BIM, INFORMATION ON SUSTAINABLE BUILDING AND PERFORMANCES

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ABSTRACT

Sustainability thresholds generating Value
There is an expanding literature on the value of sustainability features in buildings (European Commission, 2013; World GBC, 2013; World GBC, 2014). While several publications focus on the price differentiation between buildings with sustainability credentials and buildings with no sustainability credentials (Eichholtz *et al.*, 2010; etc.), others examine the costs and benefits of sustainability features individually referring to both monetary and intangible values (Heerwagen, 2000).
These various studies usually refer to different concepts of value and encompass benefits that may not always directly profit the investors themselves. The value of sustainability can thus be interpreted differently according to the stakeholders and scope considered. On the one hand, market value refers to the price at which the good would be traded in a perfect open market. On the other hand, a concept of total value could be defined to encompass all the benefits associated with sustainability features for the various stakeholders (investors as well as users, local authorities, citizens, etc.). This notion would include a wider range of benefits which may not all be priced by the market. However, examining the mechanisms through which benefits for the different stakeholders could impact investors helps better understand the financial gains investors can expect from sustainability.
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KEYWORDS

Sustainable investment, risk analysis, green value

1 INTRODUCTION

ESG and climate risks should be managed by asset owners and trustees through their determined investment framework and approach, and importantly through their selection of managers and advisers as integral part of their investment strategies. The result is that all asset specific and selection dialogues contain an ESG and climate risk component embedded and as determined through the strategic review process.

- **Holistic description of the building performance**

As a starting point, sustainability-related features should be treated as constituents of an "extended" approach of describing building quality. A separate consideration of overall building quality and sustainability-related features does no longer make sense.
Data collection should be integrated in the design and building management processes. The cost of systematic data collection and storage would probably be lower than the costs of one-off due diligences required to start each time from scratch. Information should be collected directly from the people who create the data or who have access to the data, namely designers and contractors for new buildings, and facility managers for existing buildings. The verification of this information by third parties would increase the value of the data.

- **Integration of sustainability-related information into market value and investment worth**

Current valuation and investment decision practices partially incorporate sustainability-related features. The presence of a sustainability certification (BREEAM, LEED, HQE, BNB/DGNB or equivalent) sometimes appears "translated" into an additional rental value in markets where certification schemes have not yet widely spread. Conversely, its absence is increasingly often translated into a discount in markets where certification credentials have become standards. Capital expenses increasingly include costs for sustainability retrofit in particular when investors aim to achieve a given sustainability credential. Adjustments are also sometimes made to operation expenses, letting periods and yields. However, the type and scale of the adjustments performed are still heterogeneous.
Improvement should be made to better account for technical data and individual features and propose a more standardised integration of sustainability-related features. Discounted cash flows (DCF) approach appears particularly appropriate to better integrate sustainability-related information into valuation exercises. An assessment of the sustainability performance and an examination on how the market context respond to sustainability performance can be used to properly adjust in a transparent manner the various input parameters (rents, rental growth, operation and capital expenses, durations to let, yields and risk premium) of the DCF calculation.
The adjustments completed should be documented and the DCF parameters should be presented in a standardised format allowing for transparency on how sustainability features are integrated into the valuation. A generic format for this transparent and comprehensible integration is suggested in this report.

In addition, uncertainty associated with the reliability of the information used to assess sustainability performance and the potential impact of said performance on market value drivers should be accounted for. Accounting for uncertainty in the input variables is paramount in order to avoid the impression of unrealistic levels of precision. Monte-Carlo simulation is a method of choice to account for the impact of uncertainties on the valuation output and present a sensitivity analysis. The simulation outcome is a value distribution.

- **Accounting for flexibility and adaptability into building investment worth appraisals and decision-making**

Integration of flexibility into investment worth appraisal and investment decision-making is important as flexibility can have a considerable impact on building occupancy rates, retrofit costs and environmental performance through lower consumption of building materials. Two key types flexibility should be distinguished: service flexibility and adaptability (Kendall *et*

al., 2013). Currently there is no common explicit technical requirements, metrics for assessment or benchmarks to investigate these two types of flexibility. In addition, although building owners, valuers and analysts increasingly acknowledge the impact of service flexibility and adaptability on market value, there is no standardised framework to integrate the flexibility information collected into investment decisions and valuation exercises.
Moreover, valuing flexibility in buildings is not straightforward due to the uncertainty on the potential future cash flows. Pricing flexibility is difficult because its value depends particularly on the uncertainty of the future organizational activities, i.e. whether the flexibility will be actually put into use (e.g., Vimpari *et al*., 2014). Since the value of flexibility is a contingent claim into the future, real option analysis (ROA) could be used to account for service flexibility and adaptability. Based on expert interviews and a review of state-of-the arts projects and studies on valuing flexibility, this report recommends valuers and building owners to apply ROA as a supplement to the DCF valuation. A simple calculation using payoff methods is presented. This method is practical and straightforward, as only three payoff scenarios are needed for valuation.

- **Accounting for risks and resilience against future changes**

Current valuation methods do not very well account for risks associated to shift in the future market context. However, future changes in the users' expectations or in the regulatory framework would impact property value since retrofit works would be required to maintain the building attractiveness. A flexible design enabling the owner to adapt his building to the evolutions of the context would offer a protection against these risks and would thus improve the value of the building. For example, better fits between users' needs and buildings space can improve occupancy rate, reduce capital costs required to update the building. In special cases –in particular for owner occupant willing to decide between different retrofit solutions- a simplified real options method may allow to calculate an option value of a sustainable flexible design. The output may be added to the DCF results.

2 CONCLUSIONS

Current valuation methods do not very well account for risks associated to shift in the future market context. However, future changes in the users' expectations or in the regulatory framework would impact property value since retrofit works would be required to maintain the building attractiveness. A flexible design enabling the owner to adapt his building to the evolutions of the context would offer a protection against these risks and would thus improve the value of the building. For example, better fits between users' needs and buildings space can improve occupancy rate, reduce capital costs required to update the building. In special cases –in particular for owner occupant willing to decide between different retrofit solutions- a simplified real options method may allow to calculate an option value of a sustainable flexible design. The output may be added to the DCF results

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