

RETROFITTING COMMERCIAL OFFICE BUILDINGS FOR SUSTAINABILITY: TENANTS' EXPECTATIONS AND EXPERIENCES

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ABSTRACT

Introduction

Buildings, which account for approximately half of all annual energy and greenhouse gas emissions, are an important target area for any strategy addressing climate change. Whilst new commercial buildings increasingly address sustainability considerations, incorporating sustainability technologies in the refurbishment process of older buildings is technically, financially and socially challenging. This research explores the expectations and experiences of commercial office building tenants, whose building was under-going sustainability retrofitting.

Methodology

Semi-structured in-depth interviews with seven residents and neighbours of a large case-study building under-going sustainability refurbishment in Melbourne, Australia. Built in 1979, the 7,008m² 'B' grade building consists of 11 upper levels of office accommodation, ground floor retail, and a basement area leased as a licensed restaurant. After refurbishment, which included the installation of chilled water pumps, solar water heating, waterless urinals, insulation, disabled toilets, and automatic dimming lights, it was expected that the environmental performance of the building would move from a non-existent zero ABGR (Australian Building Greenhouse Rating) star rating to 3.5 stars, with a 40% reduction in water consumption and 20% reduction in energy consumption. Interviews were transcribed, with responses analysed using a thematic approach, identifying categories, themes and patterns.

Results

Commercial property tenants are on a journey to sustainability - they are interested and willing to engage in discussions about sustainability initiatives, but the process, costs and benefits need to be clear. Critically, whilst sustainability was an essential and non-negotiable criterion in building selection for government and larger corporate tenants, sustainability was not yet a core business value for smaller organisations – whilst they could see it as an emerging issue, they wanted detailed cost-benefit analyses, pay-back calculations of proposed technologies and, ideally, wished they could trial the technology first-hand in some way. Although extremely interested in learning more, most participants reported relatively minimal knowledge of specific sustainability features, designs or products. In discussions about different sustainable technologies (e.g., waterless urinals, sustainable carpets), participants frequently commented that they knew little about the technology, had not heard of it or were not sure exactly how it worked. Whilst participants viewed sustainable commercial buildings as the future, they had varied expectations about the fate of existing older buildings – most

felt that they would have to be retrofitted at some point to meet market expectations and predicted the emergence of a ‘non-sustainability discount’ for residing in a building without sustainable features.

Discussion

This research offers a beginning point for understanding the difficulty of integrating sustainable technologies in older commercial buildings. Tenants currently have limited understandings of technology and potential building performance outcomes, which ultimately could impede the implementation of sustainable initiatives in older buildings. Whilst the commercial property market is interested in learning about sustainability in the built environment, the findings highlight the importance of developing a strong business case, communication and transition plan for implementing sustainability retrofits in existing commercial buildings.

Keywords: commercial buildings, retrofitting for sustainability, qualitative research

As buildings are responsible for nearly half of all global energy and greenhouse gas emissions, there is increasing pressure for the design, construction and maintenance of the built environment to be environmentally sustainable (Brown *et al.*, 2005; Commission for Architecture and the Built Environment, 2007). Indeed, internationally, many government agencies and private organisations are mandating the integration of environmentally sustainable development (ESD) principles in commercial buildings and enforcing sustainability benchmarks for buildings (Madew, 2006). Yet, whilst it is relatively easy to incorporate sustainability technologies and initiatives into new buildings, retrofitting existing buildings for sustainability is much more difficult. Thus, to better understand the challenges, this paper explores the experience of residents and neighbours of a large case-study building under-going sustainability refurbishment in Melbourne, Australia.

Sustainable commercial buildings

There is a wide diversity of definitions for a ‘sustainable’ building, but the Green Building Council of Australia (Madew, 2003, p.15) defines it as one that “incorporates design, construction and operational practices that significantly reduce or eliminate the negative impact of development on the environment and occupants with strategies for addressing: energy efficiency; greenhouse gas emission abatement; water conservation; waste avoidance, reuse and recycling; pollution prevention - noise, water, air, soil & light; enhanced biodiversity; reduced natural resource consumption; productive & healthier environments; flexible & adaptable spaces”. Similarly, Lucuik (2005) argues that the essential difference between a sustainable and conventional building is that sustainable buildings offer healthier interior spaces and include measures which reduce a building’s ecological footprint. Critically, there has been significant market transformation towards sustainable buildings due to their environmental, social and economic benefits. As well as reducing environmental impact through energy and water efficiency, research suggests that sustainable buildings are cost-effective and enhance occupant wellbeing and productivity (Madew, 2003). Yet, whilst it is relatively easy to integrate standard sustainable features and products into new buildings, a key challenge is the retrofitting and refurbishment of existing buildings.

Retrofitting commercial buildings for sustainability

Existing buildings, designed without sustainability as a key consideration, are much less energy and resource efficient than most new buildings. Retrofitting existing buildings for sustainability is much more challenging, however, than designing a new sustainable building from scratch. Retrofitting for sustainability is typically viewed as expensive and disruptive, with building owners wary of the design challenges and costs and building users resistance to change and the disruptive process (The Royal Institution of Chartered Surveyors, 2007). Fortunately, there is increasing international pressure for action; for example, in May 2007, under the banner of the Clinton Climate Initiative (CCI, 2010), former President Bill Clinton announced the creation of a global Energy Efficiency Building Retrofit Program. In an attempt to reduce energy consumption in existing buildings, the program brings together energy service companies, banks, and fifteen of the world's largest cities, including Melbourne in Australia. The participating city councils will retrofit buildings and develop incentives to encourage private owners to audit and retrofit buildings, with the energy service companies conducting audits to identify energy efficient opportunities and the banks financing these retrofits at no net cost (paybacks for the loans plus interest will come from future energy savings). Initiatives such as these are designed to foster the implementation and uptake of sustainable interventions into existing commercial buildings.

In Australia, the reality is that older existing buildings comprise the bulk of commercial office accommodation: according to the Property Council of Australia's (PCA) Major Office Market Report (2005, cited in Madew, 2006), existing B and C grade (i.e., non sustainable) buildings comprise over half (53%) of the existing office building stock. Thus, like many developed economies, making the transition to a sustainable built environment will require significant investment from developers and property owners. And despite the environmental benefits of retrofitting for sustainability, there remain significant economic and social barriers. First, from an economic perspective, although several studies have demonstrated that sustainability initiatives are, in the long-term, cost-neutral and often significantly reduce expenses deriving from water and energy consumption (see Davies 2005; Lucuik, 2005), the reality is that an initial financial outlay is necessary to install sustainability features in existing commercial buildings. Second, from a social perspective, there needs to be a demand for supply – for substantial change to occur, citizens (especially tenants) need to place a value on sustainability and demand that existing buildings adopt sustainable initiatives and practices.

The reality is that, regardless of the ability of designers and constructors to create high quality sustainable built environments, the cost involved with incorporating sustainable features in either new or existing assets means that it will only become mainstream when tenants demand it. This is particularly problematic given the almost inevitable degree of disruption associated with any building renovation – as Pivo (2010) explains through eight examples from the United States, Europe, and Australia, whilst improving existing commercial buildings is better than demolition, it is often more difficult because there must be cooperation between owners and tenants. Indeed, even the development and construction of a new sustainable building can be very challenging, as Brown and Vergragt (2008) documented via a recent case study and interviews with six project management team

members (architects, developer, urban planner, energy analyst) involved with a new zero-energy residential building in Chicago. Focussing on problem definition, learning style and processes, Brown and Vergragt (2008) found that ensuring key stakeholders share the same vision, and are open to sharing ideas and learning together was critical to the success of the project. Rohracher and Ornetzeder (2002) explored the impacts of living in green buildings on occupants and found that only owners of apartments, who participated in planning, design and construction decisions accepted and incorporated new sustainable energy-saving technologies into their daily lives. Apartment tenants, who did not participate in the decision-making process, were much less positive. Such findings raise interesting questions about how tenants of existing non-sustainable commercial buildings might experience and react to decisions to retrofit for sustainability, especially when the retrofitting process is disruptive and owner-driven.

To date, very little is known about how commercial building occupants view and experience retrofitting for sustainability. Thus, to begin to fill this knowledge gap, our exploratory qualitative research explores the experience of residents and neighbours of a large case-study building under-going sustainability refurbishment in Melbourne, Australia. Three research questions drove this study: (a) do commercial building tenants perceive sustainability as a key criterion in building selection; (b) what is the existing knowledge base and relative importance of sustainability for commercial building tenants and (c) what is the actual experience of undergoing sustainability refurbishment.

Method

Participants and procedure

Five residents (50% of the current tenants) and two neighbours (a state government representative and a leasing agent) of the case-study building in the central business district of Melbourne, Victoria were interviewed. Whilst only a relatively small number of participants were interviewed (n=7) in this exploratory study, it is important to remember that in qualitative research: “the success of a study is *not* in the least dependent on sample size, it is *not* the case that a larger sample necessarily indicates a more painstaking or worthwhile piece of research. Indeed, more interviews can simply add to the labour involved without adding anything to the analysis” (Potter & Wetherell, 1987, p. 161). Potential interviewees were contacted via email and phone and invited to participate in an in-depth interview exploring sustainability issues in commercial buildings. Participants received an information packet and consent form which provided details of the project. The interviews, which lasted between 45 minutes and 2 hours, were conducted in a convenient location chosen by the participant. A semi-structured discussion format was utilised to explore perceptions of sustainable features and services in existing commercial buildings, focussing on the interviewees’ experiences and understandings. The following areas were broadly covered: key factors influencing commercial building selection, experience in case-study building (including refurbishment process), knowledge of sustainable initiatives, designs and technologies, and the relative appeal of sustainability from personal and corporate decision-making perspectives.

Case Study Building and Locality

At the time of interviews (late 2007), the large case-study building was under-going refurbishment for sustainability. Built in 1979, the 7,008m² 'B' grade building consists of 11 upper levels of office accommodation, ground floor retail, and a basement area leased as a licensed restaurant. After refurbishment, which included the installation of chilled water pumps, solar water heating, waterless urinals, insulation, disabled toilets, and automatic dimming lights, it was expected that the environmental performance of the building would move from a non-existent zero ABGR (Australian Building Greenhouse Rating) star rating to 3.5 stars, with a 40% reduction in water consumption and 20% reduction in energy consumption. This building was located in the central business district of Melbourne, the state capital of Victoria in Australia. Whilst sustainability considerations are increasingly important in all of Australia, Victoria in particular has made sustainability in the built environment a top priority and views itself as a world leader in this area. This is demonstrated by Melbourne's participation (one of only 15 cities worldwide) in the Clinton Climate Initiative's Efficiency Building Retrofit Program (CCI, 2010).

Analysis

Transcripts and responses were analysed using a thematic approach, identifying key categories, themes and patterns. The process of identifying, categorising and coding data, described by Punch (1998) as "putting tags, names or labels against pieces of the data" (p204), helps reduce and simplify the vast amount of data and identify dominant themes. A key focus was to identify the extent of convergence or divergence in views on the relative importance of sustainability in existing commercial buildings.

Results

All participants felt there had been a significant growth in demand for sustainable buildings, as people have become more aware of the importance of conserving the natural environment and the impact buildings have. As the quote below illustrates, making commercial buildings sustainable was seen as the responsible and '*right thing to do*'. In particular, tenants described how staff and clients expected their business to be sustainable, and the younger generation in particular were increasingly expecting to "*help save the environment at home and work*". Having a sustainable office was increasingly viewed as a factor in recruiting staff, with several participants indicating that potential staff (primarily Generation Y) had asked in interviews what the organisation did to promote sustainability.

Residing in a sustainable building is very important – it reduces my outgoings which means I make more money. It creates a better work environment which means my staff will want to come to work because the place is attractive, pleasant and comfortable. And I think consciously or subconsciously they feel that they are making a contribution because they are working in a work environment that is in a sustainable building and the other things is that I can say to my clients this is part of my commitment.

To me it would be ridiculous to be looking after the staff's wellbeing without having environmental policies in place. I occasionally get asked about our environmental policy. They want to know what we do – if we have a social conscience. They want to know what we do for the environment, whether we give to charity and what charities we give to.

Making older buildings 'sustainable'

With sustainable commercial buildings viewed as the future, participants had varied expectations about the fate of existing older buildings. Although most felt that there would

always be a place for older non-sustainable buildings, there was an expectation that most would have to be retrofitted at some point to meet market expectations.

I think there are people out there looking for that competitive edge. Not only in terms of being able to brag about the fact that they have 5 star [sustainability] rating, but also increasingly with the cost of overheads

Owners who don't take this [sustainability] approach now or in the near future will basically rule themselves out of obtaining about 70% of the marketplace. If you don't address this, you are going to be left behind the eight ball and you will find it will eventually hit your hip pocket because you haven't done it.. so you are better off spending the dollars now, meeting the tenants needs.. where the market is going now.

There was a view that older commercial buildings could not be brought up to the ideal sustainability standard and thus should be either demolished or turned into residential apartments. Others suggested that as sustainable buildings become mainstream, there may be a 'non-sustainability discount' for residing in a building without sustainable features. The argument was that as operating costs (i.e., water & energy) would be lower in a sustainable building, there should be a rental subsidy in non-sustainable buildings to compensate for this.

Sustainable technologies: aware, but not knowledgeable

For many, sustainability in commercial buildings was currently a relatively abstract concept. Participants frequently described themselves as '*aware, but not knowledgeable*' about sustainable technologies. In addition, although generally supportive of sustainable technologies, occasionally there were questions about whether there was the same standard of quality in services (particularly among the potentially less well tested and developing technologies) and demand for specific cost-benefit analyses. In discussions about different sustainable technologies (e.g., waterless urinals, sustainable carpets etc), participants frequently commented that they knew little about the technology, had not heard of it or were not sure exactly how it worked. Comments such as the following, in response to a question about waterless urinals, were common: "*I've heard of them but I don't know a great deal about it. If they do the work as well as the ones with the water in them and they are still as clean and sanitary then I think it is great*". Many current tenants of the case-study building also wanted to be convinced of the financial value of sustainable initiatives. They wanted tangible evidence through exposure to case-study buildings, detailed cost-benefit analyses, examples, and the ability to trial and 'see it in action'. The cost was critical, with sustainability "*not a big factor, not overtly prioritised....need to convince him [management] why this would be good for 'me' – I think it is always for 'me' first then the environmental benefit because it is really all about me – in the society we are living in and the business definitely it is always at the bottom dollar*".

Role of organisational size in commitment to sustainability

Interestingly, the relative importance and experience of sustainability in commercial buildings differed considerably as a function of organisation size. For smaller organisations, sustainability was not yet a core business value. The greatest barrier to sustainability raised by smaller organisations was cost, with participants expressing a desire to see detailed cost-benefit analyses and pay-back calculations of proposed technologies and, ideally, wished they could trial the technology first-hand in some way. Notably, although current tenants did not

want to pay more rent, most were open to discussions about the implementation of sustainable initiatives, particularly those associated with reducing energy (i.e., lighting and air-conditioning). In general, smaller organisations were relatively unaware and uninterested in cost-sharing arrangements and partnerships, such as 'green' leases, which were perceived to be too complicated. For government and larger corporate tenants, however, sustainability was a critical factor and they *expected* to reside in sustainable and green star rated buildings. Sustainability was the norm and residing in non-sustainable buildings was *not an option*. Essentially, sustainability was a non-negotiable criterion in building selection for government and larger private organisations. To capture this market, some participants recommended that owners and landlords seize opportunities (i.e., vacancies) to integrate sustainable features and 'future-proof' buildings or they would be ruled out of the majority of the market in the future.

Experience of refurbishment in case study building

In terms of the case-study building, tenants were clear about their likes and dislikes. Participants were extremely satisfied with the natural light and views offered by the building, emphasising the benefits of the layout and location. On the other hand, the lifts and general 'oldness' of the building were negatives. The refurbishment process was described as never-ending, with some noting that if the installation of sustainable initiatives took as long and was as disruptive they would have to think 'long and hard' about the cost-benefit balance.

One thing we have noticed here is how disruptive the work is progress are – we've had constant clients come in and there is noise. And if someone said to us for the next five years to upgrade to set to a certain standard there would be noise all the time there would be some kind of consideration about leaving the building and obviously that wouldn't be so great for us... but ultimately that building would be up to scratch eventually

Case-study building tenants emphasised the importance of retrofitting in a manner which is cost-effective (i.e., immediately obvious initiatives, such as smart/low-energy lighting and air-conditioning) and socially-acceptable (i.e., minimal impact on existing tenants). However, on the other hand, one tenant encouraged the owners and management to be innovative and 'think outside the box' in terms of retrofitting the building, possibly via the development of a roof-top garden and communal space.

Discussion

This research offers a beginning point for understanding the difficulty of integrating sustainable technology in older commercial buildings. Tenants currently have limited understandings of technology and potential building performance outcomes, which ultimately could impede the implementation of sustainable initiatives in older buildings. Whilst the commercial property market is interested in learning about sustainability in the built environment, the findings highlight the importance of developing a strong business case, clear communication about the benefits and a transition plan for implementing sustainability retrofits in existing commercial buildings. Whilst conducted in Australia, we believe these findings are applicable to commercial building sustainability retrofitting and refurbishment programs in most Western contexts and provide some valuable lessons for those wishing to implement such initiatives.

Overall, there is little doubt that participants were supportive of sustainability as a general principle and the idea of residing in a sustainable commercial building. They felt that residing in a sustainable building is a relatively easy way through which organisations can

demonstrate their commitment to the TBL philosophy, integrating economic, social and environmental considerations. This research suggests that the tenants of the case-study building are interested and willing to engage in discussions about sustainability initiatives, but that the process, costs and benefits needed to be clearly delineated. In light of these findings, there are three key recommendations.

First, with participants unanimously expecting sustainability in commercial offices to become standard in the next decade or so, it is clear that making the transition to sustainability should be a priority. Larger and government tenants will not consider non-sustainable commercial office buildings, with smaller tenants anticipating the emergence of a 'non-sustainability discount' for residing in a building without sustainable features that would cost them more in terms of utility outgoings (e.g., electricity, water). This is consistent with two recent Jones Lang La Salle reports (Hilderson, 2004; Wallbank 2006), which have highlighted the possibility of market-driven non-sustainability discount, which is essentially the opposite notion of a 'green' lease. Specifically, the reports raise the possibility that while "*tenants currently may not be willing to pay a premium rental for buildings with sustainability features, some tenants will very soon come to expect a discount to occupy buildings that do not have these features*" (Wallbank, 2006, p6). Thus, although change is not easy, given trends in the marketplace indicating 'sustainability' is good for asset value and may soon be non-negotiable, building owners need to consider building a sustainability retrofitting program into their planning.

Second, whilst generally accepting of the main environmental, financial and social benefits of sustainability, smaller organisations needed to see tangible proof and detailed cost/benefit analyses of specific sustainability features. Thus, occupant education regarding these issues (and particularly the cost benefit of them) needs to clearly quantify the financial and non-financial costs and benefits of each feature. Of concern is the finding that most participants reported relatively minimal knowledge of specific sustainability features, designs or products. Such limited knowledge highlights the importance of generic industry and consumer awareness-raising activities, illustrating that researchers need to work harder to ensure that the business case for sustainability is clear and convincing. Third, unlike new buildings, existing buildings need to be retrofitted, which inevitability involves some disruption for existing tenants. With case-study building tenants currently experiencing significant disruption due to ongoing refurbishment, they felt that the benefits of further retrofitting would have to be very clear; thus, we recommend the development of a clear transition plan, outlining the timeline, information and cost benefits of each sustainable feature or new technology essential.

Finally, we must acknowledge the limitations of our exploratory qualitative research, which is based on in-depth interviews with seven commercial building tenants in Melbourne, Australia. Obviously, we cannot draw generic conclusions from one small case study and our hope is that these findings will inspire other researchers to explore the experience of sustainability refurbishment and retrofitting. We would argue that although the attitudes and experiences described are not that dissimilar to those highlighted in other economies, future international and quantitative research is clearly needed to further explore these issues. Critically, whilst our study is obviously small scale, it has considerable depth: the building is

quite typical of much of the stock in central business districts across Australian cities and the profile of their tenant base. Our findings provide a unique insight into the challenges of retrofitting existing commercial buildings for sustainability and the expectations and experiences of tenants.

References

Brown, M., Southworth, F., Stovall, T. *Towards a Climate-Friendly Built Environment*, Arlington, VA: Pew Center on Global Climate Change, 2005. Retrieved 20/1/11 from: <http://www.pewcenteronthestates.org>.

Brown, H.S. , Vergragt, P.J. Bounded socio-technical experiments as agents of systemic change: The case of a zero-energy residential building. *Technological Forecasting & Social Change*, 75, 107–130, 2008

Clinton Climate Initiative. *Energy Efficiency Building Retrofit Program*, 2011. Retrieved 20/01/11 from: <http://www.clintonfoundation.org/cf-pgm-cci-home.htm>

Commission for Architecture and the Built Environment. *Sustainable design, climate change and the built environment*, 2007. Retrieved 20/09/10 from: www.cabe.org.uk/AssetLibrary/10661.pdf

Davies, R., Ed. *Green Value - Green buildings, growing value*. London: Royal Institution of Chartered Surveyors, United Kingdom, London, 2005.

Hilderson, P. *Commercial Property Going Green*. Jones Lang LaSalle, Australia, 2004.

Lucuik, M. *A Business case for Green Buildings in Canada*, Canadian Green Building Council, 2005. Retrieved 10/10/09 from:

www.cagbc.org/uploads/A%20Business%20Case%20for%20Green%20Bldgs%20in%20Canada.pdf

Madew, R. *The Dollars and Sense of Green Building - Building the Business Case for Green Commercial Buildings in Australia*. Green Building Council of Australia, Australia, 2006.

The Royal Institution of Chartered Surveyors, *Transforming Existing Buildings: The Green Challenge*, United Kingdom, 2007. Retrieved 9/3/2011 from: www.rics.org/site/download_feed.aspx?fileID=907&fileExtension=PDF

Pivo, G. Owner-Tenant engagement in sustainable property investing. *Journal of Sustainable Real Estate*, 2(1), 184-199, 2010.

Potter, J. & Wetherell, M. *Discourse and Social Psychology*. London: Sage Publications, 1987.

Punch, K. *Introduction to Social Research: Quantitative and Qualitative Approaches* London: Sage Publications, 1998.

Rochracher, H., Ornetzeder, M. Green buildings in context: improving social learning processes between users and producers, *Built Environment*, 28 (1), 73–84, 2002.

Wallbank, C., Hilderson, P., Apted, J. *Assessing the Value of Sustainability*. Jones Lang LaSalle, Australia, 2006.