

GREEN BUILDINGS AND WELL-BEING OF EMPLOYEES IN COMMERCIAL SPACES

James Hartwell, Matthew Tucker and Mohan Siriwardena*

Department of Built Environment, Liverpool John Moores University, United Kingdom

ABSTRACT

As recently as forty years ago, the Facilities Management profession was relatively unknown in the built environment industry. Buildings were generally maintained serviced and cleaned. The Facilities Management profession is now one of the fastest growing professions in the UK and as a result, there is a growing list of services to provide, including delivering on environmental commitments and sustainable practices. This research adds to the growing body of literature on the profound effects sustainable buildings can have on its occupants and converts these benefits into financial metrics which benefit both landlords and tenants of commercial buildings. Although there is conclusive evidence of the benefits, there is still a perception that building green does not represent value for money. This paper aims to investigate to what extent facilities managers are responsible for introducing sustainable initiatives that enhance the health well-being and productivity of employees. To achieve this aim, primary data was gathered through face to face interviews with Facilities Management professionals.

The findings reveal that although sustainability was viewed as important and is highly valued by most organisations, there are more important priorities to focus on. The results from the interviews found that 100% percent of the organisations who participated had sustainability policies in place and the main drivers for introducing those policies was to comply with legislation and to provide a healthier, more attractive workplace for their employees. Although sustainability and the health, well-being and productivity of employees was a main driver, as well as being embraced and promoted by Facilities Managers, ultimately, they felt that they had more important responsibilities to focus on, hence it did not feature as a priority in their day to day job. This was also identified as one of the main barriers for sustainable Facilities Management to improve, as well as cost, the current skillset and knowledge of Facilities Managers.

Keywords: Facilities Management; Green Buildings; Health, Well-being and Productivity; Sustainability.

1. INTRODUCTION

The subject of sustainability and sustainable development has generated a vast amount of literature in recent years, especially from the built environment industry, which is believed to be accountable for almost 50% of the UK's CO₂ emissions as well as 50% of water consumption (Cotgrave and Riley, 2013). The most widely accepted definition of sustainable development is from the Brundtland Report (1987), which describes it as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Over the last two decades, as organisations became a lot more aware of their environmental commitments and began to incorporate sustainability principles into their core business strategy, multiple claims emerged that green buildings can have profound effects on the health, well-being and productivity of employees occupying those buildings. Although these claims from researchers such as Vivian Loftness *et al.*, (2003), Browning *et al.*, (2012) and WGBC (2013) were supported with calculated findings and clear evidence, resistance still remains from viewing sustainability as a strategic priority at the design stage of construction projects. As staff salaries and benefits can typically account for up to 90% of a typical business operating costs (Edwards & Naboni, 2013), the health, well-being and productivity of employees should be a high priority for any organisation. As Facilities Managers have a significant influence

*Corresponding Author: E-mail - m.l.siriwardena@ljmu.ac.uk

of how buildings are controlled and operated every day, they are in a unique position to strategically develop and implement an organisations commitment and contribution to the sustainability agenda. However, Facilities management is still a relatively new found profession within the property and construction industry, and although Facilities Managers are in a position to improve the environmental performance of their business, as well as employee productivity, it ultimately depends on how much Facilities Management is valued and involved at a strategic level within an organisation.

This issue led to the aim of this research, which was to critically investigate the extent Facilities Management can strategically influence sustainable initiatives within commercial organisations, in order to optimise the health, well-being and productivity of employees.

2. GREEN BUILDINGS

The term green building has attracted a vast amount of literature in recent years as the built environment can affect the people who occupy buildings every day as well as the wider natural environment. The definition of a Green building has been widely discussed internationally and can be defined by US Environmental Protection Agency as the practice of creating structures which are resource efficient and environmentally responsible throughout a buildings lifecycle. Whereas Chinas Green Building Evaluation standard defines a green building as a building which provides healthy, productive, practical, highly efficient use of space whilst saving resources such as land, energy, water and protecting the environment. The difference in the two definitions highlights the different perceptions of what a green/sustainable building is, from being just environmentally responsible and resource efficient, to recognising that green buildings can deliver so much more if viewed holistically, resulting in economic, social and environmental benefits.

Literature generally agrees that sustainability is looked at from a triple bottom line perspective: Economic, Environmental and Social. The priority of each circle has been widely discussed and there has been much debate over whether they should be used equally or not. According to (Boyd, 2006) in order for a meaningful triple bottom line assessment of an organisations built assets, an equal balance of economic, social performance as well as environmental protection factors should be evaluated.

While the environmental benefits of green buildings have been well documented over the last two decades, the emphasis appears to be shifting from 'planet', to 'people' and 'profit' as a deeper understanding of the triple bottom line value of green buildings has developed across different industries, particularly the commercial sector. (WGBC, 2014)

Across the UK, offices account for approximately 102 million m² of floor space with 83% of this being classified as commercial offices, with the bulk of the remainder being local government-occupied buildings (ONS, 2016). Over a 10- year period between 2001-2011 commercial offices expanded at the fastest rate in comparison to retail and industrial sectors, with a total increase in floorspace of 29%. (ONS, 2016).

The subject of sustainability has significantly increased in the commercial office sector in recent years. Greater awareness and recognition especially among stakeholders, such as building owners, developers, investors, and the public sector has placed sustainability as a high priority worldwide. Following a report by GVA (2012), It concluded that sustainability was no longer just 'nice to have', but in order for the property sector to retain its long-term value, ensuring that sustainability is a high priority will need to continue. One of the main challenges for developers, investors and building owners for building green is how it represents value for money in comparison to a conventional office building. Increasing evidence is appearing on the numerous benefits a green building can have, not just on the environment, health and well-being of employees, but also financial benefits.

Asset Value

Studies around the world have shown a pattern emerging that green buildings can attract a financial premium in terms of rental and sales value and could be more attractive to tenants and future occupiers, which is driven by lower operating costs, higher occupancy rates and lower yields. An example of some of the international studies can be found in Newell *et al.* (2014) and Chegut *et al.* (2014). These studies found that in the sale of certified buildings compared to non-certified buildings, sale price premiums were in the range of 0%-30%. Also, the study found that the higher the certification of the building, the higher the sales premium was.

Operating Costs

Green buildings saving on operating costs over the course of the buildings lifecycle is often seen as the most recognised benefit of green buildings as numerous studies have shown that commercial buildings can save on costs by reducing the amount of energy and water used, as well as lowering long term maintenance costs. The reduction in energy usage in certified buildings compared to non-certified buildings ranged from 25% - 30% in Kats (2003). Similar to this study, Kats (2010) found that the higher levels of certification, often related to the highest percentages of energy and water savings.

Reduced Absenteeism

One of the less obvious financial benefits of green buildings in the commercial sector is the costs which can be saved by reducing the amount of days employees are absent from work, as well as retaining existing employees. The design of the office can have a significant effect on the health, well being and productivity of employees, which is discussed further in the next chapter. Studies such as Sing *et al.* (2010) have found that employees cannot work as effectively when they are ill, have little motivation and high stress levels, which results in employees taking sick days due to illness and stress. In the UK alone, over 50 million days were lost in 2015 due to employees being absent from work, just for reasons including minor illnesses, stress, depression, anxiety, headaches and migraines (ONS 2016). Absence through sickness can come at a major financial cost to organisations. Taking into account that the average wage in the UK in 2015 was £26,500 (ONS 2016), the total cost companies would have paid employees to be absent in 2015 alone, would have been just under £6b.

Employee Turnover

Employee turnover can be costly for any organisation. A generally accepted figure of the true cost of replacing an employee is approximately 1.5 – 2 times the employee's salary (Heschong 2003). Costs can be accumulated throughout a number of different processes, from the termination cost, recruitment agency costs, time spent interviewing, negotiations and lost productivity. The cost could eventually be greater if for example in knowledge sectors where the competitive edge and advantage is the human expertise. Also, once a new employee is eventually hired it can be argued that he/she may only be working at around 50% within the first 6 months whilst undergoing inductions, training and becoming familiar with the role and organisation.

An example of how green buildings can result in significant savings due to employee turnover is shown in a report by CBRE 2009 which found that, recruitment of new employees, public image and retention of existing employees were all enhanced in green buildings. In order to gain financial benefits from designing/retrofitting a green building, it has to be designed with people in mind, designing from the inside out, focusing on the people just as much as the planet, which will in turn, result in profit.

Relationship between the Office Building and its Users

Gensler (2005) Argues that British businesses have always perceived the office as an overhead, with the result that minimising costs often determine the shape of Britain's workplace, rather than focusing on creating an enjoyable and productive working environment for the buildings occupiers. Since buildings are built predominantly for human occupation, and given the fact that up to 90% of a typical business operating costs comes from staff salaries and benefits, with 9% rental costs and just 1% energy costs, the benefits a green building could have on employee productivity and bottom line benefits should not be ignored. Considering the percentages of a typical business operating costs over its life- cycle, the cost of employing people far outweighs the cost of maintaining and operating the building over its lifecycle, which is why investing in improving the work environment could be the most efficient and cost effective method of improving productivity.

There is overwhelming evidence in the commercial sector which indicates that the design of the office can impact on the productivity and the health and well- being of its occupants. WGBC (2014) highlight the key priority areas of a green building which can influence health, well-being and productivity of employees as Indoor Air Quality (IAQ), Thermal comfort, Lighting and daylight, Acoustics, and Interior layout and Active Design.

3. FACILITIES MANAGEMENT

Facilities Management has many definitions due to the dynamic nature of FM and its rapid development as a profession. However, one of the most widely accepted definitions in the UK is from BIFM who define it as the integration of processes within an organisation which maintains and develops the agreed services which support and improve the effectiveness of its primary activities.

The profession and role of Facilities Managers has evolved over the last three decades, they are longer just thought as building managers responsible for day to day operations such as cleaning and maintenance. Instead, it is being recognised as a strategic business function with a growing list of services to provide to support organisations core business in both the long term and short term. Due to this rapid progression it is now one of the fastest growing membership associations in the UK and the FM market is set to rise to £117b by the end of 2017. One area that has developed interest in the FM industry in recent years is the facilities manager's role in adding value to an organisation by delivering sustainable practices.

Sustainable FM

As the subject of sustainability has grown in significance across many businesses, organisations are becoming more aware of the effect their business activities are having on economic, environmental and social issues, and are now incorporating sustainability policies into their reports (Lindsey 2011; KPMG 2008). Sustainable Facilities Management can therefore be described as the process of managing, implementing and delivering an organisations non- core business activities aswell as integrating the people, place and business of an organisation which will optimise environmental, economic and social benefits of sustainability.

Although Facilities Managers are in direct control of how a building and its facilities are controlled every day, and are in a position to influence the health, well-being and productivity of those working in the office environment, it is not clear which of the drivers, issues and responsibilities are most important for FM to develop skills and knowledge in. (Kwawu & Elmualim, 2011)

Sustainable FM Policies

In order for Facilities Managers to be in a position to significantly influence the health, well-being and productivity of employees, it has to be a key driver and be a part of an organisations sustainability policy. Until recently, research of organisations drivers to implement a sustainability policy have not been documented, but with recent economic downturns and ever tightening legislation regarding carbon emissions, organisations are now beginning to integrate sustainability issues into their policies as they are expected to be part of delivering on environmental commitments

Recent studies by GVA (2014), GVA (2016), Elmualim *et al* (2010) and Price *et al* (2011) have all analysed to the extent to which organisations adopt a sustainability policies and strategies, with many organisations not believing sustainability to be a high priority, only being 'of some importance' and viewing sustainability as just an 'add on'.

Key Drivers for Introducing Sustainability Policies

An organisations sustainability policy directly influences the Facilities Managers responsibilities (Kwawu & Elmualim, 2011), so depending on where staff productivity ranks on the sustainability agenda, this could be a challenge for the FM to have an influence on improving the productivity and the health and well-being of employees. As the built environment accounts for approximately 40% of global natural resources which are used, aswell as 40% of global waste and gases that are produced, sustainability policies in the past have previously been influenced by legislation and the proliferation of energy and carbon footprint related issues.

Studies from Kwawu and Elmualim (2011), GVA (2014) all found that increasing legislative pressure was the key driver for undertaking sustainability assessments and implementing sustainability policies. However, in GVA (2016), client pressure and occupier demand overtook government legislation as the key driver for introducing sustainability policies within organisations. Results show how occupier demand has increased by 100% in the space of 5 years, highlighting the fact that building occupiers and clients want to be associated with and occupy sustainable buildings.

Now that the key drivers for an organisation to implement a sustainability policy are not as influenced by increased legislative pressure, in comparison to the previous years, the facilities manager's sustainability responsibilities may change. In a study from Kwawu and Elmualim (2011), where legislative pressure was the

key driver as shown in Figure, the facilities managers responsibilities were directly influenced by this, with the top 2 responsibilities being waste management and energy management (Figure 1). The productivity of employees was not regarded as an important responsibility for the facilities manager, ranking down in 11th place.

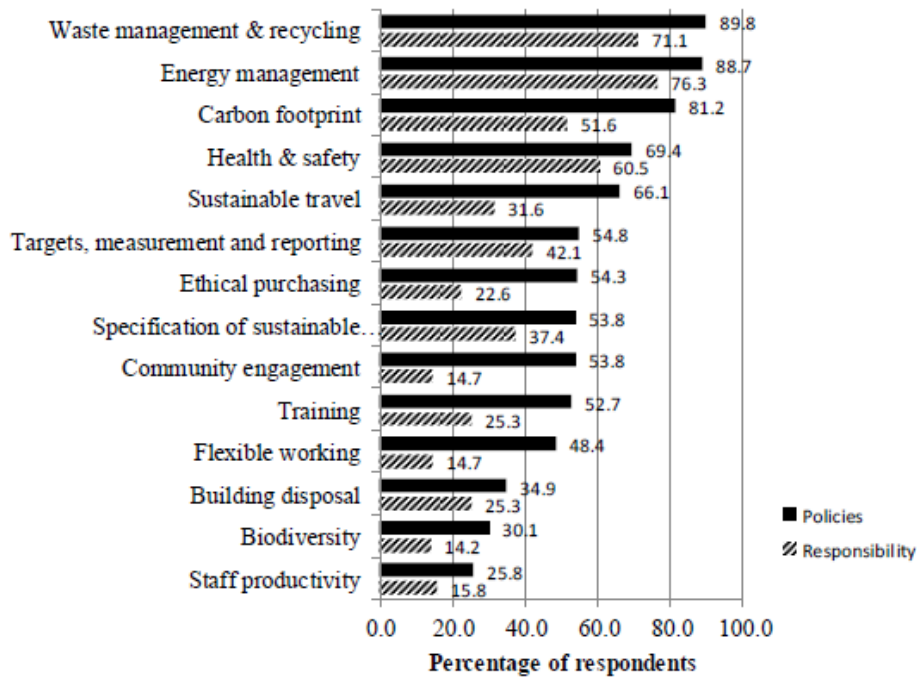


Figure 1: FM Sustainability Responsibilities (Adapted from: Kwawu & Elmualim, 2011)

Although Facilities Managers are in key a position to influence and add value to an organisations sustainability agenda, a more holistic approach is needed to recognise equally important issues like the health, well-being and productivity of employees. Having a productive work environment is an important factor for an organisations productivity and with the FM being in direct control over the building environment, the responsibility of the FM should be significant. The reasons for employee responsibility not being regarded as a high priority for facilities manager can be linked back to Elumalim *et al* (2010) which identified the main barriers for sustainable FM as lack of knowledge, lack of senior management commitment and time constraints.

Knowledge and Skills Barrier

A common challenge which appears in the literature for the future progression of sustainable FM is the current skill set, knowledge and experience of Facilitates Managers (Elmualim *et al.*,2010; Shah 2007). As the FM profession is experiencing a period of rapid growth and complexity regarding the functions of a FM, they highlighted the fact that facilities managers need to have a seat at the table during any discussions where significant changes occur throughout the buildings life-cycle. However, in order to be present during meetings, and to be able to successfully implement sustainability policies, they need to be highly qualified professionals who are capable of understanding the complexities of green buildings and their operation.

Value of Facilities Management within an Organisation

Similarities in the literature from (Hodges 2005; Elmualim *et al.*, 2010) found that one of the most important issues in FM is how much FM is valued as a strategic priority within the organisations culture, and how well it is used to contribute to the bottom-line of the organisation. If FM is valued within the organisation, the work required to implement sustainability policies and practices can be more easily achieved but in contrast to this, (Elmualim 2010) found that the undervaluation of the contribution FM can make to the success of an organisation, was responsible for the lack of success of sustainable FM. Finance also plays a part in the attitude towards how an organisation runs its Facilities Management department and whether they are treated as assets or not. This could then dictate the organisations attitude towards sustainability issues and how receptive they would be towards making changes.

4. RESEARCH METHOD

Overall research approach was based on multiple case studies (Yin, 2009). Research design adopted a broadly qualitative and inductive. Rather than analysing and gathering data from a specific group, it is more appropriate for this study to gather data from individuals from different organisations to assess how much each FM department is valued within each organisation, where sustainability ranks as a strategic priority and to evaluate the different views towards the responsibility of employee productivity. For this study, a collective case study approach has been adopted to provide a more balanced and valid approach and to achieve strong conclusions.

The unit of analysis is still the organisations with an in-house FM department, but will also be organisations who provide FM services on behalf of clients who find that outsourcing is more effective. By selecting to interview both in house Facilities Managers as well as Facilities Manager Consultants, it will provide more accurate data of the nature of the Facilities management industry. This also allows to study the facilities managers in their real life setting, as the common denominator between in house Facilities managers and facilities management consultants is that they all manage FM services within a real life setting for a client, or on behalf of a client. The size and nature of organisations who participated in the study, as well as the level of each participant are presented in Table 1.

Table 1: Research Participants Overview

	Nature of Organisation	Size of Organisation	Type of Organisation	Level of Superiority
Participant 1	In house FM	Large	University	Facilities Manager
Participant 2	FM consultant	Large	Commercial Real Estate providers	Facilities Manager of Asset services
Participant 3	In house FM	Small	Charitable Organisation	Associate Director of FM
Participant 4	In house FM	Medium	Football club	Facilities Manager of football stadium
Participant 5	FM consultant	Medium	FM providers	National Operations Director

Empirical data were collected through semi-structured interviews and were subjected to a code based thematic analysis.

5. FINDINGS AND CONCLUSIONS

The aim of this research was to conduct an investigation into the relationship between green buildings and the health, well-being and productivity of employees within commercial office space. The rationale behind selecting this topic for investigation was due to multiple claims in recent years which suggested that green buildings and their indoor environmental characteristics can have profound effects on the health, well-being and productivity of employees, which result in significant bottom line benefits. As Facilities Managers are in direct control of how buildings and its facilities are managed and controlled every day, they are in a unique position to influence the health, well-being and productivity of those working in commercial offices.

There is overwhelming evidence in the commercial sector which indicates that the design of the office can impact on the productivity and the health and well-being of its occupants. By investing in the upgrade to a green building and designing the building from the inside out, focusing on the people just as much as the planet and profit, this can result in financial benefits to both landlords and tenants, which are; could attract a financial premium in terms of rental and sale value, could be more attractive to future tenants and occupiers which would mean the building would be vacant for less, ability to secure finance for the development from Energy Efficiency Financing (EEF) schemes, quick return on investments, lower maintenance costs. Benefits to the tenants of green buildings are; reduced absenteeism, reduced employee turnover, employee recruitment, lower operational costs and improved productivity.

Although there is substantial evidence for each of these points and various other green building benefits, resistance still remains from building green, largely due to the behaviours of real estate investors and occupiers, and that building green is a lot more expensive than a conventional building. By incorporating green strategies from an early stage in construction and refurbishment projects, it will cost considerably less than more

expensive ‘bolt on’ strategies where sustainable features and enhancements are added after the design stage. An example of adopting green strategies from the design stage is an integrated design approach, reducing the energy demand from the building by a passive design philosophy, reducing the heat loss through a thermally efficient skin and predominantly relying on natural ventilation and lighting.

After critically analysing the data gathered from the literature review and interviews, it appears Facilities Management is starting to get the recognition it deserves at a strategic level, especially for medium-large organisations with tall organisational structures and their own in house FM departments. Although it still appears to be a work in progress, the world is changing in regards to FM internally and externally, with a lot more drivers for FM’s to become more strategic. In some cases, organisations are now beginning to involve Facilities Managers from the design stage of construction projects and have a seat at the table, instead of being involved after the handover stage, which was an issue mentioned by Shah (2007). A challenge for FM to further progress is still from the senior management level, recognising that FM should be something that is thought of strategically, invest in and monitor. Although it is showing signs of progression and organisations appear to be becoming more aware, the same cannot be said for organisations who outsource their FM services. There is still a lot of room for improvement in this area as FM consultants were not involved in key strategic decision making on behalf of the clients they represent. It was found that the FM providers were strictly only involved in the operational stages such as the day to day management of operations and services. It is unclear what the reasons for this are, however there were a number of deciding factors such as whether they may have their own internal FM structure or they may want to run the facilities at the lowest cost.

In order for Facilities Managers to be able introduce and successfully implement sustainable initiatives in the workplace to enhance the health, well-being and productivity of employees, sustainability has to be a key driver and highly valued by organisations and not just seen as ‘nice to have’. The comparison of studies in the literature review indicated that organisations are becoming more aware of their environmental commitments and becoming more aware of the benefits of being a sustainable organisation by the increase in organisations adopting sustainability policies. These findings were also similar in this study as 100% of organisations had policies in place, although not necessarily successfully implemented. There is also similarities in the research from Pitt *et al.* (2009) who found that most organisations who had sustainability policies were medium to large sized. Although it appeared to ‘highly valued’ by most organisations in this study, it was only regarded as a strategic priority for the large organisations. It is therefore concluded that those organisations who place sustainability high on the agenda and drive it through the organisation from a senior management level, are more likely to implement further sustainable initiatives which could enhance the health, well-being and productivity of employees.

It can be argued that this objective of determining who is responsible within organisations for introducing sustainable initiatives, as well as the Facilities Managers’ opinion of their responsibility of employee productivity is the most important in achieving the aim of this study. Four that Facilities Managers strongly felt that high level staff were responsible for introducing sustainable initiatives within the workplace, and it had to be filtered down from the top. It was generally agreed that Facilities Managers should be driver behind it and recommendations should come from themselves as well as high level management, but ultimately the decisions were made at the top. The big issue on this theme, as well as regarding the future of sustainable FM, is the Facilities Managers view on responsibility of managing the sustainable initiatives once they have been implemented. In Kwawu and Elmualim (2011), it was found that the key driver of sustainability policies, which was legislation, had a direct impact on the responsibility of Facilities Managers. Yet in this study, the health, well-being and productivity of employees was the key driver and mentioned twice as much legislation, but the facilities managers view towards managing that, was that they had more important responsibilities. It was said that whilst it is easy to get involved with and it features highly within organisations, it doesn’t feature highly within their day to day job. Although they promote it, with the pressures of what goes on, they have not got the time to dedicate to implementing sustainability policies, as a lot of the time they are ‘firefighting’ and dealing with ‘quick fix projects’. So, although the health, well being and productivity is acknowledged as a key driver and it can result in significant financial benefits for the organisations, if it is not a key responsibility or does not feature in their day to day job, it is unlikely that it will improve.

It is generally agreed that sustainability should not stop on the completion of projects, whether it be new build or refurbishing an existing building to a green building standard, and should be continued through to occupation. Introducing sustainability policies are the first steps for organisations for when they are trying to deliver on their environmental commitments, as well as introduce sustainable practices. However, to ensure

it is successfully implemented and does not fail, it is recommended that organisations have an Environmental Management System (EMS) in place. An EMS is a system and database which integrates procedures and process for training of personnel, monitoring, summarising, and reporting of specialised environmental performance information to the internal and external stakeholders. The most widely used international standards for the EMS is ISO:4001 and through a successful implementation of the EMS system, it will help to encourage organisational environment improvement as well develop a wider understanding of environmental issues. As a result of implementing this system, this may help to combat the challenges which the interviewees faced of successfully implementing their policies, as well as people taking it seriously.

Recommendations for change and improvement of sustainable FM is that staff training and development is essential for a clear understanding on how sustainable FM can be strategically applied to an organisations business strategy, and the impact. It can have on the core and non-core business objectives of an organisation. To be able to effectively manage green buildings and ensure it performs as intended over course the buildings lifecycle, it is imperative that Facilities Managers have the knowledge, training and capability on how to do so. This approach was hugely successful for an organisation which participated in the study, who said that the sustainability training course 'opened their eyes' and 'made them think about things they wouldn't normally think about'. The knowledge and skill set of Facilities Managers was one of the main barriers gathered from the literature review as well as this research study. Therefore, for Facilities Managers to be able to effectively introduce and manage sustainable initiatives which enhance the health, well-being and productivity of employees, this should be addressed.

The main research limitation for this study was undoubtedly the time scale which was available to gather primary data from research participants. The time constraints of the study was the rationale behind the selection of the cross-sectional design, as there was insufficient time available for a longitudinal study. Although the results and primary data received from the cases and interviewees who participated were extremely effective and valuable, the results of a longitudinal study may be more beneficial. The research was also limited by the number of organisations willing to participate in the study by allowing access into their organisation, which is not uncommon in case study research (Creswell, 2013). The results would have been more beneficial to the study if an equal amount of small, medium and large sized organisations were able to participate, as well as an equal amount of in house Facilities Managers and FM Consultants. Attempts to overcome these limitations can pave the further research endeavours.

6. REFERENCES

- Boyd, T., 2006. Evaluating the Impact of Sustainability on Investment Property Performance. *Pacific Rim Property Research Journal*, 12(3). [Accessed: 3rd November 2016]
- Browning, W.D., Kallianpurkar, N., Ryan, C.O., Labruto, L., Watson, S. and Knop, T., 2012. *The Economics of Biophilia*. New York, Terrapin Bright Green llc.
- Brundtland Report, 1987. *Report on the World Commission on Environment and Development*. United Nations General Assembly Resolution 42/187
- Cotgrave, A. and Riley, M., 2013. *Total sustainability in the built environment*, 1st ed. Basingstoke: Palgrave Macmillan.
- Creswell, J.W., 2013. *Qualitative Inquiry & Research Design*, 3rd Ed. Thousand Oaks: Sage
- Chegut, A., Eichholtz, P. and Kok, N., 2014. Supply, demand and the value of green buildings. *Urban Studies*, 51(1), pp.22-43.
- Elmualim, A., Shockley, D. and Shah, S., 2010. Barriers and commitment of facilities management profession to the sustainability agenda. *Building and Environment*, 45(1).
- Edwards, B. and Naboni, E., 2013. Designing Green Buildings: The Breeam and LEED. *Green Buildings Pay: Design, Productivity and Ecology*, 23.
- Gensler, 2005. *These four walls: The Real British Office* Available at: https://www.gensler.com/uploads/documents/TheseFourWalls_07_17_2008.pdf [Accessed: 18th December 2016].
- GVA, 2014. *Green to Gold* Available at: <https://www.gva.co.uk/sustainability/green-to-gold-autumn-2014> [Accessed: 1st March 2017].

- Heschong, L., 2003. Windows and offices: A study of office worker performance and the indoor environment. *California Energy Commission*, 1-5.
- Hodges, C.P., 2005 'A facility manager's approach to sustainability', *Journal of Facilities Management*, 3(4).
- Kats, G., 2003. *Green Building Costs and Financial Benefits* Available at: <http://www.greenspacebuildings.com/wp-content/uploads/2011/05/Kats-Green-Buildings-Cost.pdf> [Accessed: 3rd March 2017]
- Kats, G., 2010. *Greening Our Built World: Costs, Benefits and Strategies* Available at: <https://new.usgbc.org/leed> [Accessed: 1st March 2017]
- KPMG, 2008. *KPMG International survey of corporate responsibility reporting, 2008*, KPMG, Amstelveen, Netherlands
- Kwawu, W. and Elmualim, A., 2011. *Sustainability in facilities management: a review of drivers and policy issues* In: Egbu, C. and Lou, E.C.W. (eds.) *Proceedings 27th Annual ARCOM Conference*. ARCOM.
- Lindsey, T. C., 2011. Sustainable principles: common values for achieving sustainability. *Journal of Cleaner Production*, 19(5), 561-565.
- Vivian Loftness, F.A.I.A., Hartkopf, V. and Gurtekin, B., 2003. Linking energy to health and productivity in the built environment. In 2003 Greenbuild Conference.
- Newell, G., MacFarlane, J. and Walker, R., 2014. Assessing energy rating premiums in the performance of green office buildings in Australia. *Journal of Property Investment & Finance*, 32(4), pp.352-370.
- Office for National Statistics (ONS), 2016. Estimate of the number of days of sickness absence taken: by reason, UK, 2013 to 2015 Available at: <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/adhocs/005914estimateofthenumberofdaysofsicknessabsencetakenbyreasonuk2013to2015> [Accessed: 8th March 2017]
- Pitt, M., Tucker, M., Riley, M and Longden, J., 2009. Towards sustainable construction: promotion and best practices. *Construction Innovation*, 9(2), 201-224.
- Price, S., Pitt, M. and Tucker, M., 2011. Implications of a sustainability policy for facilities management organisations. *Facilities*, 29(9/10).
- Shah, S., 2007. *Sustainable Practice for the Facilities Manager*. 1st ed. New York, NY: John Wiley & Sons.
- Singh, A., Syal, M., Grady, S. C. and Korkmaz, S., 2010. *Effects of green buildings on employee health and productivity*. *American journal of public health*, 100(9), 1665-1668.
- World Green Building Council (WGBC), 2013. *Business Case for Green Buildings* Available at: <http://www.ukgbc.org/sites/default/files/World%20GBC%20Business%20Case%20for%20Green%20Buildings.pdf> [Accessed: 3rd December 2016]
- World Green Building Council (WGBC), 2014. *Health, Wellbeing & Productivity in Offices* The next chapter for green building Available at: <http://www.ukgbc.org/sites/default/files/.pdf> [Accessed: 2nd December 2016]
- Yin, R. K., 2009. *Case study research: Design and methods*. 4th ed. Thousand Oaks, CA: Sage