SPR/RICS Cutting Edge Conference 2010

London May 13th 2010

How to Measure and Manage Real Estate Risk in the Real World

Winning in the Long Run – a quantified approach to the risk of sustainable financial value on real estate: Working Paper 1: Barriers and A Route Map

---

Authors

Vis. Prof. Dr. Juerg R. Bernet, MSc MBA MRICS
Prof. Sarah Sayce, BSc PhD FRICS IRRV
Maarten Vermeulen FRICS
DI Rupert C. Ledl
Billy Clements, BSc

Abstract:

This paper presents the first steps in an RICS Education Trust supported project which aims to contribute to the debate and professional knowledge base regarding the link between real estate financial performance and sustainability characteristics by an analysis of properties within selected mainland European portfolios against a set of sustainability characteristics.

The project builds on a series of other research projects (for example Ellison and Sayce, 2006; Eicholtz *et al,*2008; Fuerst and McAllister, 2008, 2010;) and the sustainability rating tools produced by Building Research Establishment (BREEAM); The Green Rating Initiative (GRI) produced by *inter alia* Bureau Veritas and by IPD/IPF (ISPI). The work undertaken to date has found it hard to link financial and sustainability performance in any positive way (Sayce *et al,* 2009) though early indications are that energy efficiency is beginning to have a value linkage, at least in the US. But no such body of evidence exists in mainland Europe, due in no small part to a lack of rating systems and metrics such as Energy Star and LEED which have acted as the benchmark for sustainability.

Therefore the first stage of the work will be to analyse the leading sustainability rating and benchmarking systems, such as those listed above and evaluate them for practicality and appropriateness for the portfolios under consideration.

Later stages of the work will seek to establish and isolate the characteristics which can be evidenced as linking to financial performance in order to inform investment decision making.

Keywords

Commercial Real Estate; Sustainability Metrics, Risk, Worth, Methodology

1.0 Introduction

Within a context in which sustainability has risen swiftly and seemingly irreversibly up both government and corporate agendas, one of the largest challenges facing the built environment is the promotion of both sustainable building stock and, perhaps of equal if not greater importance, the management of that stock in ways that mitigate environmental damage and promote sustainable behaviours by building occupiers.

Currently it is estimated that in the region of 50% of all carbon emissions result from the manufacture and use of buildings; further their location and associated transport implications provide other environmental impacts. Accordingly, as the science of climate change becomes more widely accepted on a global basis, so governments are increasingly placing regulatory constraints on the design, construction and use of buildings. Already this is evident across many jurisdictions but nowhere more so than in the European Union with, for example, the introduction of tightened building regulations, European Directives in relation to energy performance, waste and water conservation and an integration of climate change considerations into spatial planning policies. Further fiscal measures, such as the Carbon Reduction Commitment, present additional real costs in the use and occupation of buildings which are not low-carbon.

Whilst legislation, in the past, has focused primarily upon new buildings, growing realization that such measures are ineffective except over long time scales due to the slow rate of production of new buildings, has shifted attention to the existing building stock and in particular at measures that will provide greater transparency in terms of building performance, such as Energy Certification, with the ambition that this will lead to differential demand and, through the market pricing mechanism, to stimulus for more sustainable and climate-resilient buildings.

In addition to environmental concerns, there is recognition that buildings have social impacts: on health and well-being and in promotion and protection of communities. As the locus for most human activity, buildings have high social footprints- as well as carbon ones.

To commercial property investors, these matters present ongoing risks to property portfolios. A failure to 'future-proof' investment portfolios against the tide of legislation and regulation presents risks in relation to possible increased capital spend to retro-fit buildings, the possibility of compromised building life and a potential decline in lettability and, consequentially, capital value. In support of this, theoretical research has made the case that buildings which are less sustainable, will lose value differentially to more sustainable stock (Ellison and Sayce, 2006; Bienert *et al* (2008); De Francesco and Levy, 2008; Reed and Wilkinson, 2008).

However, whilst in theory, research has demonstrated this *should* be the case, there is a paucity of evidence to support the contention that this *is* the case (Sayce *et al,* 2010). There are exceptions and, in notably, some researchers examining transactions in the

United States have evidenced linkages between rents achieved and sustainability (energy) rated buildings research (for example Eichholtz *et al.,* 2009 and Fuerst and McAllister, 2009). No such evidence exists within European portfolios (see for example, IPD, 2009).

To investors, seeking to optimise their portfolio positions, there are a series of key questions that require response in order to inform their decision making:

- What is the impact of sustainability factors on the returns from my portfolio?
- What are the risks?
- Are these risks priced in appropriately?

This paper presents the first in a series of papers that will explore the relationship between sustainability criteria, risk and return through the development and testing of a theoretical model against a sample of institutional grade properties. The over arching aim is in order to develop a deeper understanding of how these risks are translating into market responses better to inform institutional investment decision making.

2.0 The issue to be addressed

The issue to be addressed by the research is complex. The research and business communities have for some years been seeking to establish a solid and defensible business case for investing in sustainable properties. Whilst, as set out above, there is in general terms a theoretical case for such investment, to produce robust financial analysis to support the contention in the real world has met significant barriers.

These barriers are now set out in brief as they form the rationale for the project.

First, to create a financial case to invest in sustainable property requires both a track record of performance and, as a pre-requisite of an understanding of what properties do meet a definition of 'sustainable. In the lack of any agreed definition (Sayce *et al.*2010) empirical studies have taken certification as a surrogate. Within the states there are approximately 2,000 buildings that are rated by LEED (Leadership in Energy Efficient Design) and considerable more that are rated by EnergyStar. Whilst both rating systems imply energy is the key consideration, LEED does address other characteristics.

Within Europe however, as detailed below, the number of buildings that carry any form of sustainability accreditation is much less and the range of measures is wider. Recent research by Kok *et al* (2010) suggests that the proportion of new space with a 'green' rating is as low as 10%. This makes any meaningful concept of what is a sustainable building problematic and without this there is no firm foundation for comparative studies. The matter is further complicated as rating systems change over time and most have different grades of achievement. There is also no monitoring mechanism to assure the achievement of these standards over time. It is for this reason that ISPI (IPD/IPF 2009) has adopted the use of *either* a BREEAM or achievement against a simple set of weighted criteria, adapted from Ellison and Sayce (2006).

Second, where studies have been undertaken and these have been very few in transactional terms, linkage has been sought between rents and rating achieved, regardless of the date that rating was achieved, or the grade achieved (silver, gold etc)

(see for example Eichholtz *et al*, 2009). This means that, however robust the analysis, the underlying data has not been able to show for levels of sustainability or individual criteria, other than, with the Energy Star based work, energy efficiency. Whilst headline rental differentiation in some parts of the US have been established in terms of energy, the work undertaken by IPD/IPF has revealed that to date no differential financial returns have been achieved.

This last point is important: If sustainability is *not* yet reflected in pricing, then it would be expected that differential performance would likewise not be observed. It will only be over time as the criteria do start to work through the pricing mechanism that returns will start to differentiate. The RICS has recently issued a Valuation Information Paper (VIP 13) (RICS, 2009) to valuers advising them to take account of sustainability factors when conducting valuations but the paper does recognise that the role of the valuer is to reflect markets – not to make markets and it recognizes that there is a lack of data transparency.

To overcome the barriers requires the routine and uniform recording and measurement sustainability characteristics of buildings, so that these can be built into financial modeling and into forecasts of investment worth. The findings of Kok *et al* (2010) demonstrate the currently limited data measurement practices both globally and specifically within Europe, where energy consumption is the most widely measured amongst portfolios of listed companies (31%); a figure which falls to a mere 6% for their private counterparts. These findings may be explained in part by the reluctance that has occurred previously for landlords and tenants to share data (see for example, the calls in the UK contained within the commercial Lease Code 2007) as well as a genuine lack of systematic data collection.

In the light of the above it is concluded that unless and until there is a better database of information to support investment decision making and to enable valuers and appraisers to be able to analyse sales and lettings of buildings in relation to particular sustainability characteristics, market transformation is likely to be slow.

Accordingly this work seeks to adapt and build on the methodology of ISPI[i], through the analysis of assets contained within existing portfolios, to analyse the extent to which sustainability metrics are held by portfolio managers and to frame the way in which these can be built into performance measures.

3.0 The Aims of the Project

The overall aim of the project, which is ongoing throughout 2010, is to develop a deeper understanding of how sustainability risks are translating into market responses better to inform institutional investment decision making.

In order to do this it has set several objectives:

- to decompose some of the rating systems that are most widely used in Europe in order to look similarities and differences and to establish in particular which characteristics are most widely included;

- to establish, through literature and in the light of the analysis, which sustainability characteristics are most likely to have an impact on risk/return performance moving forward;

- to set up a flexible mathematical interpretative model which can analyse and returns and risk on buildings against a selected range of sustainability and conventional property performance characteristics; and

- to trial the model on actual buildings to test whether data can in practice be collated and in the light of this, to draw recommendations for next steps.

Given that the hypothesis on which this research is based is that there is little if any current impact on yields and rent of the sustainability characteristics of a building in Europe, it is not anticipated that the model will produce definitive results. Instead it seeks to develop a framework which, over time, may present a better understanding of market behaviours. Further it seeks to explain whether, within certain European portfolios, there is 'hidden' within the valuations some evidence that, whilst not explicitly expressed, would indicate that investors and their appraisers are indeed reflecting certain aspects of sustainability within their appraisals.

4.0 Towards a Methodology

The project is still at an early stage and the methodology will be refined as it progresses. However a number of steps have been identified and the early results are presented for discussion and feedback. The methodology builds on other research (such as Ellison and Sayce 2006; Eicholtz *et al.* 2009; Lorenz & Lützkendorf, (2008); Fuerst and McAllister 2008 and 2010), a series of sustainability rating tools, such as BREEAM, and the benchmarking system ISPI produced by IPD/IPF and the Green Rating Initiative (*inter alia* Bureau Veritas).

Step 1

As a first stage, a comparative analysis of commonly used rating systems and frameworks has been undertaken to identify the most commonly occurring environmental and social sustainability features as it is postulated that they both represent the factors which stakeholders consider most important and are therefore those which will be most likely to impact on return and risk. No weights have been attributed to any individual factor of those selected as the modelling should reveal the degree of impact**.** Additionally, there is a concern that if weights are attributed, these will vary from country to country due to climatic, economic and social factors. For example, issues of energy efficiency are likely to have larger impacts in countries with more extreme weather patterns and high energy costs; similarly water conservation has greater impact in areas with low natural resource. Set out below is the result of initial analysis.

For the purpose of this research it is important to adopt a set of criteria independent of any rating system as it is anticipated that very few, if any, of the trial properties to be included in the project will have achieved any accreditation mark, due to the low incidence of rating systems.

Step 2

Step 2 is the development of an initial analysis tool. The initial methodology considered was the development of a multi-factor regression model, such as that used by, for example Eichholtz *et al.* (2009) and Fuerst and McAllister (2008; 2010), combined with a binomial real options analysis (Bernet, 2007). Such a methodology would take into account both the uncertainty and the flexibility inherent in sustainability issues, such as evolving changes in building legislation, quality standards and energy prices. However, the Team have concluded that such an approach might be too complex to yield meaningful results, given the paucity of data likely to be available when the empirical work commences. Accordingly, this is being re-considered and set out below is the results of deliberations to date with a proposed simplified model of sustainability worth.

One key difference between the analysis undertaken by most other researchers and this research is that, like the ISPI model; which comprises a simple time series of financial performance of 'more sustainable' properties against others within the portfolio, the model will build in valuation, as opposed to transaction, data. However where it departs from the ISPI is that it will include a range of key economic indicators that can normally explain significant amounts of property performance. By this mechanism it is intended to isolate performance related to factors not currently priced (i.e. sustainability criteria).

Step 3

Step 3 will be trial the model on a selection of institutional grade properties. To date, the Research Team, have obtained 'buy-in' from a range of investors such that a data set of some 300 office and retail commercial properties should be achieved[1]. It is anticipated that this step will reveal that the data required to run the model may be simply unavailable in many cases as it will either not exist, or not be held by portfolio managers in a systematic and consistent way. This in itself will be an important finding as it will indicate the level of work required to achieve the sustainability transparency that is required for informed decision making.

Step 4

In the light of the results of Step 3 the model will be revised with a view to making it more robust and possibly simpler if that is all that the data will allow. Further recommendations for data transparency will be made. .

5.0 Findings to Date

5.1 An analysis of Rating Tools

As outlined above, Step 1 of the project involved developing a qualitative comparative matrix of numerous rating systems across Europe. The fundamental aim of the matrix is to identify the most commonly occurring environmental and social sustainability features

[1] Whilst a range of investors have agreed to participate it is considered premature to release their identifies. The portfolios will consist of properties within Germany, France, Egnland Switzerland, Austria, Central Europe, Benelux and the Nordics initially.

and extract those criteria which are viewed as most important to stakeholder regardless of individual locales and by inference, those which are most likely to impact upon risk and return. The base categories for the matrix are largely drawn from the European Commission (EC) LEnSE project (2008) as these were considered to represent the full spectrum of sustainability considerations and as such, provide the basis to establish the extent to which the identified rating systems map to a holistic view of sustainability.

Initially, the following rating systems have been identified and assessed:

- BREEAM
- LEED
- HQE
- DGNB
- ISPI
- IPD Environment Code
- Green Rating Initiative
- SB Framework (iiBSE)
- PromisE

Some of these rating systems have a global application (for example BREEAM and LEED), whilst others focus are country specific such as HQE (France) or DGNB (Germany). For the purposes of the matrix, weightings applied to the various criteria have been intentionally overlooked as these will be shaped by the underlying social, economic, physical and legislative characteristics of its host nation or region.

Although further analysis of identified rating systems needs to be carried out and other systems employed within Europe identified, the initial results provide some early indication of the key criteria for consideration[ii]. Headline findings include:

- Uptake and usage of building rating systems across Europe is relatively limited compared to the US, confirming the findings of Kok *et al* (2010). This means that any large-scale modelling of sustainability data must be based upon data obtained individually from each building manager; an approach whereby the financial performances of rated buildings compared with non-rated building is simply not tenable. Indeed it was for this reason that the ISPI is based on a questionnaire response from asset managers. Further it is expected that as comparatively few buildings in Europe have ratings, to compare on this basis might be misleading as it is quite possible that buildings with high sustainability scores may well not have any rating label.

- Eight key sub-issues emerge as core criteria (appearing in 6 or more of the systems analysed) primarily falling into environmental or socio-environmental:

    - Non-renewable energy use
    - Non hazardous waste generation/disposal
    - Fresh/mains water consumption
    - Lighting and visual comfort
    - Thermal comfort
    - Ventilation conditions
    - Public transport – frequency and proximity

- Provision of adequate cycling facilities

- The aspects most readily considered tend to be those most capable of quantitative assessment; however, whilst they do address aspects of key environmental concerns such as energy, waste and water, they are far from providing a holistic approach to sustainability and appear to be more appropriately labelled as 'green' than 'sustainable'. This is clearly demonstrated by the fact that coverage of biodiversity and community aspects is the most patchy amongst the systems analysed;

The purpose of this analysis is to identify a set of independent criteria that are perceived to be important to the understanding of sustainability as applied to commercial buildings. Whilst some are matters over which the investor who is purchasing existing buildings can have no control, such as those related to initial specification or construction processes, others are related to the in-use performance of existing buildings and can be pro-actively managed. It is the latter which are more likely to have an ability to relate to ongoing financial performance. As the project is geared towards a pan-European understanding, the drive is also to identify aspects which are not country specific.

Therefore questions to be answered in the remainder of this project are:

- How many of the identified factors really matter for stakeholders?
- How are factors being weighted by stakeholders – if at all? and
- If the factors can be weighed – should such weights apply equally across countries?

Whilst the matrix identifies those criteria which are, by inference, most important to stakeholders and as such, those that should be considered for initial testing and inclusion within the model in later stages, data availability will be a major practical consideration. A number of the criteria identified within the analysis may only be collected in the event that an individual property or development undergoes a formal certification process and may not be easily captured during the in-use phase of the property. Additionally, the actual measurement of certain metrics by investors will inevitably have some bearing on those criteria most appropriate for further consideration.

As such, these findings and the matrix itself will prove an important asset in developing sustainability relevance in European real estate and identifying the scope of work required to achieve the level of sustainability transparency needed to effectively support investment decision-making.

On the basis of the research described above the intention is also to develop transparency and understanding of sustainability relevance in European Real Estate, identifying the countries in Europe which are most sustainable when it comes to real estate investments and developments. This should support international investors and developers in their decision making in relation to countries they want to invest in.

5.2 A Sustainability Worth Analysis Model: first steps

In earlier research, capital worth was modelled using an adapted discounted cashflow approach (for example Ellison & Sayce, 2006 and Meins *et al*. 2009). This methodology allows for expectations of cashflows and their distributions in time to be assessed, but takes the approach that risk can be reflected within the discount rate applied to the cashflows. Other research approaches have sought to consider the interaction of some sustainability defined criteria with transaction data.

A multi-factor regression is usually applied to identify these risk factors and to model their pricing (for example Fuerst & McAllister 2008; Eichholz, Kok & Quingley 2009). To date, most analyses that have been undertaken have used conventional investment theory based on cashflow analysis and/ or on standard regression analysis. Further the research has only tested the relationship between market values and energy and sustainability certificates and even here only weal linkages have been established. But as these approach are based on the assumptions of decision making utilising modern capital market theory, it is open to challenge given the fundamental changes in approach to decision criteria that are emerging consequent on the global financial crises. Today and in the future, investment worth has also to include the uncertainty of strategic choices in a highly flexible and dynamic management environment. In short, the rules of the investment game are beginning to change as new views on risk are emerging.

What is emerging with the new finance theories are for example an approach to the assessment of capital worth based on real option analysis and the theory of strategic games (for example Smit & Trigeorgis 2004 and Dixit & Skeath 2004). In particular, this approach allows the investor to assess the strategic worth of management options such as corporate social responsibility policy, sustainability reporting, sustainability certification, green leases and other management choices taken under uncertainty and flexibility. It also allows for the *deferring* of decisions in ways not normally contemplated under the NPV/IRR regime.

For this research an integrated concept has been tentatively developed, modelling sustainability worth in the full context of the property, its environment, social and economic performance and its management. The simplified model to be adopted, and which is offered for discussion is:

TRUE INVESTMENT WORTH
= Capital Worth + Sustainability Worth + Strategy Worth

where

- CAPITAL WORTH
  = NPV of cash flows from operating, investment and finance of PROPERTY
- SUSTAINABILITY WORTH
  = NPV of cash flows from natural, social and economic ENVIRONMENT measured against benchmarks
- STRATEGY WORTH
  = NPV of cash flows from asset, portfolio and investment MANAGEMENT

(NPV: Net present Value;
Sustainability worth is allowed for as either positive or negative.)

Capital worth is taken to be the net present value of all cash flows from the operating, the investing and the financing activities for the property. Sustainability worth is the net present value of all cash flows from an assessment of the sustainability characteristics, including environmental, social and economic metrics measured against a benchmark and the economic environment and strategic worth is the net present value of all cash flows from the dynamic interplay between the asset, the portfolio and the investment management. Special attention has to be given to avoiding double counting.

The model for investment worth has to test for explanations of values, rents, vacancies, costs, taxes, duration over time in terms of potential drivers of capital worth, sustainability worth and strategy worth. Potential drivers of the investment worth include investment grade, market sector, country and location, transportation and access, efficiency of space use and other factors normally included within a conventional appraisal. Potential sustainability includes energy use and source, water conservation, waste management measures, resilience to flood and other sustainability criteria as decided following the conclusion of the sustainability tools analysis. Potential drivers of the social environment include population, education, productivity as well as indoor light quality, indoor air quality and others. Potential drivers of the economic environment include sectoral diversity, economic growth, interest rates, inflation and others. Finally, potential divers of management include corporate policy, sustainability reporting, certification standards, green leases and others.

6.0 The way forward

This project is still at an early stage and this paper presents the first steps only. The overall aim is to contribute to the debate and professional knowledge base regarding the link between real estate financial performance and sustainability characteristics. Literature has revealed a lack of empirical evidence within Europe of any such linkage; even in the US where more systematic projects have been based, the linkage is still slight and primarily related to rental values and LEED or Energy Star with the latter showing the strongest results.

One of the key issues within Europe is the small number (in both absolute and comparative terms) of properties that have achieved any sustainability rating.

Additionally, where such ratings exist they are normally expressed as a single global figure which does not separate performance under each head. Therefore buildings with the same rating could have very differing sustainability profiles; this makes it very difficult to develop a deep understanding of which characteristics are, or are not, in reality taken into consideration by investors during their decision making process.

Accordingly, this research is seeking to agree, with investors a series of simple metrics that can realistically be applied to a sample of commercial buildings in a variety of northern European countries and sitting within a range of portfolios. The sustainability data (sustainability worth) for each will then be collected and combined with a range of factors that are normally included within standard portfolio appraisals (investment worth) and tested in order to test whether and to what extent sustainability and strategic considerations are being factored into decision making processes. It is acknowledged that the methodology is current experimental and that there will be challenges in collating the data, much of which may not be available from all properties within the sample. Nonetheless, by so doing it is hoped that greater transparency may be achieved.

Bibliography

Bernet, J. (2007) *Selection and Timing of Real Estate Investment under Uncertainty* [German title: Immobilieninvestitionen in unsicheren Märkten – Optionen für Selektion und Timing], in: Mayrzedt, Geiger, Klett, & Beyerle (Ed.), Internationales Immobilienmanagement, Verlag Wahlen, Munich, pp. 375-395.

Bienert, S. Wagger, C. And Steixner, D (2008); Models to Evaluate the Quantitative Effects of Climate Change on Real Estate Markets paper to 14th PRRES Conference Paper, Kuala Lumpur, 20-23 January

Boyd, T. (2005) *Can We Access The Worth of Environmental and Social Characteristics In Investment Property?* Brisbane; Queensland University of Technology; Australia.

De Francesco, A. & Levy, D. (2008) *The Impact of Sustainability on the Investment Environment: a Case Study of Australia* RICS Research

Dixit, A. & Skeath, S. (2004) *Games of Strategy*, W.W. Norton & Company, 2nd Ed., New York.

Eichholtz, P. Kok, N. and Quigley, J. M. (2009) Doing Well By Doing Good? An Analysis of the Financial Performance of Green Office Buildings in the USA; A Research Report; RKS London.

Ellison, L. and Sayce, S (2006) *The Sustainable Property Appraisal Project* Kingston University.

Fuerst, F. and McAllister, P. (2008) *Pricing Sustainability: An Empirical Investigation of the Value Impacts of Green Building Certification.* Florida, USA; *American Real Estate Society Conference.* 16-19 April 2008.

IPD (2009) Introducing ISPI: presentation to IPF June 2009.

Kok, N.; Eichholtz, P.; Bauer, R. & Peneda, P. (2010) *Environmental Performance: A Global Perspective on Commercial Real Estate,* Netherlands: Maastricht

LeNse Project (2008) Methodology Development towards a label for environmental, social and economic buildings www.lensebuildings.com

Lorenz, D. & Lützkendorf, T. (2008) *The Case of Transaction Data – Availability and Scope* RICS EU Advisory Group on Sustainable Property Investment and Management Meeting, Brussels, 7 March

Meins, E.; Wallbaum, H; Hardziewski, R; and Feize, A (2010) Sustainability and Property Valuation: a risk-based approach *Journal of Building Research and Information* 38 (3) pp: 280-300

Reed R. G. and Wilkinson, S. (2008). The Increasing Importance of Sustainability for Building Ownership. *Journal of Corporate Real Estate*, 7(4), pp.339-350

RICS (2009) *Valuation Information Paper 13*

Sayce, S. Sundberg, A. and Clements, W (2010) *Is Sustainability reflected in Commercial Property Prices: a review of the evidence base*. London: RICS Research

Smit, H.T.J. & Trigeorgis, L. (2004) *Strategic Investment – Real Options and Games*, Princeton University Press, Princeton NJ.

[i] ISPI utilises data from the IPD databank. Of approximately 10,000 properties tracked by the database sustainability data is only available for some 750 properties of which approximately 78 have been found to meet the criterion of 'more sustainable'

[ii] The full table will be made available on request