flexible space planning—column-free spaces, long-span frames, and modular grids—increase the adaptability of a building to meet dynamic tenant and market requirements, which in turn can increase market value and investment attraction. Askar et al. (2021) note that adaptability has long been recognized as a desirable attribute in built environments, but systematic assessments of adaptability premiums remain rare (Geraedts et al., 2014; Grover et al., 2018; Remøy & van der Voordt, 2014; Schmidt et al., 2010; Slaughter, 2001; Friedman et al., 1978).

Buttimer and Ott (2007) demonstrated that structural systems facilitating flexible space planning influence occupancy and rent levels, and thus market value in commercial properties. Open floor plans with minimal structural constraints can accommodate diverse tenant requirements, thereby reducing vacancy risk and potentially commanding higher rents through increased functionality. Structural systems with inflexible configurations, by contrast, may be associated with higher vacancy rates, increased tenant turnover, and higher tenant improvement costs.

Long-span structures that eliminate interior columns are of particular value in commercial and institutional buildings where open and flexible spaces are in demand. However, the value of long-span structures must also take account of increased construction costs and the possibility of increased structural depth, which can affect overall building height and development economics.

2.4.4 Sustainability and Embodied Carbon Implications

The structural design of a building is a key determinant of its sustainability performance. Choices of structural material—steel, concrete, mass timber, or hybrid systems—have direct consequences for embodied carbon, a metric of growing importance in investment and regulatory contexts (Buchanan & Levine, 1999; Lawson et al., 2014). Mass timber construction, in particular, has attracted significant attention for its ability to sequester carbon while providing competitive structural performance (Björnfot & Stehn, 2007; Kasal & Tannert, 2010). Green building rating systems such as BREEAM and LEED increasingly engage with structural material choices as part of whole-life carbon assessments, and there is a growing expectation that properties with lower embodied carbon profiles will attract sustainability premiums from institutional investors (Lützkendorf & Lorenz, 2009; Lorenz & Lützkendorf, 2008). Structural adaptability also contributes to sustainability by extending building life and reducing the need for demolition and rebuild—outcomes with both environmental and financial value that conventional valuation frameworks have yet to capture systematically.

2.4.5 Aesthetic Integration of Structural Elements

When structural elements appear as design features in architecture—exposed trusses, dramatic cantilevers, and expressive shapes—they can elevate the aesthetic value of a building and make it more distinctive in the marketplace. McGreal and Taltavull de La Paz (2010) determined that the quality of construction, including the aesthetic qualities of structural elements, had a large impact on property values in Spain. The variables associated with construction quality were highly significant across multiple valuation equations.

A structurally expressive building design can create a distinctive building identity, enhance the perception of space, and convey quality to consumers and investors. Aesthetic quality is not, however, absolute or constant; it varies with culture and period, reflecting the changing tastes of different markets and times. Exposed structural elements can also increase maintenance costs and make future modifications more difficult, which tempers potential aesthetic benefits.

2.4.6 Innovation Premium and Performance Excellence

Innovative structural solutions that support unique architectural shapes or enhance functionality can raise property values in targeted market niches, particularly for iconic buildings housing institutions, businesses, or government-related activities. Buttimer and Ott (2007) found that innovative attributes command a premium where they address specific market needs or provide a clear competitive advantage. Such premiums reflect both functional performance advantages and the aspirational appeal of design excellence. There are, however, potential downsides: unproven performance, obsolescence risk, and uncertain market acceptance. The value-creating potential of structural innovation thus depends on quality of implementation, the effectiveness of market education, and alignment of the innovation with actual market demand. As innovative solutions become more widely adopted, innovation premiums can erode, moving from special to standard.

2.5 Critical Structural Systems and Their Valuation Implications

2.5.1 Foundation Systems and Ground-Structure Interface

The foundation system represents the critical interface between the structure and the soil, with implications for value that remain largely latent in most market transactions. Deep foundations, including driven piles, drilled shafts, and caissons, involve significant initial costs but can provide substantial value through enhanced stability, particularly on difficult sites with poor bearing capacity, high groundwater tables, or seismic activity (Tomlinson & Woodward, 2014; Kulhawy & Mayne, 1990; Poulos & Davis, 1980; Bowles, 1996). Foundation performance has a direct impact on building lifespan and maintenance requirements. Systems that minimize differential settlement prevent cracking, misalignment, and damage to interior finishes and building systems. Foundation system quality tends to receive little direct attention in the valuation process unless visible damage is apparent, which can lead to information asymmetry where actual foundation quality is not reflected in market prices. Foundations with redundant vertical strength can also provide substantial value by enabling future vertical expansion, particularly on constrained urban sites—though markets may undervalue this option value, especially where expansion is only hypothetically feasible.

2.5.2 Structural Framing Systems and Material Selection

The choice of structural framing material—steel, concrete, timber, masonry, or combinations—alters many aspects of what a building can be used for and how much it is worth. The material selected determines fire safety, durability, sustainability ratings, construction speed, sound transmission, and building appearance. Steel-framed buildings are best suited for applications requiring large spans, rapid construction, and flexibility to modify later. Concrete-framed buildings provide good thermal mass, excellent fire resistance, and effective vibration control. Timber-framed buildings are experiencing a resurgence in popularity due to their sustainable qualities, and engineered wood products are expanding the possibilities for timber construction. Material value is not universal; varying conditions and preferences exist across regions and building types (Buchanan & Levine, 1999; Lawson et al., 2014; Björnfot & Stehn, 2007; Gorgolewski, 2008; Kasal & Tannert, 2010).

Long-span structures that minimize interior columns produce flexible spaces of particular benefit for offices and institutions, but are associated with higher structural costs and, in some cases, deeper floor plates. Floor-to-floor height is also determined partly by the structural system. Greater floor-to-floor height provides more daylight, easier distribution of mechanical systems, higher ceilings that improve space quality, and greater opportunities for future uses. These factors translate to added value in commercial developments where ceiling height can enhance tenant utility and rent, but taller structures are more expensive and may create permitting issues, requiring optimization within the total development budget.

2.5.3 Lateral Force Resisting Systems

Systems designed to resist side-to-side forces from wind and earthquakes are recognized as value-creators in high-risk areas. The design philosophy of lateral systems—whether limited to life safety, damage control, or immediate occupancy—has a direct impact on building performance during extreme events, and thus on risk and value. Buildings that exceed the minimum seismic requirements can command higher prices in seismically active areas due to reduced expected losses, lower insurance costs, and enhanced safety. Performance-based seismic design, which estimates building behaviour across varying levels of earthquake intensity, provides a more nuanced understanding of risk than code compliance alone, potentially enabling more refined risk pricing. However, the technical sophistication of performance-based design introduces information gaps, as many market actors lack the knowledge to evaluate such designs.

Buildings with redundant lateral systems—featuring multiple load paths and protection against progressive collapse—enhance structural robustness, but redundancy increases construction costs, and markets may not value it highly unless risk awareness or regulatory pressures are strong.

2.5.4 Floor Systems and Performance Characteristics

Selecting a floor system is more than a concrete-and-steel decision—it represents an investment in how the floor affects performance, space quality, and the operation of building services, all of which have monetary value. In environments where vibration sensitivity is a concern—research facilities, hospitals, semiconductor fabrication, and high-precision manufacturing—floors designed for superior vibration performance can command significant value premiums. The floor's ability to damp and resist motion is a function of its stiffness, weight, and damping, and meeting demanding vibration requirements is a complex design task. Floor load capacity also influences building flexibility and tenant desirability, particularly in commercial and industrial buildings where uses may change over time. Floor systems that permit simplified mechanical, electrical, and plumbing (MEP) routing can reduce floor-to-floor heights without sacrificing usable ceiling area, improving building efficiency. An integrated structural and MEP design strategy enables multiple services to share structural depth, providing value through space optimization—though it requires complex design coordination and may not be easily adaptable to future changes.

2.6 Research Gaps, Methodological Challenges, and Future Directions

2.6.1 Quantification Difficulties and Information Asymmetries

Typical valuation approaches group structural quality into general categories such as "construction quality" or "building condition," concealing the precise value added by specific structural design features (Rathnayake & Pushpakumara, 2023). This obscures the ability of both valuers and market participants to distinguish and reward structural quality. Information asymmetry compounds the problem. Structural quality is typically hidden from buyers, sellers, and appraisers lacking direct engineering expertise. Unlike observable aesthetic characteristics noted during a property inspection, structural sufficiency requires engineering expertise and sometimes intrusive testing. This can result in market inefficiencies where structural quality is not adequately represented in property prices, leading to adverse selection: properties with hidden structural defects may be overvalued, while superior structural quality is overlooked and unrewarded (Crosby et al., 1996).

There is also a temporal dimension to this problem. Structural performance occurs over many decades. Markets seeking short-term returns may not adequately value long-term structural advantages, resulting in systematic undervaluation of superior engineering performance. Conversely, hidden structural weaknesses may not yet influence prices, but pose significant risks to subsequent owners when they become apparent.

2.6.2 Market Recognition Variations Across Property Types and Contexts

The market recognition and pricing of structural quality varies considerably by property type, market segment, and geography. In the commercial property market, particularly for Class A office space, structural quality is more directly valued. Buttimer and Ott (2007) demonstrated that commercial property valuations consider parameters such as floor loading capacity, vibration resistance, and column spacing, which are important for tenant utility and rent potential. Advanced commercial property investors demand comprehensive engineering analysis, which provides more transparent information and more efficient valuation of structural quality.

The residential market, by contrast, tends to undervalue structural quality unless exceptional visible attributes or recent disasters have raised awareness. McGreal and Taltavull de La Paz (2010) demonstrated that construction quality had a significant effect on residential property values in Spain, although it remains unclear whether this represents actual structural quality assessment or proxies such as building age or price segment. Homebuyers generally lack engineering knowledge and are more interested in aesthetics, functionality, and location, which are more readily observable.

Geographic variations in professional culture also influence market recognition. Dobeson (2025) found that German property appraisers tend to rely on more standardised and formally codified approaches, whereas English appraisers rely on more interpretive and market-oriented methods. Consequently, the same degree of structural quality may be valued differently in different countries, potentially creating arbitrage opportunities and posing difficulties for cross-national investors.

2.6.3 Stakeholder Perspective Disparities, Information Needs, and Geographic Scope Limitations

Crosby et al. (1996) demonstrated that different actors in the property market require different types of information about building structure, and this influences how structural quality should be communicated and valued. Financial institutions demand substantial information, particularly regarding factors affecting loan security and value stability. Property investment firms, by contrast, emphasise comparable sales evidence, with structural considerations relegated to the background unless they materially affect comparable assessments. Buyers, sellers, and facility managers are more interested in factual technical information about the building—indicating a potential market need for better structural communication. Notably, Crosby et al. (1996) found that 61% of non-valuers would pay more for higher-quality valuation reports incorporating technical analysis, compared with only 31% of valuers, suggesting that valuers may be underestimating client demand for structural detail.

A limitation of the present review should be acknowledged here. The literature drawn upon is weighted toward markets in the United Kingdom, the United States, Spain, Germany, Israel, Turkey, and Japan. Markets from South Asia, Southeast Asia, Sub-Saharan Africa, and Latin America are largely absent, despite the fact that structural valuation challenges may be most acute in rapidly urbanizing economies where building code enforcement is weaker and information asymmetries are more severe. Readers should exercise caution in generalizing the findings of this review to such contexts, and future research should seek to redress this geographic imbalance.

2.6.4 Methodological Integration Challenges

Valuation techniques integrate structural considerations to varying degrees. The comparison method generally accounts for structural quality only through adjustments to comparable sales prices, and these adjustments are typically based on the appraiser's subjective opinion rather than objective criteria or quantified structural analysis (McGreal & Taltavull de La Paz, 2010). This can lead to inconsistencies and a lack of transparency in how structural differences affect value.

The cost approach is the most direct, involving replacement cost analyses that require specific information about structural characteristics, materials, and performance (Sayce, 1995; Rathnayake & Pushpakumara, 2023). However, the estimation of depreciation—particularly functional and external obsolescence—significantly increases analytical complexity. A building may be in excellent structural condition but functionally obsolete if it impedes modernization or uses outdated methods. Identifying these depreciation factors requires both technical expertise and market knowledge, capabilities rarely available to the same professional.

The income approach may implicitly capture structural quality through maintenance costs, insurance, achievable rents, and vacancy rates, but such impacts are seldom quantified separately (Buttimer & Ott, 2007). Machine learning and AI-based automated valuation models are becoming increasingly adept at handling complex property data (Yeh & Hsu, 2018; Iban, 2022), but can capture structural quality only if the dataset provides for it—which most currently do not, as they rely on publicly available transaction data with little engineering detail.

2.7 Synthesis of Research Gaps and Future Research Priorities

Drawing together the themes identified in Section 2.6, several priority areas for future research emerge. First, empirical research is needed that seeks to quantify the value added or subtracted by structural quality across various property types and markets. This requires comprehensive datasets combining engineering evaluations with transaction data—a substantial data assembly challenge that will require collaboration between engineering firms, valuation professionals, and academics.

Second, research on the role of structural quality information in markets could help close information gaps. This might involve examining the effects of structural disclosure regulations, third-party evaluations, or more comprehensive due diligence on market efficiency and outcomes.

Third, there is a need for standardized structural evaluation tools tailored for valuation purposes, balancing technical sophistication with practical application. Engineering and valuation communities will need to collaborate on such tools.

Fourth, research examining structural performance and value over the building lifecycle would provide insight into how depreciation and maintenance interact with performance-driven value changes over time—research requiring long-term observation and comprehensive data.

Fifth, examining the role of structural performance within emerging sustainability frameworks and ESG investment criteria represents a new research frontier. As environmental, social, and governance considerations increasingly shape investment decision-making, understanding how structural performance considerations—including embodied carbon, adaptability, and resilience—relate to these frameworks is becoming essential.

3. Discussion: Integrating Structural Engineering into Valuation Theory

Analysis of the literature on structural engineering quality and property value reveals a definite tension. The impact of structural properties on building performance—safety, durability, utility, adaptability, and operating costs—is well established. Yet current valuation practice does not recognize these relationships in a transparent or systematic manner. This section addresses each of the four research questions raised in the Introduction, develops the integrative theoretical framework, examines barriers to recognition, and identifies possible paths toward greater integration.

3.1 Theoretical Integration: Structural Quality as Capital Asset Attribute

The first research question asks which theoretical frameworks are most useful for explaining the relationship between structural characteristics and property value. Three complementary frameworks emerge from the literature review.

Capital asset theory conceptualises superior structural engineering as high-quality productive capital that depreciates more slowly, requires less maintenance, and enables value enhancement over time. In this framework, a well-engineered building generates higher net operating income relative to a structurally inferior equivalent, through lower maintenance expenditures, lower insurance costs, higher achievable rents due to better spatial performance, and a lower probability of catastrophic failure. When applying the income approach, these advantages should, in theory, manifest as higher net operating income and a more favourable terminal value. In practice, the standard assumptions applied by valuers treat all structural quality as equivalent, suppressing these differences. Correcting this would require a more granular, item-by-item treatment of how structural design affects individual income and expense line items in the DCF model—a change that is technically feasible but requires both data and professional skill to execute.

Real options theory offers the second framework. Properties with better structures, excess foundation capacity, flexible layouts, or demonstrated resilience can be understood as embodying valuable real options for their owners: the option to expand vertically, change layouts, or ride out disasters with minimal disruption. These options have value independent of whether they are exercised, and their value increases with uncertainty—a property in a seismically active region or one facing potentially changing use patterns has more valuable resilience and flexibility options than one in a stable environment. Traditional valuation approaches, emphasising current use and direct comparables, systematically undervalue these option-like characteristics, particularly when their exercise depends on future choices or events. A practical implementation might involve identifying key structural options (e.g., foundations designed for an additional two storeys; column-free floor plates permitting multiple partitioning configurations) and applying a simplified real options valuation to each.

Information economics provides the third framework, and its implications are perhaps the most directly actionable. The absence of credible information about structural quality leads to market distortions. Without a mechanism for distinguishing levels of structural quality, markets tend toward pooling prices—where high-quality and low-quality properties command similar prices—reducing the private incentive to invest in better structural engineering. Credible quality signals, such as third-party structural certifications, transferable structural warranties, and standardized performance disclosure, could, in theory, move markets toward separating equilibria in which structural quality is rewarded. Engineering and professional valuation bodies are well-placed to develop and administer such mechanisms, and Section 4 returns to this with specific recommendations.

3.2 Market Failures and Information Asymmetries

The second research question asks about the role of information asymmetry and market inefficiency in the valuation of structural quality. The literature consistently identifies information asymmetry as the most significant barrier to accurate structural quality pricing, and its mechanisms can be mapped precisely onto Akerlof's (1970) "market for lemons" framework.

In the classic lemons model, a market for goods of varying quality deteriorates because buyers cannot distinguish high-quality from low-quality goods, and sellers of high-quality goods are unwilling to sell at the pooled market price that results. Applied to structural quality, the analogy runs as follows. Sellers (developers, vendors) possess private information about the structural quality of their buildings that buyers typically cannot verify without expert assistance. Structural deficiencies are not visible during a standard property inspection; superior structural design is equally invisible. Buyers, lacking the ability to distinguish, offer a price that reflects their expectation of average quality across the market. Sellers of high-quality buildings find this price insufficient and may exit the market or fail to recoup their investment in superior engineering. Sellers of structurally inferior buildings, by contrast, benefit from the pooled price premium they receive. Over time, this adverse selection process can erode the incentive to invest in structural quality, lowering the average quality of the building stock—an outcome with both private and public costs.

Several institutional mechanisms attempt to address this asymmetry. Building codes set a minimum floor for structural safety, but they do not differentiate quality above this minimum, and their enforcement is not uniform across jurisdictions. Professional inspections provide more information, but standard residential inspections do not include detailed structural engineering analysis. Insurance and lending risk assessments identify potential structural issues, but these are typically focused on catastrophic risk and default probability rather than optimizing for quality differentiation.

The net effect is an information environment that prevents disasters but fails to identify and reward structural excellence. Shifting this equilibrium toward a separating one requires credible quality signals with three characteristics: they must be costly to fake (so that inferior buildings cannot mimic the signal), verifiable by third parties (so that buyers can rely on them), and transferable at resale (so that the original investment in quality continues to be rewarded across the building's life). Structural performance certificates, engineering-backed warranties with transfer provisions, and publicly accessible building structural registers are all candidate mechanisms with these properties. The policy and regulatory implications are developed further in Section 4.4.

3.3 Temporal Mismatch Between Engineering Horizons and Market Timeframes

Structural engineering projects are planned on a multi-decade scale, with 50 to 100-year design lives typical. The benefits of superior structural design—longer durability, reduced maintenance costs, extended useful life—are realized on this long time horizon. However, real estate markets tend to operate on much shorter cycles, with average holding periods measured in years rather than decades.

This mismatch creates a problem: the long-term value of superior structure may not be fully priced, particularly in markets with high discount rates or where owners expect to sell before the benefits are realized. Theoretical mechanisms exist to incorporate these long-term gains into current prices—including capitalization of avoided future costs, transferable warranties or performance bonds, or institutional investment strategies that can accommodate longer time horizons. The practical difficulties are, however, considerable: uncertainty about the magnitude and timing of future benefits, difficulties in maintaining performance records across multiple ownerships, and the standard principal-agent problem between owner-occupied and investment properties all impede implementation.

3.4 Heterogeneity Across Property Types and Market Segments: An Analytical Synthesis

The third research question asks how structural quality is translated into market value, and the literature's answer is that the translation mechanism is strongly conditioned by property type, investor sophistication, and geographic context. Rather than a single channel, several distinct value translation pathways emerge.

In commercial property markets, structural quality translates into value primarily through its effects on income-producing capacity. The specific structural attributes that matter—floor loading, vibration performance, column spacing, floor-to-floor height—are those that directly affect tenant utility, and their impact can be modelled within a DCF framework once engineering data are available. Sophisticated institutional investors with long holding periods have both the technical capacity and the financial incentive to conduct this analysis, which is why structural quality is more efficiently priced in institutional-grade commercial property than anywhere else in the market. The challenge for practice is to replicate this analytical rigour in less sophisticated market segments.

In the residential market, the translation mechanism is weaker and more intermittent. Structural quality is not directly observable by homebuyers, and the short holding periods typical of residential investment mean that long-term structural benefits are heavily discounted. The market may nonetheless price structural quality implicitly through construction age and quality proxies, but this is a coarse mechanism that conflates structural performance with other correlated attributes. The strongest mechanism for correcting this is post-disaster market adjustment: Ansenberg (2024) and others document sharp increases in structural risk awareness following major seismic or climatic events, which temporarily sharpen the market's ability to discriminate. The progressive fading of this effect as memories fade represents, in itself, a market failure—the repricing reflects subjective risk salience rather than objective structural quality, and reverts as salience declines.

Geographic context introduces a further layer of heterogeneity. Different professional valuation cultures—more codified in Germany, more interpretive in the United Kingdom—produce systematically different translations of structural characteristics into value estimates, even for comparable properties. This points to a path dependency in how structural value is institutionalised within national valuation systems, with implications for cross-national investment and for the design of internationally applicable structural valuation standards.

3.5 Professional Practice: Toward Integration of Structural Engineering and Valuation

The literature identifies a consistent professional gap: structural engineers and valuation professionals largely operate in separate epistemic communities with limited regular interaction. Valuers may lack the technical knowledge to interpret structural information; structural engineers are not trained to reason in terms of market value and financial effects. Bridging this gap is not merely a matter of goodwill—it requires institutional mechanisms.

Standardised protocols for structural assessment specifically designed for valuation purposes would give valuers concrete, decision-relevant information about structural matters without requiring them to become engineers. A tiered system is appropriate: rapid, low-cost screenings for routine properties; more detailed assessments for complex or high-value assets. The protocols should be designed to generate outputs in a format that maps directly onto the inputs required by the three main valuation approaches—specifically, information on replacement cost components (for the cost approach), expected maintenance and insurance cost profiles (for the income approach), and quality adjustment benchmarks (for the comparison method).

Cross-training represents a complementary pathway. Certification programmes that teach valuers the fundamentals of structural engineering—loads, materials, system types, performance indicators—and that teach structural engineers the fundamentals of valuation—market value, capitalization, DCF, comparable evidence—would improve mutual understanding and communication. Several professional bodies already offer such cross-disciplinary pathways in adjacent fields (e.g., building surveying); the model is well established and could be adapted for the structural valuation domain.

3.6 Policy and Regulatory Considerations

Building regulations establish the baseline for structural quality but do not differentiate above it. Whether stricter regulations increase property values depends on whether buyers value the performance improvements sufficiently to compensate for increased construction costs—a market- and property-type-dependent question.

Disclosure mandates represent a second regulatory channel with more direct potential for improving structural quality pricing. Mandating disclosure of structural condition, perhaps including engineering evaluation for certain transactions, can reduce information asymmetry. Such regulations must, however, balance the benefits of improved information against compliance costs and potential litigation risk; pilot programmes are a prudent means of assessing cost-benefit trade-offs before broad implementation.

Tax policy provides a third channel. If policies permit faster depreciation for superior structural systems, provide credits for seismic upgrades or resilience investments, or adjust property tax assessments to reflect demonstrated structural performance, private incentives can be aligned more closely with public values for improved building stock quality and resilience.

3.7 Sustainability and Future-Oriented Valuation

The emphasis on sustainability in property markets is bringing structural quality to the fore. The structural design of a building determines its sustainability performance—embodied carbon in materials, energy performance (influenced by thermal mass and structural form), durability and lifespan, and adaptability that can reduce the need for demolition and rebuild.

Green building rating tools are increasingly engaging with structural considerations. A more prominent focus on whole-life carbon accounting is likely to make structural material choices a key sustainability consideration. Methods of valuation that incorporate sustainability metrics offer a pathway to acknowledging these structural contributions.

As climate risks escalate—more frequent extreme weather events, rising sea levels, and temperature fluctuations—structural resilience is gaining prominence. Buildings that can withstand emerging risks without significant upgrades will likely command premiums, while structurally inadequate buildings will face obsolescence pressure. Valuation that accounts for climate risk demands long-term horizon thinking and probabilistic risk modelling—capabilities that stretch traditional valuation approaches but are increasingly required.

While theory supports the consideration of structural quality in property valuation, its implementation faces real-world difficulties in the form of information deficits, temporal incongruences, professional knowledge gaps, and methodological constraints. Overcoming these difficulties demands a multidisciplinary effort involving professional communities, standards bodies, and market actors. The following section provides specific recommendations.

4. Conclusion

This review has examined the theoretical and practical relationship between structural engineering quality and property value across multiple disciplines and international markets. The core finding is that the question of whether structural quality matters to property value has been settled affirmatively; the challenge that remains is ensuring that this relationship is properly and systematically accounted for in valuation theory and practice.

Structural quality influences property value through multiple mechanisms: risk reduction (seismic resistance, wind resistance, structural redundancy), performance optimization (vibration control, floor loading capacity, spatial flexibility), lifecycle cost advantages (durability, reduced maintenance, extended service life), adaptability for modification and repurposing, and sustainability performance including embodied carbon. Substantial heterogeneity exists in how markets recognize and price these attributes, with commercial properties and sophisticated investors demonstrating more explicit valuation, while residential markets and individual buyers may systematically undervalue structural characteristics. Information asymmetry constitutes a fundamental barrier, as structural quality frequently remains invisible to typical market participants lacking engineering expertise.

Three complementary theoretical frameworks account for structural quality's value role. Capital asset theory conceptualises superior structural engineering as high-quality capital that depreciates more slowly and enables value enhancement. Real options theory recognises structural characteristics as embodying valuable flexibility—options to expand, adapt, or absorb extreme events. Information economics explains how asymmetries create market inefficiencies and suggests mechanisms—certifications, warranties, disclosure requirements—for improvement through credible quality signalling.

4.1 Implications for Valuation Practice

Valuation practitioners should improve structural literacy to identify structural quality indicators more accurately and to communicate better with engineers. When comprehensive structural analysis has not been performed, this should be treated as a source of uncertainty in the valuation rather than as an implicit assumption of adequacy. For high-value or complex properties, structural engineering analysis should be standard, not optional.

In the comparison method, construction quality adjustments should be systematically supported by identifying the specific structural elements involved. In the cost approach, replacement cost estimates should reflect actual structural elements and their performance, and depreciation should be structured around actual structural conditions. In the income approach, the impact of structural quality on operating expenses, insurance, and capitalization rates should be analysed systematically, rather than based on generic undifferentiated assumptions.

4.2 Implications for Structural Engineering Practice

Structural engineers should develop a greater understanding of the value implications of design decisions, moving from a pure performance-optimization perspective toward a value-driven one. Providing transparent documentation of structural characteristics relevant to value—excess capacity, resilience, flexibility, and innovative systems—would help markets identify and reward superior engineering. Standardised reporting formats that communicate structural data in a value-focused, accessible manner would assist non-technical audiences including valuers, investors, and lenders.

Lifecycle cost analysis should be integrated more prominently into structural design practice, so that the economic implications of structural design choices are clearly articulated from the outset.

4.3 Recommendations for Professional Bodies and Standards Organizations

Professional bodies for valuation should develop guidelines that directly address structural considerations in property valuation, acknowledging the varying needs associated with different property types while establishing minimum requirements for comprehensive assessments. Standardised procedures for structural assessment in the context of valuation—with varying levels of detail appropriate to property type and transaction size—would enhance consistency and promote integration.

Professional bodies for engineering should collaborate with valuation professionals to develop comprehensive cross-disciplinary frameworks. Joint training programmes, conferences, and standards development can help fill the knowledge gap. Certification courses in "valuation-oriented structural assessment" for engineers and "structural fundamentals for valuers" would establish clear professional development pathways.

4.4 Recommendations for Policy and Regulation

Policymakers should seek means to close information deficits regarding structural quality. Strengthened disclosure requirements for property transactions, third-party verification of structural integrity for certain asset classes, and publicly accessible registries recording the structural performance of buildings are candidate mechanisms, each of which must be carefully designed to ensure that benefits outweigh compliance costs.

Building regulations should move toward performance criteria that not only verify compliance but also reward and record superior performance. With reliable performance records, this can inform property valuation and signal real structural quality. Tax laws and financial regulation should be examined to ensure that private and public interests are better aligned with regard to building quality and resilience.

4.5 Future Research Priorities

Empirical research quantifying structural quality premiums and discounts across property types and markets is the most pressing priority. This will require large datasets combining engineering analysis with transaction data—a significant data assembly challenge requiring collaboration between engineering firms, appraisers, and academics. Longitudinal research tracing individual buildings over time to document how structural performance affects value would provide insight into depreciation patterns.

Research examining the communication of structural quality information—including the effectiveness of disclosure programmes, certification schemes, and enhanced due diligence—could inform policy design. Behavioural research investigating how buyers and investors react to structural information would provide insight into effective communication strategies.

The development and validation of integrated structural valuation models—combining engineering analysis with standard valuation approaches and tested across different property types and markets—represents a further priority. Such models, if robust, could substantially close the gap between the theoretical importance of structural quality and its practical recognition in valuation.

4.6 Closing Synthesis

The analysis presented in this review reveals a gap between what theory tells us about the importance of structural quality to property value and what valuation practice currently delivers. This gap may result in market inefficiencies where superior structural design is not valued as such, and where substandard structures are not sufficiently discounted—outcomes that misallocate investment and dampen the incentive to engineer buildings well.

With the increasing importance of resilience, sustainability, and performance in the context of climate change, new user demands, and resource constraints, integrating structural quality into valuation will become progressively more important rather than less. Buildings are long-term capital with broad economic, environmental, and social impacts. Ensuring that structural quality—which lies at the heart of building performance in all these respects—receives appropriate treatment in valuation is both theoretically necessary and practically required.

The issue is no longer whether structural quality matters to property value: the evidence reviewed here confirms that it does, through multiple mechanisms and across diverse market contexts. The challenge, and the research agenda, lies in ensuring that this relationship is properly and systematically accounted for in valuation theory and practice—through education, methodology, empirical research, and, where market failures persist, targeted policy intervention. The obstacles are significant, but the path forward has never been clearer, nor the stakes higher.

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