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BREEAM Excellent: Business Value Vs Employee Morale

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Abstract. BREEAM is gaining popularity in the UK. Similar green building standards have gained popularity worldwide. However, it is important that we analyse the actual value added to a business by having a BREEAM rated facility. It is also important to analyze the impact on employee performance of such a facility. This paper presents a case study of a BREEAM excellent rated building with impact on the morale and performance of the employees. The data for the paper was collected using semi-structured interviews of a group of employees who work at this facility located in Glasgow. The results suggest that it is important to highlight the tangible benefits and value added through the implementation of the BREEAM standard.

1. Introduction

In June 2011 the Committee on Climate Change (CCC) issued a report stating that the CO2 emissions for the UK rose by 3% in 2010. David Kennedy, the committees CEO, stated that the government must adopt new tools in order to make emissions fall by 3% per year. Mr Kennedy also added that there has been very little progress in terms of changing consumer behaviour in transport. Transport is just one of a number of key initiatives driving a far reaching sustainable agenda; issues such as energy, waste and water all take centre stage in combating climate change. Many would argue that the one constant seamlessly running through this agenda, and perhaps the most important, is people. According to Jackson (2005) consumer behaviour is a key concern for the impact society has on the environment. Why do we purchase, use, occupy and dispose of products and building in the way that we do? What motivates us to act in certain ways and is there a way to influence this behaviour? The following pilot study explores the attitudes of six building users occupying a BREEAM® excellent rated building with a view to identifying themes for further statistical analysis.

2. Literature Review

During the past 20 years the body of knowledge on sustainability has become replete with numerous assessments, strategies, check lists etc, for measuring and assessing the environmental credential of various building types. This, in turn, has culminated in several Environmental Building Assessment and Rating Tool (EBART) emerging both at National and International levels. Cole (2005) suggests that there is a diverse selection of tools available each with differing levels of complexity with essentially different methodologies. Cole (2005) makes the distinction between such tools as those based on Life-Cycle Assessment (LCA) principles and those that are not. Ding (2007) identifies twenty environment assessment tools both past and present, whilst Haapio & Viitaniemi (2008) identify

sixteen and acknowledge limitations to this given the number of available tools on the market. However, (Forsberg & Malmborg 2003; Cole 2005; Ding 2007; Haapio & Viitaniemi 2008; Yu & Kim 2011) agree that of the vast array of tools available by far the most widely used and well known are BREEAM, LEED, CASBEE, GBTool and Green Star.

The primary focus of many EBARTs, until recently, has been to measure the impact new construction activity has on the environment. Conversely, focus on the impact existing buildings have on the environment is somewhat trailing. BREEAM® and LEED do try to address some in-use issues, predominately through conditioning the internal environment to induce user comfort and satisfaction; although there is little evidence to suggest that such benefits built in to the assessment actually have the desired effect or impact on building occupants.

3. Leadership in Energy and Environmental Design (LEED)

The US Green Building Council (USGBC) developed LEED in 2000 initially to the US market. Essentially this is a point based system that extends to 41 Countries including Canada, Brazil, Mexico and India. The process extends to a number of applications including Retail, Schools and Healthcare and has the capacity to assess new construction, shell & core, commercial interiors, and the operation & maintenance of existing buildings. The scheme comprises seven major categories each containing a varying number of points. The credits are assigned a point value enabling each category to have an overall score. Successfully achieved credits are collated and the total score is converted in to a rating (USGBC, 2011).

4. Building Research Establishment Environmental Assessment Method (BREEAM®)

Building Research Establishment (BRE) introduced their Environmental Assessment Method (BREEAM®) in 1990 Potbhare et al (2009). BREEAM® is generally regarded as the first ever tangible environmental rating system for buildings (Howard, 2005; Xiaoping, 2009). This is essentially a credit based system and is the most widely used scheme in the UK extending to the Netherlands, Norway, Spain and Sweden with the capacity to assess a single building anywhere in the world using Bespoke International. The process extends to a wide range of applications such as Commercial, Education and Health and covers new build construction, refurbishment, fit-out and extensions. The scheme comprises nine major categories, each one dedicated to a particular issue within the built environment. Each major category is then divided in to individual credits that are assigned differing values depending on the scheme and level of commitment required by the client. A set of environmental weightings is given to each major category to enable the credits to be collated together to produce a single overall score and therefore a certified rating. (BREEAM, 2011)

4.1 BREEAM In-Use

In 2009 BRE introduced BREEAM® In-Use (BIU), a completely new scheme relevant only to commercial buildings in occupation. The scheme is essentially self-assessment, carried out by the building/facilities manager who must sit and pass an exam before they embark on the online assessment. The process can be problematic, as highlighted by Watering & Wyatt (2011) as many companies outsource their facilities management role thus diminishing overall control of the asset. The scheme consists of three major parts and uses licensed BREEAM® Auditors, as oppose to Assessors, to issue final ratings.

Part 1 Asset
Part 2 Management
Part 3 Organisational Efficiency

(BRE 2011)

Much of the criteria comes direct from BREs standard scheme and tends to focus more on the asset and the way in which this is managed rather than the way users behave. For example under both

BREEAM® and BIU the management category requests a non-technical building user guide to be provided to the users; however this assumes that the users will read such a document. This emphasises the importance of the individual. Bichard (2011*)* states that *While it is not uncommon to find employees that deny that there is a problem, they are far outnumbered by those who accept that the world is functioning in an unsustainable manner, but do not accept that they, as individuals, or as an employees of a company, have a responsibility to reverse these trends.* Research undertaken by Wood (2006) and Kua (2008) both suggest that people are at the centre of sustainability and therefore human behaviour can have a profound effect on the efficient/inefficient running of a building. Dr Janda, writing in the Architectural Science Review (2009) suggests that the personal actions of individuals account for around half of the energy consumption across sectors and buildings can be designed so that the outcome of an individual's decisions on energy use is lessened.

Both BREEAM® and LEED contain some criteria relating to operational aspects; likewise both schemes possess a version that can be applied solely to existing buildings. As highlighted in the white paper (2010) LEED tends to lean more towards the human comfort indicators such as occupancy comfort, although BREEAM® 2010 does have a mandatory requirement to obtain a BREEAM® in Use certificate within the first three years of operation as part of an exemplar standard. Both main schemes however, tend to focus more on hygiene factors, for example lighting levels, thermal comfort and glare reduction are all contained in the Health & Wellbeing category of BREEAM®. Hertzberg (1968) found, in his two-factor theory that poor working conditions can lead to dissatisfaction amongst employees and, therefore such parameters should rightfully be addressed. However their inclusion does not necessarily result in employees turning off printers, computers and lights or limiting their printing habits. Bichard, (2011) makes an interesting distinction between people turning off a machine for health & safety reasons or to save money is far easier than turning off a machine to cut carbon emissions. This highlights the need for tangibility; employees must see the benefit/impact of their actions to influence behaviour.

5. Human Behaviour

As highlighted above, Bichard (2011) identifies that even though individuals/employees are fully aware of the issues they do not believe that it is their responsibility to reverse current trends. Bickman's study (as cited in McKenzie-Mohr, 2000) carried out research whereby *500 people were interviewed regarding their responsibility to picking up litter, 94% acknowledged responsibility. When leaving the interview, however, only 2% picked up litter that had been "planted" by the researcher*. Persuasion Theory highlighted by Jackson (2005) and Bichard (2011) and Community- Based Social Marketing highlighted by Jackson (2005) and MaKenzie-Mohr (2000) may be possible approaches in the wider agenda of changing individual behaviours.

6. Methodology

The building used for this case study was originally built circa 1920 comprising six stories with a total floor area of 37,703 sq ft (3,503 m2) situated in Glasgow. The basic services comprised 4-pipe Fan Coil Units for both heating and cooling with a central concierge serving all floors. The shell and core of the building had recently achieved a 'good' BREEAM® rating. The focus of this paper concerns one of those tenanted floors that previously underwent a fit-out with the dual purpose of upgrading to BREEAM® excellent. The rationale of this paper considers whether there is any change in occupant behaviour when decanting from a typical 1970's office building to a BREEAM®2006 fit-out excellent rated building and whether the benefits of BREEAM® are relayed to the building users effectively. Under the 2006 version approximately 50 credits encompass the fit-out process of an office building, apportioned between the nine major categories. Each credit possesses different numerical values and the number of credits achieved depends on the level of commitment required by the client. The credit value in total is 97, although a score of 70 and beyond equates to a rating of excellent.

7. Data Collection

Prior to conducting interviews the researchers reviewed the BREEAM®2006 credit table, consisting of 51 credits along with the original BREEAM fit-out report to focus and formulate the questions. This was carried out over three phases. The first phase resulted in the removal of credits that did not directly interact with the users of the building. These generally comprised credits relating to construction management activities surrounding the fit-out works, for example considerate constructors, site waste management, construction site impacts and the like all of which had no bearing on the user. The second phase entailed the removal of credits that did not contain user interaction, feedback systems or did not seek to condition the internal environment. These generally comprised external lighting, major leak detection on the incoming mains supply and the like. The residual credits from phase two was refined again this time focusing and removing those credits that had the potential to result in a 'placebo effect', for example NOx emissions from boilers, refrigerants etc.

8. Interviews

Once the refining process of the credit table was complete the remaining credits could now form the basis of the questions. These were developed around six themes namely services, operation, training, building fabric, travel and impact on home-life. The intention of these themes was to explore whether the building they occupied had an impact on their behaviour and if this continued through to their home-life. A total of fifteen questions were devised relating to: one question about the building fabric, two questions around travel and transport, and eleven questions on the services installed throughout the floorplate. This encompassed three questions on lighting, two questions on sub- metering, two questions on water saving features, one question on waste recycling, and three questions on general services such as heating/cooling, thermostats and the like. Semi-structured interviews were then conducted with six members of staff to explore the experience and attitudes towards the building. All of the staff members who took part in this study had experienced occupation in the original 1970's building for more than 12 months and occupation in the new BREEAM® excellent building for more than 24 months. Four of the occupants were male and came from a professional surveying background ranging from Building Surveying to Valuation, one of which was a graduate. The remaining two occupants were female one of which was an administrator and the other a senior secretary. The six occupant ranged in age from early 20s to late 40s with an average length of employment of around four years.

9. Results

As this is an exploratory study, responses from the interviews were analysed purely on a qualitative basis to identify emerging themes for further statistical analysis. Following the interviews an initial observation to emerge hinged around users feeling a sense of resentment predominately aimed at the building. Many of the users could not quantify the benefits of occupying a BREEAM® 2006 excellent building, as many of the features of BREEAM were not being successfully relayed to the building users. Once the data was collected the responses were analysed using concept mapping techniques to identify emerging themes. These were categorised in to four initial areas namely; training, tangibility, usable benefits and feedback some of which are discussed below.

9.1 Training

The first cluster of questions hinged around the services of the building and how familiar the occupants were with their usability. One question in particular focused on whether the occupants were aware of the location and contents of the building user guide. A 'building user guide' is a feature of BREEAM that awards an addition credit during the design stage if a non-technical document is made available to the users of the building. The guide contains the following information; Building Services Information, Emergency Information, Energy & Environmental Strategy, Water Use, Transport Facilities, Materials & Waste Policy, Re-fit/Re-arrangement Considerations, Reporting Provision, Training, Links & References (BREEAM, 2006). The guide goes further, however and demonstrates the benefits and savings associated with energy saving and efficient fittings throughout the building. Many of the users

expressed a nonchalant attitude when answering this particular cluster of questions and had little regard towards the importance or purpose of the building user guide. One possible explanation for this behaviour could be associated with some of the services being automated and the remaining services being controlled centrally through a concierge. This could leave users feeling like they did not need to read or understand the contents of a user guide, as they have no responsibility in their operation. This is in line with Bichard's (2011) observations whereby individuals do not see it as their responsibility to reverse trends. Therefore the general trend amongst occupants was the lack of importance given to the user guide. By the same token the employer did not make any ongoing attempt to engage the occupants. This was further confirmed during the interviews where the researchers where shown a monthly report on energy consumption distributed to all staff members, however many of them did not understand the information it contained. Concerns with this line of thought are that users overlook a document that actually contains very useful information that could have a positive impact on their behaviour.

Further issues to emerge in this area concerned the ongoing debate between the level of occupant control over their own space and the development of bad habit through too much automation. Veitch & Gifford (1996) state that *the pervasive view is that when personal control is lacking feelings of powerlessness and unhappiness and decreased task performance will follow*. This is further supported by Monfared, (2011) who concluded in her study that an overall lack of control caused further dissatisfaction among occupants. Whereas Bordass (1993) suggests that controls can deliver a high levels of comfort but are usually too complex for the average user to understand. There needs to be a balance between user control and sophisticated automation.

9.2 Tangibility

The results indicated that users react positively where they can see the impact of their actions. The best example of this was in the area of recycling where each of the users interviewed said that this had a positive impact on their behaviour and now actively recycle both in the office and at home. Occupants were asked if information from, for example the sub-meter, was presented electronically where peaks and troughs in the data were clearly identifiable would they investigate this further. All responses suggested that this would make them investigate further. One particular response stated "*If we were given a breakdown of the meter readings then it would probably make me investigate it more and may have an impact on my behaviour at home if I could see the savings and benefits*". However a report is already issued on a regular basis, albeit not presented in its simplest form and many of the occupants do not read it. There is a dichotomy here firstly the way in which data is presented and secondly there is a 'disconnect' between words and actions, as highlighted in Bickman's (1972) study.

9.3 Useable Benefits

The results also indicated that useable benefits can impact on behaviour. While most of the users were vaguely aware of the company's transport plan and the issues between using private v public transport, their decision for using public transport was solely down to the company subsidising the cost of an annual ticket. One respondent in particular suggested "*without the company offering to pay up front for an annual train pass I couldn't afford to take the train, that's why I use public transport not to be sustainable*". This was in contrast to the number of occupants who actually cycled to work as a result of installing cycle stores and showers as part of the BREEAM® requirements. This measure should impact on behaviour or at least persuade occupants to cycle more, however the useable benefit of a bus pass appeared to have more impact on travel behaviour than the provisions allowed for in the design stage of BREEAM®. It is possible that during the design stage the decision taken to include cycle storage and showers could have been to simply to gain extra credits. This highlights the possibility of using benefits 'indirectly' to influence behaviour. For example, benefits offered to occupants where the rationale is unconnected to the wider sustainability agenda could actually result in a positive impact on behaviour.

9.4 Feedback

The results highlighted that, in general, feedback systems were not in place and information was not disseminated to a usable level. Many of the energy and water saving features installed in the building, as part of the fit-out works did not have any meaningful results collated and fed back to the building users. Zabel (2005) and Kua (2008) both identify the importance of feedback loops as an integral element for influencing behaviour.

10. Discussion and Conclusion

This paper is the result of an exploratory pilot study carried out with occupants of a BREEAM® Excellent rated building, using semi-structured interviews for data collection. The paper makes no universal claims about BREEAM® occupied buildings, however, the study does provide a basis for further statistical analysis. The initial findings presented in this paper, briefly discusses some of the preliminary themes to emerge from the interviews. Initial analysis has identified that there is, in fact, a disconnection between the intentions and aspirations of the design team when compared with the actual 'in use' benefits and perceptions of the building occupants. Monfared, (2011) identified in her study that there is a gap between occupants expectations and perception of a green building. One of the occupants' quotes taken from that study states "*I feel this building has been a massive missed opportunity with too much effort put into winning its 'green' status and little or no thought given to the practicalities and needs of the staff who would work in it*". This study identified that dissemination, training and actual benefits to the users did not appear to be strong themes of BREEAM®, particularly from the user's perspective . An example of this hinged around public transport with more occupants opting for the annual transport pass rather than cycling to work, even though well lit cycling stores and showers had been installed as part of the BREEAM® award. This indicates that decisions taken at design stage do not necessarily consider the end user, particularly as the rationale for such decisions can centre on a point scoring exercise and can result in the design team chasing the highest rating possible, rather than focusing on the 'in use' performance . However this can have the reverse effect in the sense that well thought out sensible decisions taken on controls, energy, water efficiency and the like during the design stage can quickly unravel if the users are not aware of how such technologies work. Dissemination of simple information could motivate occupants to investigate and act upon it. Likewise with simple tangible solutions where occupants can see and feel that they are making a difference.

It was not the intention of this pilot study to monitor user behaviour patterns, however, the responses given by the interviewees did identify issues around centralised automated controls as opposed to individual manual controls over the user's own workspace. The 'lighting zone and controls credit' of BREEAM® 2008 does not require automation for lighting although it does require zoning of the lighting in to banks of 40m^2 or 4nr work stations. It is possible that the easiest way to achive this credit is through automation. The majority of respondents, while accepting that that automation was a part of the building, would have preferred to have more user control over their own workspace. This is further example of achieving a credit at the design stage without considering how the user may interact or perceive this type of feature.

'Closing the loop' between the 'design' and 'in use' aspects of BREEAM®, or more importantly sustainable aspirations against actual performance, needs to be addressed. Many of the features of BREEAM® attained in the early stages appear to be lost in translation or do not have the desired impact on the building occupants as originally envisaged. The themes outlined in this paper are early indications of wider issues each of which are worthy of further investigation and statistical analysis.

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