An investigation into the implementation of green building features and initiatives among stakeholders in the Zambian property market

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ABSTRACT

There is a global challenge and demand in the current century to develop buildings that conserve and preserve the environment; implementing green building features and initiatives (GBFIs) is one way to achieve this. The success of implementing GBFIs requires inclusive participation of the stakeholders in the property market.

A multiple case study analysis was conducted on the Zambian Property market, involving three buildings that had different GBFIs. A total of six interviews were conducted across the three cases with relevant stakeholders, namely Facilities managers, tenants, project architect and regulatory body representative. Interviewees were asked questions pertaining to their company's participation in the development of green building, the benefits of GBFIs, the perception of GBFIs, the relationships among stakeholders as well as the impact of GBFIs in the property market.

The findings revealed that there were different approaches to implementing GBFIs. However, a lack of knowledge by some stakeholders on green features and their benefits was noted. This lack of knowledge was a product of inadequate education and poor integration of stakeholders in implementing GBFIs in the Zambian property market. It is important to note that there are vigorous efforts by stakeholders including the government in contributing to conserving the environment in the Zambian property industry. This is evident in the formulation of green building guidelines and environmental impact assessment guidelines for the construction industry.

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List of abbreviations

BEE – Building Environmental Efficiency

BREEAM – Building Research Establishment Assessment Method

CASBEE – Comprehensive Assessment System for Building Environment Efficiency

CSR – Corporate Social Responsibility

GBC – Green Building Challenge

GBCA – Green Building Council of Australia

GBFIs – Green Building Features and Initiatives

GBCSA – Green Building Council of South Africa

ILO – International Labour Organisation

LEED – Leadership in Energy and Environmental Design

NCC – National Council for Construction

RPI – Responsible Property Investing

SBTool – Sustainable Building Tool

SGBC – Singapore Green Building Council

SRPI – Socially Responsible Property Investment

SRI – Social Responsible Investment

UKGBC – United Kingdom Green Building Council

USGBC – United States Green Building Council

ZESCO – Zambia Electricity Supply Corporation

ZANACO – Zambia National Commercial Bank Ltd

ZGBA – Zambia Green Building Association

1 INTRODUCTION

1.1 Introduction

This chapter establishes the foundation of the research topic. An overview of green buildings in the Zambian property market is given. Thereafter, existing green buildings around the world are discussed and finally the factors that influence the implementation of green building features and initiatives in the Zambian property market are outlined.

The research problem, questions and aims and objectives that have been derived from the previous literature are stated. The literature is both academic and non-academic. The methodology and the limitations of the research topic are outlined. The most appropriate methodology for the study is considered.

1.2 Background

1.*2.1 Building industry's link to global warming*

The earth's climate has been adversely affected by greenhouse gas emissions due to activities by humans (Younger *et al.,* 2008). Designing, constructing and operating buildings that are energy efficient, resource efficient and environmentally responsible has become increasing necessary (GBCSA, 2017a). According to Dwaikat and Ali (2016) green building answers building industry's concern about natural resources depletion and gas emissions. The building industry has contributed to the global warming through the human-generated gases from transportation systems, building construction and urban and regional planning (Younger *et al.,* 2008). Buildings consume a great number of natural resources through construction and operations of these buildings (Gou and Siu-Yu Lau, 2013). It is as a result of the depletion of natural resources and energy that are consumed during the construction of buildings that the construction industry is putting efforts together to design and construct green buildings (Zuo *et al.,* 2014).

Global warming has affected the least developed countries, therefore, during the planning of cities, urban green space planning is encouraged as it reduces the effects of global warming by preserving regional ecosystems in built-up areas (Younger *et al.,* 2008). These countries have been implored to adopt green building practices for the benefit of the environment and the people (Kalua, 2015).

Property investors have responded to these factors by considering social governance issues that pertain to green building which looks beyond financial gain by considering the management of the environment, sustainability, and social equity (Pivo, 2008). The various activities that affect the surrounding environment where buildings are constructed are critical and include building designs, location of buildings, and the neighboring landscape (Younger *et al.*, 2008).

Similarly, developers have adopted Responsible Property Investing (RPI) whose main purpose is to ensure that environmental and social problems in the built environment are considered in order to achieve a successful green building (Pivo, 2008). RPI considers property investment in green building beyond financial benefits in conjunction with better environmental management for the built environment (Kriese, 2009).

As a result of various activities in the building industry such as construction, demolition, energy use, water use, waste generation and others, green building standards, certifications, rating systems have been created to mitigate the direct and indirect impact that buildings have on the natural environment (United Nations in Zambia, 2016).

1.*2.2 Green building overview*

There are various stakeholders that concern themselves with green buildings in the quest to reduce damage to the environment; these include both financial and social drivers. Examples of these stakeholders are the government, the construction industry, property industry, private organisation and the general public (Miller and Buys, 2008). It was further revealed through literature that generally, green building can be classified into three categories namely definition and scope of green building, benefits and costs of green building and ways to achieve green building (Chang *et al.*, 2018).

There have been various discussions on the definition of green building and what it encompasses which reveals that there is a level of awareness of green building which relates to one of the objectives to determine the awareness of GBFIs in the Zambian property (Zuo and Zhao, 2014). Green building involves using processes that are environmentally responsible and maximises resources from siting to design, construction, operation, maintenance, renovation and deconstruction (Sinha *et al.*, 2013). As defined by Lutzkendorf and Lorenz (2010), a green building is a building that consumes less energy, uses environment-friendly building materials and provides a comfortable indoor environment for

the occupant. However, indoor air quality cannot be guaranteed by green building (Steinemann *et al.*, 2017).

Stakeholders in the property market have begun focusing not only on maximum financial gain but on environmental and social issues when investing in property (Pivo, 2008; Newell, 2009). Regulatory frameworks such as the United Nations Guiding Principles for Business and Human Rights and the ten principles of the United Nations Global Compact are available to guide companies in CSR principles and evidence shows that a number of companies are working towards achieving the set standards of the frameworks (Stibbe and Voigtlander, 2014).

With regards to the implementation of green building features and initiatives (GBFIs), social responsible investment (SRI) and corporate social responsibility (CSR) are vital tools in the property market that encourage companies to be more environmentally conscious and responsible (Nurick and Cattell, 2013). Additionally, RPI is another tool that is being considered by investors not only because there is financial motivation but because investing in green properties helps to preserve the environment. These investors include property organisations, lenders, and asset owners (Pivo, 2008). Investors should not only comply with minimum environmental requirements but should also focus on social and environmental matters when making decisions pertaining to property investment (Newell, 2009).

Uganda is one of the countries participating in green building as seen from a study that highlights how energy efficiency can be incorporated in buildings at all critical stages of a building and special attention is drawn to the site and orientation of the building, use of building materials and sun shading (Da Silva and Ssekulima, 2011). South Africa is another example in Africa that has recorded remarkable growth in green building and uses different rating tools to certify green buildings in the property market. The Green Building Council of South Africa currently has 250 green building certifications in Africa and this success is as a result of the commitment from associated stakeholders (GBCSA, 2017b).

There are various building assessment tools that have been developed to certify green buildings; these include Building Research Establishment Assessment Method (BREEAM) in the United Kingdom, Sustainable Building Tool (SBTool) in Canada, Leadership in Energy and Environmental Design (LEED) in the United States of America and Comprehensive Assessment System for Building Environment Efficiency (CASBEE) in Japan (Alyami and Rezgui, 2012a). The German government has put up strict measures to reduce the energy

consumption of buildings in a quest to become one of the most energy-efficient countries in the world, this has had an effect on the real estate sector (Cajias and Piazolo, 2013). Australia further investigates the performance and life cycle of newly constructed green buildings; this is done by assessing indoor comfort and as the satisfaction of the occupants (Paul and Taylor, 2008). Sweden has concentrated on waste separation in the past twelve years (Gluch *et al.*, 2014) and South Africa develops Green Star tools that are used to rate buildings according to each building type in South Africa and Africa (GBCSA, 2017b).

The earth's ecosystem has without doubt been negatively affected by the actions of human beings and the need to prevent further damage cannot be overemphasised (Boyd, 2006). It is evident that the real estate sector is responding to green building construction despite the challenges to promote and implement green buildings (Zuo and Zhao, 2014).

1.2.3 Stakeholder influence

In recognising the need to reduce the carbon footprint of the property market, it is important to consider the different stakeholders that influence the success of these green buildings. Stakeholder participation is vital to the success of green building projects; every design decision affects the environment, the community and economic resources (Reed and Gordon, 2000). For example, green building design in commercial buildings needs to be tied to workplace operations and goals in the organisational structure when it comes to office space planning, the combination will realise considerable benefits (Brown *et al.*, 2010). The main stakeholders identified in green building include the owner, occupant, designer, facilities manager, contractor, supplier, financial institution and research institution (Liang *et al.*, 2015).

It is important to note that the stakeholder's involvement will increase the demand for green building as the stakeholders will highlight the benefits of the green building in the different sectors that relate to them (Lutzkendorf and Lorenz, 2007). Tenants recognise the importance of green buildings even though their knowledge is low on the green building technology and building performance (Miller and Buys, 2008) whereas developers consider looking at critical issues during the life cycle of the project when introducing green features in green building (Zuo *et al.*, 2014). Valuers need to have a clear understanding of GBFIs in order to compare the property values of conventional and green buildings (Nurick *et al.*, 2015).

Different stakeholders focus their interests of green buildings on different aspects, for example, the developer focuses on the profit margin that can be realised in a green building

project while blue chip tenants prefer the use of green buildings because their public image takes precedence (Chan *et al.*, 2009). Furthermore, the property investor critically analyses the portfolio and considers the investment worth of green buildings, the financial impact on the overall expected return as well as the associated risks of these types of buildings (Ellison *et al.*, 2007).

Government is another essential stakeholder that contribute to green building construction and regulations though not all governments are capable of providing guidance in the market or providing consistent updates on different policies that pertain to green buildings (Chan *et al.*, 2009). There are other stakeholders that are not direct participants in the property market but whose contribution is crucial in influencing the development of green building projects.

1.2.4 Green Building Support factors

Green buildings are being recognised by the property market. Various tools, councils and associations have been created in different countries to lead the development of green buildings and green building ratings (Nurick and Cattell, 2013). In addition, green building guidelines have been created in developing countries to guide the construction industry (Potbhare *et al.*, 2009). In addition, green building guidelines have been created in developing countries to guide the construction industry (Potbhare *et al.*, 2009).

Table 1.1: Examples of Green Building Councils

Country	**Name of Organisation**	**Year of establishment**	**Source**
South Africa	Green Building Council of South Africa (GBCSA)	2007	(GBCSA, 2017a)
Singapore	Singapore Green Building Council (SGBC)	2009	(SGBC, 2015)
Zambia	Zambia Green Building Association (ZGBA)	2015	(Zambia Green Building Association, 2015)
Australia	Green Building Council of Australia (GBCA)	2002	(GBCA, 2016)
South Africa	UK Green Building Council (UKGBC)	2007	(UKGBC, 2018)

Rating tools are significant in different phases of the building life cycle and their results are important in decision making in the property market (Haapio and Viitaniemi, 2008). Other

supporting factors are evident through the efforts made in the management and regulation of green buildings (Hakkinen and Belloni, 2011) and it is the mandate of contractors and project managers to ensure that these ratings are adhered to on site (Hwang and Tan, 2012; Nurick *et al.*, 2015).

It is evident that most tenants have appreciated the benefits associated with green buildings, which include productivity benefits, natural lighting, greater retail sales and reduced absenteeism, most of these demands are mainly from the private sector (Miller *et al.*, 2008). According to Cajias and Piazolo (2013), energy efficiency is important to consider in green building as it results to reduced greenhouse emission, enhances public health and improves society welfare. Additionally, tenant investment decisions are affected by the energy efficient factor in green building investment. This is evident through companies that are willing to pay more for buildings that have a green rating as this enhances company image and as stakeholder relationships. Opportunities are being created for educational institutions such as universities to train not only professionals but other stakeholders in the construction sector in order to build capacity to deliver green buildings (Gluch *et al.*, 2014).

1.2.5 Green Building Barriers

It is important to note that not everyone is interested in investing in green building for various reasons. One school of thought highlights the negative perception of how the developer and the landlord are not enthusiastic to supply green buildings because of poor demand from the market and thus little value is placed on the performance of green buildings (St Lawrence, 2004). Additionally, the government of Indonesia places little value on the importance of green building which is a barrier to success of green building in that country (Mollaoglu *et al.*, 2016).

There are contrasting views that the barriers to the implementation of GBFIs are not as severe in that the amount of green buildings in the property market continues to increase and occupants are placing value on the performance of the buildings (St Lawrence, 2004). However, these barriers have an influence on cost, time, and quality with cost being highly influential in the delivery of a green building project (Hwang and Tan, 2012). These barriers need to be considered in the implementation of GBFIs as they not only affect building design but stakeholders, labour, and the equipment used on green building projects all of which need to be guided by various mechanisms in order to be overcome (Hwang *et al.*, 2015).

Lack of technical understanding (Mollaoglu *et al.*, 2016), experience and knowledge are capable of hindering first time developers in green projects, therefore, planning and education are key to having successful green building projects (Miller *et al.*, 2008). Project delays in construction of green building affect the timely delivery of the building, this means that there has to be close adherence to project schedule in order to have the project delivered on time (Hwang *et al.*, 2015). It is therefore important to constitute a team of professionals for each speciality for the green building project at the inception stage so that each representative is aware of the requirements of the client (Liu *et al.*, 2012). Furthermore, the lack of adequate research on the advantages of green building affects the demand for green building structures (Hwang and Tan, 2012).

The perception of the professionals that the initial cost of green buildings is high has affected the development of the green buildings. Studies show that the initial cost is not as high as most stakeholders perceive it to be, this is an indicator that adequate education is not available in the field of green buildings and this, in turn, makes many unaware of how to best contribute to reducing the carbon footprint in the property sector (Chan *et al.*, 2009). This is demonstrated in China where green building has become increasingly significant, but insufficient building techniques and experience have affected green practices in the Chinese building industry (Liu *et al.*, 2012).

1.2.6 Green Building Features and Initiatives (GBFIs)

The development of green buildings is not limited to new construction projects but extends to existing conventional buildings that can be retrofitted which is not an easy task to achieve (Miller and Buys, 2008). Additionally, green retrofits are complex projects to manage and their success is related to the stakeholders within the projects (Liang *et al.*, 2015). When it comes to the marketing of green buildings, realtors and property do not describe the building as a whole but place emphasis on issues such as the green building features, indoor comfort, productivity gains, maintenance efficiency and energy efficiency (Kriese, 2009).

The following features are highlighted in the green building design: natural indoor lighting that is achieved by positioning windows carefully, natural ventilation that is possible by strategic siting of building on the plot, building materials that are recyclable and environment friendly and the overall building layout (Hwang and Tan, 2012). Gou and Siu-Yu Lau (2013) draw emphasis on maximising internal thermal comfort in a green building. The other aspect

of improving energy saving behaviour of occupants in green buildings compared to occupants in a conventional building is highlighted (Azizi *et al.*, 2015).

An example of green building considerations that have been highlighted includes energy efficient air conditioning, low-emissivity glass, sun shading devices, careful use of timber, building space planning and use of solar cells (Chan *et al.*, 2009). Another green building consideration includes rain water harvesting as it covers 95% of water needs (Da Silva and Ssekulima, 2011).

There is evidence that stakeholders are concerned with clearly outlined cost of development and the associated financial savings (Miller and Buys, 2008). The introduction of GBFIs in a building encompasses different features that have an effect on operating cost, it is important to consider a green building approach that incorporates environmental, social and economic dimensions (Ali and Al Nsairat, 2009).

Although green building is an emerging field in the Zambian building industry, there are various efforts to create a green built environment, this is seen through the creation of the Zambia Green Building Association which was established in 2015 to educate and create awareness about green building (Zambia Green Building Association, 2015). Following the back ground research into the emergent growth of GBFIs in the Zambian property market, coupled with stakeholder integration and the related subject matter, the following problem, question, and proposition have been formulated.

1.3 Problem Statement

The problem to be examined in the study can be stated as follows:

Little is known about stakeholder integration with respect to the implementation of GBFIs in the Zambian property market. Zambia is a developing country and the green building movement is still in its infancy.

1.4 Research Question

The research question that will be addressed will be stated as follows:

To what extent does the harmonisation amongst stakeholders impact the implementation of GBFIs in the Zambian property market?

1.5 Research Proposition

The research proposition to be tested in this study is:

The integration among stakeholders impacts the implementation of GBFIs in the Zambian property market.

1.6 Aim

The aim of the study is as follows:

To establish the effect of stakeholder integration in the implementation of GBFIs in the Zambian property market and how stakeholders participate in achieving GBFIs.

1.7 Objectives

The research objectives to be achieved are as follows:

1. Determine the awareness and impact of GBFIs.
2. Establish the perception of the stakeholders in benefits of the implementation of GBFIs.
3. Determine how stakeholder participation in the Zambian property market affects the implementation of GBFIs

1.8 Research Method

The case study method of analysis has been selected in this research and this will be done on specific buildings. The method is applicable to this specific research because case studies encompass more than one perspective and that makes it the most appropriate method for this research. It does not only consider statements and perspectives of participants but considers the environment of the participants (Tellis, 1997). Case study method deals with specific situations and encompasses a comprehensive approach (Graue, 2015).

The data collected in this research is qualitative in nature and the results of the aims and objectives of the study are achieved through the following:

1. Reviews of academic and non-academic literature of similar cases to the study.
2. Multiple case studies will be carried out. The case studies will employ semi-structured interviews with stakeholders that are involved in the implementation of GBFIs.
3. Detailed interpretation of the findings of the study.
4. Presentation of the conclusions as well as the recommendations.

1.9 Limitations

The limitation of the study is that there is limited literature for the green building market in developing countries; therefore, the research will largely be based on literature from the developed world. The study involves the selection of cases that were accessible within the capital city of Zambia because the researcher could not get exposure to other areas.

1.10 Report Structure

The remainder of the report consists of four chapters and they are structured as follows¨

Chapter two comprises of a critical literature review relating to the study as outlined in the background. The literature on green buildings and how different stakeholders are involved in the implementation of GBFIs are sourced from international green building research. Through the critical review of the literature, the appropriate research questions and themes and/or patterns are identified.

Chapter three outlines the research method that is relevant to the study, the aim is to explain and justify how the findings were reached in chapter 4. This is followed by the justification and explanation of the selected research methodology which is the multiple case study approach. The unit of analysis, sampling techniques, data collection method and finally the data analysis method are outlined.

Chapter four is a presentation of the findings from the semi-structured interviews followed by an analysis of the data in the form of comparison to previous research. The findings discuss how stakeholders participate in implementing GBFIs within the Zambian property market as generated from the interviewees.

Chapter five supports or refutes the research proposition based on an analysis of data presented in chapter four. The research objectives and aims are re-examined and conclusions are drawn.

1.11 Summary

This chapter gives an overview of the green buildings and the factors that affect their development and success; it further focuses on the perspectives of the different stakeholders. The research problem, question, proposition and aims/objectives have been identified. Additionally, the research methods and limitations of the study have been outlined.

2 LITERATURE REVIEW

2.1 Introduction

This chapter provided a critical analysis of literature that is related to the business case of green building and stakeholder integration in implementing GBFIs.

2.2 Green building legislation

While green building is not as advanced in the developing countries as it is in the developed countries, the legislative framework in developing countries does not cover sufficient environmental aspects (Melchert, 2007). There is a legislative regulatory framework that governs the construction sector in Zambia, however, the framework lacks specific guidelines to govern green construction (United Nations in Zambia, 2016).

It is, therefore, difficult to enforce regulations and rules on green building in developing countries and the lack of adequate expertise in regulations, management, standards, and monitoring affect the success of the implementation of GBFIs (Liu *et al.*, 2012). It is evident that legislation for green building is necessary and has been introduced in developed countries compelling developers to develop green buildings (Hwang and Tan, 2012).

Even though regulations may be present, there are stakeholders that do not feel compelled to invest responsibly and that impacts negatively on green building because leaders have an influence on the people they lead (Pivo, 2008). Hwang and Tan (2012) explain that developers are reluctant to implement green building legislation due to lack of convincing benefits of green building.

2.3 Timelines for projects with GBFIs

The willingness from the developers and the landlords to incorporate GBFIs in developments is a great benefit to the building environment and the social environment (St Lawrence, 2004). The findings from Hakkinen and Belloni (2011) reveal that the client is a critical stakeholder and that communication with the project team needs to highlight that green building takes longer to implement compared to conventional buildings. Therefore, it is important to engage and communicate with the associated stakeholders to highlight the entire process of implementing GBFIs so as to adhere to the timing of the project (Hakkinen and Belloni, 2011).

2.4 Awareness of GBFIs

The low levels of awareness amongst stakeholders on GBFIs have resulted in poor demand for green building and the lack of interest in the matter (Hwang and Tan, 2012). Furthermore, low levels of public awareness among stakeholders may adversely affect the implementation of GBFIs in the least developing countries because of not being aware of the benefits that are related to green building (Kalua, 2015).

It is claimed that public authorities have an influence on the use of public funds for building construction works (Lutzkendorf and Lorenz, 2007) and therefore need to be incorporated into the delivery of green buildings. Similarly, institutions of higher learning cannot be excluded in the implementation of GBFIs in the property market because there is a need to apply the acquired knowledge (Da Silva and Ssekulima, 2011).

The involvement of stakeholders such as the government and business houses plays a major role in creating awareness of GBFIs. This can be at various level of design or during maintenance of buildings that contain GBFIs (Liu *et al.*, 2012). The use of campaigns, pamphlets, seminars, and product exhibitions are all efforts to reach as many masses as there can be and to remind them of the benefits of GBFIs in the property market (Azizi *et al.*, 2015).

One initiative by Build It International which was implemented in Zambia reveals that the use of green materials, training of stakeholders and community involvement in the implementation of GBFIs has strong support which is a catalyst to achieving green building in the Zambian property market (Fielding *et al.*, 2012). However, public awareness on its own is not enough because stakeholders need to be trained and well equipped with knowledge of GBFIs in order for them to contribute successfully to green building (Gluch *et al.*, 2014). Additionally, there is reluctance to use materials such as thatch and soil as they are viewed to be outdated and this has affected the demand for GBFIs in what are termed as modern buildings (Fielding *et al.*, 2012).

2.5 High cost of green building

Developers emphasise the need to highlight costs and savings for various GBFIs in order to easily compare between conventional and green building (Miller and Buys, 2008) because managing the costs of conventional buildings is less complicated compared to green buildings (Hwang and Tan, 2012). Similarly, design and cost control in construction are major barriers

in green building projects because the high initial building and design costs are passed on to the tenant through higher rentals (Liu *et al.*, 2012).

Therefore, all related costs should be clearly documented and factored into the implementation process so that all stakeholders are aware of what they are paying for (Miller *et al.*, 2008). In terms of economic benefits, there is evidence that most buildings constructed in the developing countries use metal sheets and concrete blocks because they are the cheaper compared to other materials (Fielding *et al.,* 2012).

2.6 Limited knowledge and lack of experience in green building

Boyd (2006) expresses that there is not enough empirical research on the economic performance of green buildings and that means that decisions have to be made based on the limited research available. The lack of research on green building benefits is what has had an effect on the demand because the stakeholders are not fully aware how beneficial GBFIs are in the property market (Hwang and Tan, 2012).

Professionals need to understand that the decisions they make pertaining to the implementation of GBFIs will affect the whole process of delivering a green building and ignoring the outlined standards can have a negative impact (Reed and Gordon, 2000). There is evidence that professionals lack education in green buildings which may lead to overestimation of the additional costs that are necessary for installation of green building which results in increase of overall cost of the project (Lutzkendorf and Lorenz, 2007). Additionally, inadequate green product information affects the implementation of GBFIs because the developers need to engage consultants who are familiar with green building which has cost implications (Hwang and Tan, 2012).

Trained specialists that are certified to assess green buildings are required and therefore, sufficient knowledge and experience are necessary in grading various green buildings (Potbhare *et al.*, 2009). Poor or no application experience affects the green building certification process and therefore, newcomers in the field may need to rely on experienced professionals who have vast knowledge in the field of work to assist in the certification process (Liu *et al.*, 2012).

2.7 Green retrofits and related risks

Although green retrofits improve the environment and energy efficiency of existing buildings, they are risky, uncertain and complex projects to manage (Liang *et al.*, 2015). The

number of conventional buildings is more than green buildings and in order to convert them, the buildings will need to be retrofitted to attain the desired energy efficiency for green buildings (Ellison *et al.*, 2007). Stakeholders have become more aware of the potential benefits of green buildings and tenants prefer occupying green buildings thereby rendering conventional buildings into the obsolete phase at a much quicker rate (Miller *et al.*, 2008). There is a strong interrelationship that exists between success factors of green retrofits and the stakeholders. Success factors need to be outlined in order to measures the success of green retrofits (Liang *et al.*, 2015).

Even though retrofitting conventional buildings into green buildings is vital, the retrofitting process has more challenges compared to new buildings and all risks associated need to be considered with caution (Miller and Buys, 2008). This though does not mean that retrofitting cannot be achieved but that concerted efforts from stakeholders are of importance. An example of such efforts is the Chinese government involvement in improving energy efficiency retrofit for existing buildings (Liang *et al.*, 2015). Additionally, there are risks that are as a result of reusing building material and these need to be considered and their impact evaluated (Hwang and Tan, 2012).

2.8 Smart technology used in buildings

Stakeholders have become increasingly aware of the benefits of green buildings, for example, occupants take interest in smart lighting and air-conditioning; however, they are not knowledgeable about how these technologies can be implemented and the lack of such knowledge can cause resistance to the implementation of GBFIs (Miller and Buys, 2008).

Despite these barriers, efforts are being made to overcome them which include government involvement, public awareness, integrating design and communication in the delivery of green buildings (Hwang and Tan, 2012).

2.9 Green Building Features and Initiatives (GBFIs)

According to Michell and Nurick (2014), a feature is a component of a building that reduces consumption of a resource and an initiative is a component of a building that increases consumption of a resource but results in a decrease in the carbon footprint of building occupants. In order to successfully implement GBFIs, an integrated process should be considered with the efforts of all the key stakeholders on the green building project (Da Silva and Ssekulima, 2011). It is claimed that there is potential in implementing GBFIs in

developing countries by allowing for the influence that the local climate has on the design and the environmental conditions (Fielding *et al.*, 2012). However Kalua (2015) suggests that green building practices may not be economically sustainable in the least developed countries because of issues such as lack of awareness and limited public access to finance for construction.

Siting, building orientation and building fabric are vital in achieving GBFIs. For example, orientation will consider daylight, shading and solar gain which all have to be considered whereas building fabric will consider the use of eco-friendly materials where the building is airtight so as to reduce heating in the cold months (Da Silva and Ssekulima, 2011). Reusing building materials on new green construction projects reduces the impact on the environment (Hwang and Tan, 2012). The incorporation of green building features assist to make building more energy efficient, improves indoor quality and increases efficient use of the materials during building construction all of which are vital for both the developer, tenant and the landlord (Nurick *et al.*, 2015)

According to Boyd (2006), the occupant has an influence on GBFIs that can be implemented in a building. For example, at the planning stage, the requirement for the overall site layout is necessary and should include issues of circulation patterns, shade, and slope that will follow a green building theme (Fielding *et al.*, 2012). There is further evidence that occupiers of green building are more conscious of the space they are in and therefore tend to preserve energy which is an indicator that public awareness still plays a major role even for users in green buildings (Azizi *et al.*, 2015).

In the implementation of GBFIs, improving the environment alone is not enough as the social and cultural aspects of the built environment should be considered (Boyd, 2006; Cajias and Piazolo, 2013). GBFIs can be introduced on new and retrofitted buildings, both of which are vital in achieving green buildings because the aim for all these efforts is to have a property market that has buildings that offer good thermal comfort and also less environmental degradation (Younger *et al.*, 2008). Climate control is important to consider in commercial green building because changing occupier requirements is likely to increase the cost of retrofitting a building (Ellison *et al.*, 2007).

It will be more cost effective when GBFIs are introduced at the initial stage of the project unlike introducing these features at a later stage which could be costly as a result of the various changes made (Hwang and Tan, 2012). Furthermore, it makes more economic sense

if green building materials can be produced locally. Costs rise because of dependence on importing of these materials which increases the overall cost of a green building (Kalua, 2015).

Natural ventilation and lighting, use of low toxic finishes and recycled material form part of GBFIs and they improve indoor quality however, Paul and Taylor (2008) argue that the connection between GBFIs and indoor thermal quality is weak. On the contrary, natural ventilation and cross ventilation poses a risk of which can affect the efficiency of cooling systems resulting from increased cooling loads (Da Silva and Ssekulima, 2011).

The management of waste is an important aspect of green buildings because tenants want to be in buildings that have good waste management policy however, this is not at all significant for the investor (Ellison *et al.*, 2007). There is debate on energy saving behaviour of the tenants in green buildings; these behaviours have an overall impact on the success of green buildings and there is evidence of good practice by tenants in green buildings because they have been sensitised about the GBFIs implemented in the building(Azizi *et al.*, 2015).

The potential impact on rental growth will differ from one investor to the other and this impact cannot be felt by only one stakeholder in the property market. Therefore, the need to account for this rental growth and assess which stakeholders need to be cushioned from such impact is of utmost importance (Ellison *et al.*, 2007). For example, developer's investment is significant and the tenant enjoys the investment thereby creating an unequal distribution of benefits between the two stakeholders (Hwang and Tan, 2012).

Another feature worth considering is accessibility which is key to the success of green buildings; this should include local transport, private transport, pedestrian access, and adequate parking. Research reveals that tenants prefer to live in areas where they spend little time to access transport nodes. The importance of a public node cannot be overemphasised as this is seen in successful retail centres where shoppers frequent centres that are close to a good public transport network (Ellison *et al.*, 2007).

2.10 GBFIs in the Zambian Property Market

It is important to highlight that in certain cases, the general principles of local climate and surrounding conditions are being followed in the building industry in Zambia. These include appropriate orientation of buildings, protection of building from the summer sun by the use of shading devices, natural lighting, cross ventilation and improvement of the surrounding

environment by incorporation of greenery (Fielding *et al.*, 2012). These general principles have an influence on costs of lighting and cooling, for example, a well-oriented building will reduce heat gain into the building thereby reducing the cost of conventional cooling (Da Silva and Ssekulima, 2011).

One example of GBFIs being used in the Zambian building industry is solar technology which has achieved significant results in the midst of erratic supply of electrical energy from Zambia Electricity Supply Corporation (Muya and Banda, 2013). Therefore, it will suffice to state that Zambia has the potential of implementing GBFIs in existing buildings and new buildings because of the solutions that are being introduced that relate to green building (Fielding *et al.*, 2012).

Eco-efficiency of properties can be enhanced by implementing RPI where social issues such as employing the locals in green building projects and applying careful environmental consideration when constructing buildings (Pivo, 2008). However, these efforts are not wholly followed in Zambia, for instance, timber sold on the Zambian market is predominantly sold fresh and the consultants that prepare drawings and specifications do not state the standard 12 per cent moisture content for roof trusses on the drawing which is vital (Muya and Banda, 2013).

The term green building is relatively new in the Zambian property market compared to South Africa and Europe and there is a strong consensus from stakeholders that the matter is vital and needs to be implemented consciously in the property market (Fielding *et al.*, 2012). The emphasis on the use of eco-friendly materials in the construction of buildings, which can improve the overall state of the environment, is evident from the involvement of the Government of the Republic of Zambia in the green buildings programme in the construction industry (Muya and Banda, 2013).

The involvement of key stakeholders in Zambia which include governmental and non-governmental organisations, financial support bodies, participating UN agencies and research centres is of importance in achieving an eco-friendly building industry (Muya and Banda, 2013). The Zambian government recognises the growing demand of timber and tree plantations have been introduced where trees are planted annually to supplement the low supply of timber and contribute to the success of green building (Zambia Forestry and Forest Industries Corporation Limited, 2013).

The establishment of the Zambia Green Building Association 2015 was an effort to highlight the importance of three pillars of sustainability which are environment, social and economic within the building industry (Zambia Green Building Association, 2015). Additionally, the development of green building guidelines is a catalyst for sustainable construction in Zambia as it will provide the criteria and guidelines on social, economic and environmental aspects of green building. The guidelines will provide information and guidelines on planning and designing of green buildings within the Zambian context (United Nations in Zambia, 2016). Even though there is little or no local research that can be referred to as a basis of green building in Zambia, global research shows that there are minor similarities between developed and developing countries on the subject of environmental effects on the building industry. It is for that reason that comparisons are made between developing and developed countries in the establishment of standards' associations (Melchert, 2007).

2.11 Green strategies and green building rating Tools

There are various useful tools that have been developed to create awareness, provide guidance in design and monitor green buildings. These include the green building guidelines (United Nations in Zambia, 2016) and the environmental impact assessment guidelines for the construction sector in Zambia (Zambia Environmental Management Agency, 2016). Due to the increasing demand for green buildings, various products, building techniques and building materials are being developed to measure green building efficiency (Lutzkendorf and Lorenz, 2007).

The various GBFIs and green rating tools form a basis for discussing and adopting GBFIs in the property industry (Hakkinen and Belloni, 2011). Green building guidelines are necessary for creating demand for green building techniques and practices which will result in the creation of rating tools to provide standards and benchmarks for green building (United Nations in Zambia, 2016). Additionally, the development of the environmental impact assessment guidelines for the construction sector in Zambia are to ensure environmental sustainability and these guidelines cover a range of disciplines such as water quality, air quality and pollution (Zambia Environmental Management Agency, 2016).

2.11.1 Influence of RPI, SRPI and CSR Strategies

There have been various strategies that have been claimed to transform the property market, these include highlighting economic advantages, assessments and descriptions of GBFIs (Lutzkendorf and Lorenz, 2007). RPI involves exceeding compliance with minimum legal requirements to better manage the environment, cost, social and governance issues. RPI mainly looks into matters that affect the built environment (Pivo, 2008). There is evidence to suggest that property investors who apply the socially responsible property investing model in their investment decisions, increase the focus on green building benefits which in turn influences investors to invest not only for reason of profit but also on grounds of SRPI (Newell, 2009).

Energy efficiency is cardinal in saving energy costs especially for commercial buildings, therefore, implementing GBFIs should be linked to the investment worth of a property in order for the investor to fully understand and appreciate the benefits related to the building (Ellison *et al.*, 2007). There has been recorded growth in CSR activities within the property sector, large corporate clients who value CSR in their capacities as investors and tenants have been a catalyst in the implementation of GBFIs because they believe in corporate sustainability (Stibbe and Voigtlander, 2014). It is important to note that decisions made by property investors and developers to consider RPI, CSR and SRPI are all applied to contribute to an environmentally friendly property market (Newell, 2009).

2.11.2 Green rating tools

Green rating in the property market are used to assess the performance of buildings and they continue to be developed and applied in the property market in developing countries. Green rating processes influence demand for GBFIs (Lutzkendorf and Lorenz, 2007). The green building challenge (GBC) through international collaboration has contributed to the building of the green rating tools (Larsson and Cole, 2001).

In some instances, rating tools are voluntarily applied but there is evidence that a voluntary commitment does not yield the best results, therefore, these tools should be a regulation in order to get the desired results (Hakkinen and Belloni, 2011). Rating tools such as BREEAM and LEED are used in the developed countries to provide a guide to rating of green buildings

and it is important to highlight that these tools are not only expensive but complex to be applied in developing countries (Fielding *et al.*, 2012).

Building Research Establishment Environment Assessment Methodology (BREEAM)

BREEAM is a sustainability assessment for master planning projects, infrastructure and buildings from new construction, in-use and refurbishment. The main result of the assessment is the rating which reflects the performance by the project (BREEAM, 2018). Various other tools around the world have been developed from BREEAM (Alyami and Rezgui, 2012b). BREEAM was introduced in 1990 and findings from a research carried out in the UK reveal that BREEAM rated buildings command high rental and sales premiums compared to non-BREEAM rated buildings (Fuerst and Van de Wetering, 2015).

BREEAM results in client and user reassurance and assists in comparing buildings (BREEAM, 2018). Rating tools create a basis for differentiating green buildings from conventional buildings, these are vital for investors to review various risks of investing in green buildings. BREEAM is also being used in financial institutions to offer green or energy efficient mortgages which create an enabling environment to invest in green building (Lutzkendorf and Lorenz, 2007).

Rating tools may be applied differently in different nations because of differing social and economic environment. The application of rating tools should suit the environment where they are applied (Miller *et al.*, 2008).

Leadership in Energy and Design (LEED)

LEED is a widely used green building rating system in the world and is a recognised symbol of sustainability achievement (USGBC, 2018) and was developed in 1998 by the United States Green Building Council (Environment and Ecology, 2018). The rating systems consider water conservation, energy efficiency, materials used and overall indoor comfort. These four aspects are vital for both the investor and the tenant to save on the use of material and for maximum indoor comfort (Younger *et al.*, 2008). This is a voluntary green building assessment tool which has been agreed upon by various stakeholders (Alyami and Rezgui, 2012b). However, Muya and Banda (2013) suggest that voluntary adherence to standards creates difficulties in enforcing them.

Comprehensive Assessment System for Building Environment Efficiency (CASBEE)

CASBEE is rating tool which is based on the Building Environmental Efficiency (BEE). It evaluates and rates the environmental performance of the buildings and the built environment and was developed in 2001 (Institute for Building Environment and Energy Conservation, 2008). CASBEE was developed in conjunction with the industrial sector, the government and academia to be used in the Japanese building sector. CASBEE takes in consideration energy efficiency, resource efficiency, local environment and indoor environment (Alyami and Rezgui, 2012b).

Sustainable Building Tool (SBTool)

The sustainable building tool is a rating system which rates the sustainable performance of buildings and projects. The tool can be used to suit specific regions and cab also be used a an education tool during the process of developing benchmarks. SBTool considers site specific context factor and the system is not limited to green building concerns but covers a wide range of sustainable building issues (International Initiative for a Sustainable Built Environment, 2009; Larsson, 2015).

SBTool prioritises environmental issues and is flexible and adaptable in building systems to changing occupant requirements (Alyami and Rezgui, 2012b). The system covers various conditions such as pre-design, design, construction, renovation projects and provides relative and absolute outputs. Furthermore, the integrated design process management support tool is incorporated in the system in order to assist the design team to work more efficiently (Larsson, 2015).

Green Star Rating System – Australia

The green rating system was developed in Australia in 2003. It is an internationally recognised sustainability rating system. The system certifies design, construction and operation of buildings, fit outs communities. The four green star rating tools are:

1. Communities – these certify a plan for a precinct development
2. Design and As built – these certify the design and construction of a building
3. Interiors – certify interior fit out of a building
4. Performance – these certify the operational performance of a building (GBCA, 2015).

Green Star SA rating tools

The tool was developed by the GBCSA to measure green building in South Africa and Africa. These tools are based on nine different categories. The green star rating tools measure the following: new building and major refurbishments, existing building performance, interior fit outs and sustainable precincts (GBCSA, 2017c).

It is hoped that these ratings will, in turn, increase the demand for green buildings as their benefits continue to be highlighted (Lutzkendorf and Lorenz, 2007). There is evidence that the measurement standards have been major catalysts in the achievement of green buildings worldwide and therefore, there is need to avail the information general public (Miller *et al.*, 2008). With the increased construction in the Zambian property market in the last decade, GBFIs need to adhere to acceptable standards of building (Muya and Banda, 2013).

2.12 Stakeholder Influence

The property market engages with various stakeholders whose priorities are having buildings that have a minimal environmental impact. These stakeholders are vital in influencing the implementation of GBFIs (Lutzkendorf and Lorenz, 2007). The building sector affects many stakeholders because of the uniqueness and complexity of the construction processes, as a result, a wide range of stakeholders should be included to develop a more sustainable building sector (Feige *et al.*, 2011). Recently there has been a growing influence from environmental managers because of their strategic position to make decisions for companies and this makes them critical stakeholders in achieving successful implementation of GBFIs (Gluch *et al.*, 2014).

There is evidence that the success of green building can be influenced by political goodwill through enforcing tools such as tax waivers on green building products, and title registration for green buildings (Kalua, 2015). Liang et al. (2015) identified stakeholders to include owner, occupant, facilities manager, designer, contractor, supplier, sub-contractor, government, financial institution, energy service company, community and the research institution all of which are considered to be vital players in achieving green buildings.

It is argued that there are stakeholders have not responded promptly to green building challenges because there are still various barriers that have not been overcome and GBFIs are not yet a prevailing practice in the building industry (Lutzkendorf and Lorenz, 2007). The implementation of GBFIs has an impact on the performance of green buildings but this

impact is experienced not only by individuals or sectors but by the surrounding environment (Ellison *et al.*, 2007). Therefore, stakeholders should have a high level of communication amongst themselves as this is a catalyst to success in green buildings (Reed and Gordon, 2000). The effects of poor communication among stakeholders may weaken the building projects team (Gluch *et al.*, 2014).

Stakeholders such as architects, researchers, academics and government have a common commitment when it comes to green buildings but their expectations differ because their needs are different (Larsson and Cole, 2001). Other stakeholders such as municipalities are necessary because of their integration with the greater public (Melchert, 2007). Additionally, the involvement of the local councils will make development permission easy to obtain for green building construction (Pivo, 2008). However, the councils in Zambia do not emphasise the use of GBFIs in the local building regulations which makes it less important for designers to consider (Fielding *et al.*, 2012).

An example of government involvement in achieving GBFIs in developed countries is in the Netherlands where the construction industry acts as a key partner in the success of green buildings (Melchert, 2007). The integration of the government to provide subsidies for research and development of green buildings in the property market cannot be ignored as it has yielded tangible results in the case of Singapore (Hwang and Tan, 2012).

Developers desire to offer new and valuable properties and therefore seek not only maximum return but also a good rating in new buildings (St Lawrence, 2004). This is an example of a win-win situation that can be experienced by stakeholders in the property market (Lutzkendorf and Lorenz, 2007). Green buildings should not end at only incorporating GBFIs but should ensure that the buildings offer maximum satisfaction of the indoor environment as this will achieve both aesthetics and occupier comfort (Paul and Taylor, 2008). Additionally, innovative as well as user-friendly designs need to be continually developed in order to attract stakeholders to implement GBFIs in the buildings they build, live in or own (Fielding *et al.*, 2012).

Corporate customers attach great importance to the internal environmental quality of a building because this has an effect on their image as a business (Paul and Taylor, 2008). This is evidence that the client influences successful implementation of GBFIs (Gluch *et al.*, 2014). Additionally, investors value environmental labels because they perceive them to be

an attractive item in marketing and benefits the image of their businesses (Fuerst and Van de Wetering, 2015).

Research reveals that the key stakeholders that would influence green building in the Zambian property market include Zambia Institute of Architects, National Housing Authority and Zambia Bureau of standards (Fielding *et al.*, 2012). Other critical stakeholders to consider are the financial institutions that provide investment capital for construction projects (Gluch *et al.*, 2014). Additionally, insurance agencies are able to create noticeable indicators within the property market (Lutzkendorf and Lorenz, 2007). Such examples include Zambian banks such as ZANACO Ltd and STANBIC bank (Z) Ltd that have created simplified programmes specifically to support businesses with capital and this can count as a positive influence from key stakeholders (Muya and Banda, 2013).

2.13 Business case of green building

Even though climate, cultural and economic context will differ between developed and developing countries, there are similarities regarding environmental impacts of the industry which may be vital to refer to for developing countries (Melchert, 2007). The general perception of green building is that initial costs for green buildings are high while developers specifically consider economic benefits to be of great importance because of lower costs of operation (Chan *et al.*, 2009).

Currently, in Zambia, there is minimal knowledge of the basics of green buildings among stakeholders and therefore, the need to conduct training for local consulting firms, council staff that approve drawing plans, contractors and regulatory agencies (Muya and Banda, 2013). Additionally, this training needs to start in the institutions of higher learning so as to equip graduates with the knowledge of green buildings before they become involved in the industry. This will provide more information in research, education and practice which will contribute to the successful implementation of GBFIs (Gluch *et al.*, 2014).

There are direct and indirect benefits that can be achieved as a result of the implementation of GBFIs such as improved health, social benefits and productivity for the occupant (Fuerst and Van de Wetering, 2015). There are opportunities to implement environmental policies through various stakeholders in the building industry and as a result, the benefits of GBFIs in the property market will be revealed and this will attract demand for GBFIs (Melchert, 2007).

Stakeholder participation in various technologies that pertain to green building is important, these include design, production, manufacturing, regulation, solar energy, waste minimisation, water conservation and use of recycled material, all of which are necessary for yielding the desired results (Liu *et al.*, 2012). In order for the various stakeholders to experience these results, comprehensive training needs to be conducted for stakeholders to appreciate the benefits of green building (Hwang and Tan, 2012). The large volumes of waste being generated in the Zambian building industry can be reused through recycling processes (Muya and Banda, 2013).

, awareness of GBFIs does not end when the green building is complete but extends to the period when occupiers are using the building thus strategies need to be implemented to increase occupants awareness of GBFIs (Azizi *et al.*, 2015).

2.14 Chapter Summary

This chapter reviewed the literature legislation relating to GBFIs, awareness of GBFIs, smart technology, green strategies and how stakeholders in the property market participate in the implementation of GBFIs. Different factors that influence the implementation of GBFIs in the property market were discussed.

A review of different approaches to achieving GBFIs was carried out and this was mostly for the case of developed countries and how these approaches relate to developing countries. Rating tools were also discussed and the need for them to be a regulation and not a voluntary commitment. Next the influence of stakeholders in the property market was discussed and finally, the business case for green building was detailed.

3 RESEARCH METHOD

3.1 Introduction

This chapter outlines the research method. The aim is to explain and justify how the findings were reached in chapter 4. The approach of the research method is outlined, followed by the justification and explanation of the selected research methodology which is the multiple case study approach, unit of analysis, sampling techniques, data collection method and finally the data analysis method.

Methodology overview

The purpose of this section is to provide an overview of the research process and the structure of the chapter. The chapter further explains the structure and the arrangement of the research.

Figure 3.2 outlines the structure of the research process that was followed by this research. The research process as outlined in the figure involves, the define stage, design stage, data collection, data analysis and evaluation and conclusion (Braun and Clarke, 2006; Burnard et al., 2008; Graue, 2015). The literature was reviewed and this formed the basis from which interview questions and research methodology were devised. Thereafter, the research method, data collection method and data analysis method are discussed in the design stage. Data collection was carried out as stated in this chapter, followed by data analysis where the results are presented in chapter 4. The evaluation and conclusion stages are carried out in the final chapter and this is where conclusions of the research problem are drawn from the data analysis.

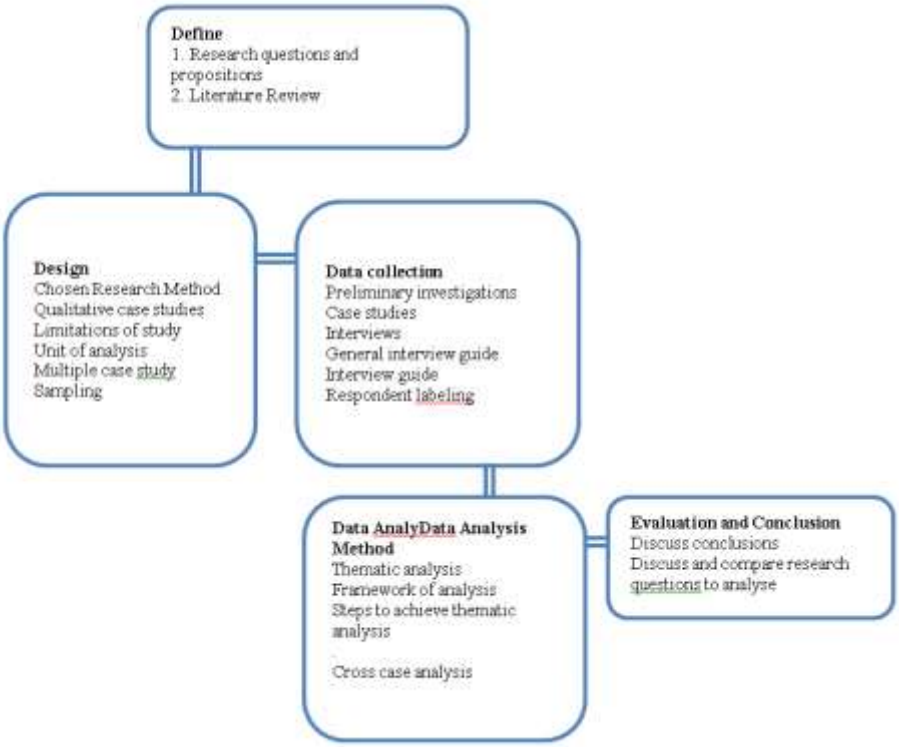

Figure 3.1: Research Process Outline

3.2 Research method

There are two approaches to carrying out research, these are quantitative and qualitative (Creswell, 2007; Graue, 2015). What determines the selection of the research approach is how clearly the applied theory is present at the beginning of the research (Graue, 2015).

The data collected in this research is qualitative and the data collected in case study has an advantage because the researcher has an opportunity to understand the observed actions and events (Graue, 2015). Qualitative research method is an expansive term and is used in various disciplines of research and applying the best methodology can improve evidence of a research topic (Williams, 2007; Moriarty, 2011).

In carrying out a research project, a research method is followed and the tools used are guided by the method chosen. The two primary functions of the research method are to give guidance on how data will be collected and how the data collected will be interpreted. This results in a conclusion which adds to the body of knowledge (Leedy and Ormrod, 2005).

3.3.1 Qualitative case study

Qualitative case study is a method that uses a variety of data sources in order to reveal and understand a topic being studied (Baxter and Jack, 2008). Qualitative case study method was identified as the most appropriate means to achieve the desired results in answering the research question. One characteristic of a case study is that case studies have a restricted focus and this is in order to acquire a wider and deeper understanding of the study area. This results in clear understanding of complex interrelationships (Hodkinson and Hodkinson, 2001). A case study method scrutinises data in a particular circumstance through a comprehensive analysis of the cases (Zainal, 2007). Additionally, a qualitative case study is examines occurrences from the collected data in order have a broad range of understanding of these occurrences (Baxter and Jack, 2008). This further reveals a wide range of issues that can be covered by any given case study (Yin, 2011).

Case studies cover more than a single perspective; therefore, it is the most appropriate method for this research because it considers the views and perspectives of various stakeholders in the implementation of GBFIs in the Zambian property market. The case study approach is able to reveal other issues that are necessary for consideration that were not present at the beginning of the research and it is important to consider them as they can be significant (Hodkinson and Hodkinson, 2001).

3.3.2 Limitations of case studies

Even though case studies have limitations, they are reliable if the outlined recommended procedures are adhered to (Tellis, 1997). In the case study approach, the researcher chooses what questions to ask, how to ask them, what is to be observed and what is recorded (Hodkinson and Hodkinson, 2001).

Flyvbjerg (2006) explains that generalisation is a concern in case study research and Hodkinson and Hodkinson (2001) emphasises that case studies are not typical and thus cannot be generalised. Furthermore, the findings of the case study method can easily be ignored by policymakers or heads of organisations if the findings are not favourable (Hodkinson and Hodkinson, 2001).

Case studies are complex as the findings and conclusions cannot be presented easily. This occurs when certain aspects of the subject are either not well presented or concealed due to the fact that the information cannot be easily conveyed in writing thereby making it difficult

to draw a summary of the findings (Hodkinson and Hodkinson, 2001). Reliance of the researcher on a single case can be a misrepresentation of data because it is unrealistic to draw a conclusion only from one case (Zainal, 2007).

The judgement of the researcher needs to be objective and clear in order to draw as much evidence as may be available that will support the outlined judgments (Hodkinson and Hodkinson, 2001). Case studies are not able to draw a general view of their own findings as these are specific to the case and use only a small number of subjects (Zainal, 2007).

3.3.3 Multiple case studies

The research can be either single case study or multiple case studies depending on the problem under study and the circumstances thereof (Zainal, 2007). The design of case study research is critical and it needs to affirm its appropriateness to the research question, its ability to follow the recommended procedures, its ability to obtain the necessary information from the sample and the evidence of a relationship to the theoretical framework (Tellis, 1997). The interpretation of the case study reports needs to be carried out carefully with in-depth understandings in order to obtain valuable results (Hodkinson and Hodkinson, 2001). The use of either single case study or multiple case study is dependent on what the research is set out to achieve and the generalisation of findings that result from either single or multiple case studies is as a result of theories and not from the population (Zainal, 2007).

Multiple case studies look at multiple cases and this can be not only expensive but time-consuming as well, however, the results obtained from multiple case study design are more reliable compared to the single case study design (Baxter and Jack, 2008). Alternatively, single case study focuses on one case which has proven to be problematic when it comes to drawing general conclusions and this is unavoidable in cases where there are no other cases that exist (Tellis, 1997).

The use of multiple case study overcomes the concerns reaching conclusions in a single case study as the researcher is able to draw by linking certain information amongst the cases thereby increasing the levels on confidence (Zainal, 2007). Additionally, the data that is drawn from multiple sources is analysed together thereby providing a wider understanding of the areas being studied (Baxter and Jack, 2008).

Flyvbjerg (2006) explains that multiple case study design is more advantageous because of its ability to relate to real-life situations. Multiple case study considers the perspective of relevant stakeholders and the interactions between them (Tellis, 1997).

3.3.4 Unit of Analysis and determination of the type of case study

The selection of the unit of analysis is the first step of research design in case study analysis and should be chosen carefully. The choice of the case study design depends on what the research intends to achieve (Tellis, 1997; Baxter and Jack, 2008).

The research question being asked is "what factors affect the implementation of GBFIs among stakeholders in the Zambian property market?" Baxter and Jack (2008) explain that in order to understand what the research wants to analyse, certain questions should be answered, for instance, does the research want to analyse the individual, a process, a programme or the difference between organisations? The subject of the question is the "stakeholders".

Participants that were chosen are involved in the property market and are practising in their various fields. The participants hold different positions within the companies and this is in order to maintain the integrity of the unit of analysis and also to get the views of these stakeholders about the implementation of GBFIs in their line of work.

3.3.5 Sampling

The aim for sampling is to select a sample that is representative of the population (Marshall, 1996) and in order to have an in-depth understanding of a phenomenon, the sample needs to be informative (Williams, 2007). Sampling can either be probability or non-probability; which is also referred to as random and non-random sampling respectively (Latham, 2007). The selection of the sample will assist in gathering research information from the data collected. Non-probability sampling has been chosen for this research and according to Latham (2007), there are four methods of non-probability sampling which are outlined in table 3.1.

Table 3.1: Non-probability sampling method (Latham, 2007)

Sampling Method	Explanation
Purposive	This is the selection of samples based on the aim the research is set to achieve and selecting samples that have similar attributes. It is also referred to as judgmental sampling.
Convenience	This is a selection of samples based on the samples that are available for the research, the ones that are convenient to the researcher.
Snowball	This method depends on referrals by identifying members with a similar attribute to make up the sample.
Quota	This method involves partitioning the population into subgroups and interviews are carried out in order to select the required sample.

Sampling involves selection of a part of the population that has characteristics of the population in question (Latham, 2007). It is important to consider that the selected cases should either be able to support or refute the proposition and this will require experience on the side of the researcher (Flyvbjerg, 2006).

Research outlines the strategies for sampling as either random sampling which avoids biases in the sample or information oriented selections which make the greatest use of the information drawn from the sample (Flyvbjerg, 2006). In addition, the three broad strategies in collecting a sample (Marshall, 1996) are:

1. Theoretical sample usually follows sampling based on theories that are interpreted and samples are drawn to examine and explain the theory.
2. Judgment sample which is the most commonly used technique where the researcher selects the most reliable sample; this selection is influenced by the practical knowledge of the researcher, evidence drawn from the research and literature reviewed by the researcher.
3. Convenience sample which involves selections of subjects that are easily accessible to the researcher but this should be done thoroughly in order to improve the quality of the data being collected.

In as much as the selection of the case is vital, the sample chosen must be appropriate to the study being undertaken (Latham, 2007)Additionally, in order to minimise the limitation of dismissingAdditionally, in order to minimise the limitation of dismissing the findings of case studies, Hodkinson and Hodkinson (2001) claim that research that depends on large representative samples with clear findings is less likely to be dismissed.

In this research, the selection of a good sample was intensified because of the need to draw representative views of stakeholders in the implementation of GBFIs in the Zambian property market. This research has limitations as stated in chapter one therefore, generalisation can only reach as far as the sample can justify.

3.3.6 Applied sampling technique

In order for a sample to be appropriate to the research, the selected sample needs to sufficiently respond to the research questions of the subject area (Marshall, 1996). The aim of the research is critical to the selection of a sampling method because the method depends on what the research sets to achieve (Latham, 2007).

Purposive sampling and convenience sampling were both applied as sampling techniques for this research in order to obtain high accuracy. A purposive sampling method involved selecting stakeholders that have knowledge of GBFIs in the Zambian property market (Flyvbjerg, 2006) while convenience sampling involved selecting cases that were available for the study and convenient to the researcher (Latham, 2007).

Purposive Sampling

In purposive sampling, the researcher selects a sample that is capable of answering the research questions (Marshall, 1996). Purposive sampling involves selecting participants who have experienced the phenomenon and have internal knowledge the of the research being undertaken (Latham, 2007; Lietz and Zayas, 2010).

The various forms of purposive techniques are outlined in Table 3.2 in order to validate the purposive sampling technique and the explanations are provided (Flyvbjerg, 2006). It is important to note that the results that emanate from the chosen sample can only relate to those findings of the specific sample and not the whole population (Latham, 2007).

Table 3.2: Purposive sampling technique (Flyvbjerg, 2006)

Sampling Technique	Explanation
Critical cases	Specific cases are selected that will be able to achieve information that will allow logical generalisation.
Maximum variation cases	Various viewpoints are obtained from various cases and circumstances and a wide range of themes are identified in the outcome.
Extreme/deviant cases	Only special cases are selected in this sample and information on unusual cases is obtained.
Paradigmatic cases	This is the selection of samples that are common to be compared to other common cases thereby establishing a normal school of thought that concerns the sample.

For the purposive sampling technique, a critical case was determined to be the most appropriate technique to understand the factors that affect the implementation of GBFIs among stakeholders in the Zambian property market and to be able to allow for logical generalisation.

Convenience sampling

Marshall (1996) explains that convenience sampling is a less rigorous technique but a thoughtful selection of the sample is justified, in this research cases that were easily accessible to the researcher were selected. As a result, the research was bound to the area of Lusaka as the researcher could not get exposure to other areas. It is important to state that the convenience sampling method is widely used in qualitative research (Moriarty, 2011).

Convenience sampling method resulted in the selection of three buildings (cases). The stakeholders associated with green buildings were willing to participate in the research and all the buildings selected possessed GBFIs. This research endeavoured to reflect the overall population through the selection of buildings that possessed GBFIs but one limitation of

convenience sampling is that the sample is unlikely to represent the population that is being studied (Marshall, 1996).

Case study selection

In order to provide insight to the research, a critical sample of stakeholders was selected to achieve information which would allow for logical generalisation in the property market. The critical case criteria was selected on the basis of being in the best position to know what projects or buildings are involved in the implementation of GBFIs in the Zambian property market and table 3.3 outlines the selected critical sample. This resulted in the selection of two key professionals for the critical sample within the property market that guided the selection of the most appropriate cases for the convenience sample. The criteria further assisted in selecting cases that have a significant influence on the property market through their magnitude and impact.

Table3.3: Table of selected critical sample

KEY PARTICIPANT	SECTOR
Project Architect (CRITS1a)	**Architectural Firm**
Human Resource Training Manager (CRITS2a)	**Regulator in Construction (NCC)**

Three case studies were selected for the purpose of the research and their selection was as a result of their involvement in implementation of GBFIs within the property market through the owners, developers and tenants. Table 3.4 outlines the cases selected.

Table 3.4: Table of selected case studies

CASE STUDY	STAKEHOLDER
CASE STUDY 1 (CS1)	**Tenant 1a**
	Tenant 1b
CASE STUDY 2 (CS2)	**Owner and Developer**
	Tenant 2a
CASE STUDY 3 (CS3)	**Tenant 3a**

The framework of sample selections outlined in this section was applied at the necessary stages of research and the samples need to maintain construct validity by maintaining sampling rigour.

Maintaining Sample Rigour

It is argued that case studies lack sampling rigour, therefore, measures should be considered to maintain this (Zainal, 2007). There are six attributes outlined by Huberman and Miles (1994) that should be followed in order to maintain sampling rigour. These guidelines and sampling approaches are outlined in Table 3.5.

Table 3.5: Attributes to be followed by purposive sampling (Huberman and Miles, 1994)

Guideline	Sampling Approach
The sample should generate information relevant to the research.	The sample was taken from the active stakeholders in the Zambian property market.
The sample should be able to generate reliable explanation.	Interviewing people creates a bias; however, since the research is exploratory in nature, there is a need to be open to other viewpoints.
The sample should enhance generalisable findings.	Specific cases are selected from the property market and these will achieve information that will allow logical generalisation. The cases selected are buildings that contain GBFIs.
The sampling strategy should be relevant to the conceptual framework and research questions addressed by the research.	The samples are the various buildings that contain GBFIs which is directly related to the research question. Additionally, the convenience sample was guided by the purposive sample. The uses of buildings that contain GBFIs address the research question through their large representation of the property market.
Feasibility of sample.	There are a number of buildings in Lusaka that contain GBFIs making the sample feasible and three buildings were selected.
Ethics during data acquisition.	The participants and the researcher were professional throughout the research.

The framework was adhered to and sampling was performed as described. The following stage of the research design is the data collection method which determines how and what is extracted from the sample selected.

3.3 Data collection method

This section informs the data collection method being used in this research. Firstly, the use of interviews is justified as the most appropriate means of collecting data; this is followed by the explanation of the type of interviews used.

3.4.1 Interviews

Interviews are selected as a data collection instrument (Leedy and Ormrod, 2005). Interviews are one form of data collection that is commonly used in qualitative research. Interviews provide in-depth information on the experiences of participants and the perceptions of the particular topic (Turner, 2010). Furthermore, interviews reveal other related issues that the research may not have considered in the beginning (Moriarty, 2011) and this provides a wider understanding for case study analysis.

There is limited documented information on the how stakeholders relate in the implementation of GBFIs in the Zambian property market. The main focus is to extract information from the stakeholders in the industry in order to provide the most accurate information. Therefore, interviews were the most appropriate data collection technique for the study.

Interviews were conducted with various stakeholders of the property industry identified in the sample. The interviews were conducted on the convenience basis for the participants, which had an impact on the time and length of the interviews. Therefore, the approach that was used was important in order to highlight the critical issues necessary for the research.

3.4.2 General Interview Guide Approach (semi-structured)

There are three categories of interviews described by Turner (2010). These are outlined in Table 3.6.

Table 3.6: Categories of interview design (Turner, 2010)

Category	Explanation
Informal conversational	There are no specific questions asked but the process is guided by the interaction with the participants.
Standardised open-ended	The questions are open-ended resulting in open-ended responses. Participants to give detailed viewpoints of their experience.
General interview guide approach	It is also known as semi-structured. The structure of questions depends on the researcher. The interview is well structured and flexible.

This research determined the general interview guide approach as the most appropriate interview design as it allows participants to express their in-depth experiences during the interview (Turner, 2010). Furthermore, the flexibility and composition of the approach and the ability to acquire in-depth information is necessary for this research.

Semi-structured interview guide gives instructions on how the interview will be conducted and this can provide reliable data, the approach has the following characteristics: (1) interviewer and respondent engage in a formal interview; (2) the interview guide is used in the conversation; and (3) the interviewer follows the guide strictly and only drifts away when necessary (Cohen and Crabtree, 2006). These interviews contain questions that are well structured and where the researcher has the ability to change the questions depending on the respondent's response to the previous question (Turner, 2010).

3.4.3 Interview Questions

Table 3.7 lists the questions posed by the semi-structured interviews in the critical sample. Beside each question, the reason for the question and the source from which the question arose is provided.

Table 3.7: Interview question for the critical sample

INTERVIEW QUESTION	REASON AND SOURCE
What do you understand by the terms green building features and initiatives and what motivates you to implement them?	To ascertain exactly what GBFIs are and what they are set out to achieve (Nurick and Cattell, 2013).
How are various stakeholders taking part in the implementation of GBFIs in the property market?	To investigate opinions drawn from the critical sample on how various stakeholders contribute to the successful implementation of GBFIs (Feige *et al.*, 2011; Liang *et al.*, 2015).
What motivates professionals to engage in green building in their line of business?	To determine what motivates professionals to engage in the implementation of GBFIs (Feige *et al.*, 2011).
What do you think are the main drivers in the implementation of GBFIs?	To determine the opinion from the critical sample on what is causing the demand for implementation of GBFIs (Hakkinen and Belloni, 2011; Liu *et al.*, 2012).
Why is there a need to implement GBFIs in construction projects?	To understand how useful the implementation of GBFIs are in the property market (Younger *et al.*, 2008; Hakkinen and Belloni, 2011).
Why is the partnership with National Council for Construction, Zambia Green Building Association and stakeholders in the building industry necessary?	To understand the relationship that has been built between the parties in the implementation of green building features (Muya and Banda, 2013; Green jobs programme, 2015).
How do you expect the subject of green buildings to grow in the future?	To investigate the how green buildings will grow in the future (Wallbaum *et al.*, 2010; Newell *et al.*, 2014).
How will the implementation of GBFIs impact the Zambian property market?	To recognise the opinions drawn from the critical sample on the possibility of the impact that GBFIs have in the Zambian property market (Muya and Banda, 2013; Nurick *et al.*, 2015).
What projects have implemented GBFIs?	Addresses the need to use opinions drawn from the critical sample in order to draw samples of critical cases for use in the research (Melchert, 2007).
Which stakeholders are practising the implementation of GBFIs and which one of them is making an impact?	Addresses the need to use opinion drawn from the critical sample to draw convenience sample of cases that will assist in the core research (Feige *et al.*, 2011; Liang *et al.*, 2015).

Table 3.8 below outlines the questions that were used for the semi-structured interviews for the convenience sample. Beside each question, the reason for the question and the source from which the question arose is provided.

Table 3.8: Interview questions for the convenience sample

INTERVIEW QUESTION	RESOURCE AND SOURCE
What do you know about GBFIs	To ascertain public knowledge and awareness of GBFIs (Hwang and Tan, 2012; Azizi *et al.*, 2015).
What benefits have you gained from working in an office with GBFIs?	To determine the benefits that were obtained by users of the building (Paul and Taylor, 2008; Zuo *et al.*, 2014).
Would you consider the office with GBFIs to be comfortable and healthy?	To determine whether the users of the building are comfortable and to understand whether the occupants consider the building a healthy environment (Paul and Taylor, 2008).
Which components of the building with GBFIs are occupants satisfied with?	To determine what components of the building the occupants are satisfied with (Paul and Taylor, 2008; Gou and Siu-Yu Lau, 2013).
What factors impact the experience of users in buildings that contain GBFIs? Can you explain more about these factors?	To obtain more understanding on what factors that impact on the satisfaction of the users (Paul and Taylor, 2008; Zuo *et al.*, 2014).
In your opinion, what are the key drivers that influence perceptions of buildings containing GBFIs	To determine whether expectations have an impact on the perceptions of GBFIs (Miller and Buys, 2008; Brown *et al.*, 2010).
Is considering buildings that contain GBFIs part of CSR strategy?	To understand more in terms of their CSR strategy (Ellison *et al.*, 2007; Newell, 2009).
Did you experience a difference in perception of users before moving into the building compared to when they understood the principals of GBFIs?	To determine whether users experience the difference in the building before principals of GBFIs understood or afterwards (Paul and Taylor, 2008).

3.4.4 Respondent labelling

It is critical that respondent labelling in the interviews be anonymised in order to protect the privacy of the research and the participants and the anonymising strategy needs to be carefully selected in order to avoid inappropriate data analysis (Clark, 2006). Furthermore, anonymity needs to aim at creating a balance between data integrity and protection of the parties involved in the research (Saunders *et al.*, 2015). The ethical protection was conveyed to the participants in order for them to freely express the needed information for the research.

The respondent labelling follows the acronym of the sampling strategy used, for example, "CRITS" represent critical sample and "CONS" represent the convenience sample. The cases selected are given numbers 1 to 3 and these represented as follows: Authoritative

Representatives of Green Building Stakeholders - CRITS and Arbitrary/Random Representatives of Green Building Stakeholders - CONS. Finally, the participants are labeled "a" and "b" to arrive at the label format. For example, "CONS2b" represents that the respondent is from a convenience sample, the second case, and that respondent would be the second respondent interviewed for the research.
The participants are outlined in Table 3.9 with the position that the respondent holds within the organisation. This indicates the level of knowledge and the position that is held by the respondent to avoid the bias of the research by interviewing one type of respondent.

The following where the reason as to why information was sought from the outlined stakeholder:

1. CRITS1a was selected because of being in the building industry , the stakeholder was also actively involved in installing GBFIs on the Citi building
2. CRITS2a was selected because of working for an institution which is a regulator in the construction industry y in Zambia. Additionally National Council for Construction entered into an agreement with the International Labour Organisation promote green growth in the construction industry
3. CONS1a, CONS2a and CONS3a were selected as a result of being an active players in the property market industry by virtue of their qualification in real estate management and experience.
4. CONS1b was selected because of experiencing both conventional building and building with GBFIs
5. CONS2b was selected because of being a tenant in a building that contained GBFIs and having experienced GBFIs for the first time.

Table 3.9: Table of participants

Participants label	Position
CRITS1a	Project Architect for Citi building
CRITS2a	Human Resource Training NCC
CONS1a	Facilities Manager at Citi bank building
CONS1b	Head Citi Services Zambia at Citi building
CONS2a	Facilities Manager at Foxdale Court
CONS2b	Tenant at Foxdale Court
CONS3a	Facilities Manager at Mt Meru building

3.4 Data Analysis Method

Following data capturing which in this research had been carried out through the interview process, a process was followed to organise and analyse the data that was collected and various themes emerged from the data analysis (Baxter and Jack, 2008) and the results are reported in chapter 4.This section will inform the method of analysis, which was thematic analysis.

3.5.1 Thematic Analysis

Thematic analysis is a qualitative analytic method that uses thematic networks. The themes within the data are identified, analysed and reported (Attride-Stirling, 2001; Burnard *et al.*, 2008). These themes capture data that is necessary to the research question. Thematic analysis involves decisions that need to be well considered and discussed throughout the process of analysis (Braun and Clarke, 2006).

Attride-Stirling (2001) describes the process of conducting the thematic analysis practically and effectively emphasising how important the process is in order for the research to obtain findings that are not only coherent but meaningful. Additionally, it is proven that thematic analysis is a flexible and useful research tool for qualitative research (Braun and Clarke, 2006).

The dominant views of the stakeholders in the property sector in each case are necessary for this research to achieve its aims; the commonalities reveal the integration among stakeholders during the implementation of GBFIs.

3.5.2 Framework for Analysis – Thematic Networks

Thematic networks are networks that summarise the main themes within textual data in order to understand the meaning of the data that has been collected. It is further important to note that in thematic analysis, the text is arranged into clusters of themes which provides the researcher to have a deeper understanding of the large textual data (Attride-Stirling, 2001; Burnard *et al.*, 2008).

Attride-Stirling (2001) states that thematic networks are represented like web-like maps which represent themes that are important. These networks are not a new method and are grouped in three categories as illustrated in figure 3.3, these are:

1. Basic Themes – these are lowest order premises evident in the text.
2. Organising Themes – these are categories of basic themes grouped together to summerise more abstract principals.
3. Global Themes – these are superordinate themes that express the essential features in the text as a whole.

The process of creating thematic networks is not a complex process.

Figure 3.2: Structure of a Thematic Network
(Attride-Stirling, 2001: 388)

Attride-Stirling (2001) further explains the three classes as follows:

Basic Theme: This is the lower-order theme that arises from textual data, these are simple premises characteristic of the data which express minimal meaning about the text or whole group on their own but clear understanding can be drawn when the theme is read within the context of other basic themes. The collective representation of this portrays an Organising Theme.

Organising Theme: This is the middle order theme that groups the Basic Themes into clusters that have similar issues, these themes explain more of what is occurring in the texts. Additionally, the goal of these themes is to also enhance the meaning and significance of themes that unite the Organising Themes. It is important to note that the Organising Themes

group the main ideas proposed by several Basic Themes in a concurrent manner and analyse the critical assumptions that underlay a broader theme that is significant in the whole text.

Global Theme: These are themes that are superordinate and incorporate principal metaphors within the data and these themes group Organising Themes together to present a position or an argument about a certain issue or reality. Thus Global Themes reveal contents of the text within the contexts of a given analysis and the complexity of the data and the analytic claims will determine whether one Global Theme or more will be produced from a set of texts. The Global Theme is, therefore, the centre of a thematic network as illustrated in figure 3.3 and an analysis may result in more than one thematic network.

3.5.3 Steps to Achieve Thematic Analysis

Thematic analysis has been identified as an appropriate method of analysis for the purposes of this research as provided by Miles and Huberman (1994) which is similar to what was employed by Attride-Stirling (2001) and by Braun and Clarke (2006). The process is composed of six steps, which are split into three broad categories: (1) the reduction or breakdown of the text; (2) the exploration of the text; and (3) the integration of the exploration. These steps were applied to each case as outlined in figure 3.4 in order to analyse the data collected.

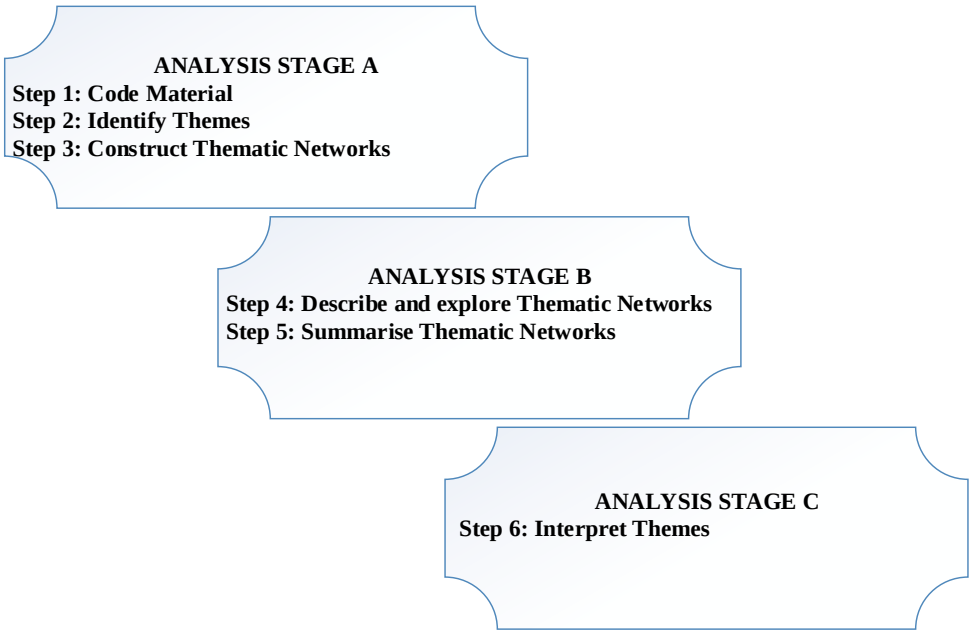

Figure 3.3: Three stages of Thematic Analysis
(Attride-Stirling, 2001; Braun and Clarke, 2006)

Step 1: Coding Material

This step involves making use of the coding framework by reducing the data into text that is more manageable and easier to understand. The coding framework is used to segment the data firstly by devising coding framework which identifies theoretical interests within the text and secondly breaks down the text to chunks that have more meaning such as single wording or quotes. Coding material will depend on whether the data is more theory-driven or data-driven. It is important to read through the data set before coding in order to be familiar with the data collected and to recognise the ideas in the text which will be useful in identifying themes in the data (Attride-Stirling, 2001; Braun and Clarke, 2006).

Step 2: Identifying Themes

The next process that follows involves is the identification of themes, where themes are abstracted from the text that is coded. This process requires that the text should be read within the context of the codes which will result in an easy identification of the underlying themes (Attride-Stirling, 2001). Thereafter, themes are refined in order to achieve: non-repetitiveness in the themes and adequate broadness that is capable of expressing the main ideas that are found in the text segments. This process is important and requires the researcher to understand the themes that have been refined (Braun and Clarke, 2006).

Step 3: Constructing Thematic Networks

This step identifies themes and this is done by:

Arranging themes – this involves assembling the themes that have similar and coherent features into groups, the groupings are based on content and theoretical grounds and each group will result in a global theme.

Selecting basic themes – in this stage, the assembled themes are the ones that are then used as basic themes.

Rearranging into organising themes – this involves the creation of clusters of basic themes centred on issues that have similarities; these issues have to be identified and named.

Deduce global themes – this involves summarising the main claim and the proposition or the assumption. The claim is the global theme of the network.

Illustrate as thematic networks – Here the basic themes, organising theme and global theme have to be illustrated as a non-hierarchical web like representations and that results in a thematic network.

Verify and refine the networks – this involves counterchecking all the text segments to ensure that global themes, organising themes and basic themes are representative of the data collected and the data supports basic, organising and global themes (Attride-Stirling, 2001).

Step 4: Describe and Explore Thematic Networks

This is the first part in the second stage of analysis and once the networks have been constructed, reference to the original text needs to be done and the networks will assist in the interpretation of the text. This involves describing the contents of the network supporting the description of text segments and exploring the network (Attride-Stirling, 2001). The data within the themes should be coherent and meaningful after being reviewed in order to provide a better understanding of the material. This step reviews and refines the coding until a satisfactory thematic map is created and how the different themes fit together (Braun and Clarke, 2006).

Step 5: Summarise Thematic Networks

After the thematic networks have been described and explored the next step that follows is summarising the thematic network where a summary of the main themes is presented. It is important to note that the main objective of this step is to ensure that the principal themes are summarised and highlighted (Attride-Stirling, 2001).

Step 6: Interpret Themes

This final step of analysis brings together the deductions and summaries of all networks and the relevant theory to explore the significant themes that arose in the text. This is the stage where the researcher refers to the research questions and theoretical interests underpinning them and these will be addressed with arguments grounded on the themes that emerged in the exploration of texts (Attride-Stirling, 2001).

3.6 Cross-Case Analysis

Analysis across cases is carried out in order to draw themes that are common among the selected cases (Attride-Stirling, 2001). Cross-case analysis is important in qualitative research

because it reveals deeper insights of the presence of certain phenomena or how they vary across the cases (Flyvbjerg, 2006). A cross-case analysis is a research method that aids in comparing common and different issues in activities or processes that are the units of analysis in case studies. The method compares the main themes across the case studies thereby identifying key similarities and differences when comparing cases (Khan and VanWynsberghe, 2008). In this research, cross-case analysis was performed towards the end of the thematic process. The commonalities and differences were identified and documented. The explanation of the findings with the cross-case analysis is presented in chapter 4 and the themes that that were similar or different in the three cases were highlighted.

3.7 Chapter Summary

This chapter dealt with the research methodology that was employed in this research. Multiple case study analysis was described and justified as the most appropriate method to be used. The unit of analysis is the stakeholders in the property market and the sampling chosen was the purposive and convenient approach focusing on a critical and convenience sample. The general interview guide approach (semi-structured) was chosen as the data collection method and the developed and explained questions were used as an interview guide.

Finally, the thematic analysis was chosen as the most appropriate data analysis method for this research and the method was explained including the use of cross-case analysis that highlighted commonalities and differences in the three cases. The results obtained from this process are presented in chapter 4 from which the conclusions were drawn in chapter 5.

4 FINDINGS AND DATA ANALYSIS

4.1 Introduction

The purpose of this chapter is to present the findings collected during interviews with participants in each case study. The findings discuss the cases involvement or lack of involvement in green building and how GBFIs are implemented among stakeholders in the Zambian property market as generated from the interviewees.

Cross-case analysis is conducted at the end of the chapter to analyse and highlight the similarities and differences across the three cases.

4.2 Findings – Critical Sample

The findings from the critical sample were used to inform the literature and to guide in the case study selection. The influential themes in the findings that were applied to this research are discussed below.

4.2.1 Defining GBFIs

According to CRITS1a, GBFIs are a set of rules that should be implemented starting from the first line that is drawn, to the positioning of the building and finally construction. This process is supposed to be normal to follow in order to protect the planet and the end user. CRITS1a added that it is important to consider the end user in green building in terms of air quality control, water quality control, and waste management as the users are more conscious of the space they occupy. The principles highlighted are taught in university but need to be followed through in the practice to ensure that professionals do not omit them in their daily execution of various developments which is in agreement. It is certain that opportunities are being created for educational institutions to train professionals within the construction industry in green building related matters. CRITS2a explained that a green building is constructed using green materials and a green building is one that has adopted the elements and features of green design, therefore the process starts from design up to construction and the product is what you get as the green building.

4.2.2 Business case for implementing GBFIs

CRITS1a stated that the motivation to implement GBFIs was as a result of desiring to care for the planet and also to provide comfort for the end user. CRITS1a further explained that what

was more motivating was to realise that the process is sustainable, there is a saving over a long period of time and that health is improved as a result improved air quality control.

According to CRITS2a, the motivation to implement GBFIs in a development means not only saving on cost over a longer term but knowing that green building comes with healthier environments where for example natural air is adopted in the design thereby eliminating mechanical ways of improving indoor air quality and using of solar energy which shifts energy dependency from ZESCO to other green sources of energy. CRITS1a stated that green building makes one realise that nature is capable of providing materials for energy efficient building, for example, cross ventilation can be used in place of air conditioning and that is a motivation.

4.2.3 Identification of GBFI projects

The starting point in the analysis is to determine the buildings in the sample, which are the ones that contain GBFIs. CRITS2a explained that there were three projects in Zambia that have implemented GBFIs which are the Foxdale centre which has a water reserve system in the basement, the American embassy in Lusaka which has occupancy and daylight sensors and sunshades around the building to reduce heat gain, and the Ministry of housing and infrastructure. CRITS1a outlined the following as projects that have implemented GBFIs: the public service microfinance, Kafue gorge hostels, and Kafue gorge training centre which has GBFIs incorporated in the design, Citi Bank building in Lusaka which is LEED certified and the Churches Health Association of Zambia which is designed to incorporate a solar roof.

4.2.4 Stakeholder integration

CRITS2a is of the opinion that the integration of stakeholders in the Zambian property market is essential for successful implementation of GBFIs. In this integration, the government needs to be convinced about the cause in order for them to drive the purpose of GBFIs. CRITS2a further added that the involvement of the private sector in the implementation of GBFIs is necessary because the needs of the sector are unique but these needs should be aligned with all stakeholders in order to be successful.

CRITS2a emphasised that there is a need for a principal law from which various regulations will originate; currently, the partnerships are not enough among the designers, the building regulators, and the Zambia Bureau of Standards that regulate the building materials, the contractor and the owner:

"The pace at which we are working with other stakeholders such as the Zambia Bureau of Standards is quite slow and what is hampering this is the absence of laws to be followed – CRITS2a*."*

CRITS2a explained that the involvement of other stakeholders was important and being a regulator in the construction sector, they entered into an agreement with International Labour Organisation under the Zambia green jobs programme to influence stakeholders to use green elements and principles in various construction activities. The integration further resulted in the creation of the Zambia Green Building Association that is spearheading green building in Zambia and the secretariat is the National Council for Construction. CRITS1a and CRITS2a agree that professionals have accepted that green is the only way to preserve the environment because the natural resources are being depleted daily and it is necessary to preserve them for the future generation.

CRITS2a also added that it has been difficult to follow the green building regulations because the building regulations that are in place currently are outdated, therefore there is minimal legal backing to regulate their implementation. Additionally, the current building regulations sit under the principal act of the Public Health Act which is under the Ministry of Health but the implementation is being done by the Ministry of Housing and Infrastructure.

CRITS1a explained that there are international stakeholders based in Zambia that are implementing various GBFIs in the property market. These stakeholders have embarked on research of windows in terms of how best to control lighting that comes in and out of a building; efforts are being made to develop a glass pane that functions like a solar panel that will generate power that can be used by the building.

CRITS1a explained that contractors could follow the pace set by the architects in implementing GBFIs; this is to say that if the designer incorporates GBFIs in the building design then the contractor has no choice but to build according to specification. The respondent added that the Zambia Institute of Architects is an active stakeholder in the implementation of GBFIs as the professionals who are affiliated to the association are encouraged through continuous professional development courses to implement GBFIs in the building designs. CRITS2a added that integration of stakeholders in the property markets is essential because they play a big role in the successful implementation of GBFIs and the integration will also prevent conflicting ideas in achieving GBFIs.

4.2.5 Main drivers

The participants to the critical sample cited the main drivers towards the implementation of GBFIs to include improved lifestyles, trends, and regulation.

According to CRITS2a the desire for an improved lifestyle will drive the desire to have buildings that contain GBFIs and this also comes from the desire to want to make use of the natural resources to incorporate those benefits in a building such as using natural ventilation in place of conventional air conditioning and the same applies to natural lighting. CRITS2a added that another driver is trends, as everyone wants to be associated with what is fashionable, in this case, it is green building and most people want to attach themselves to what is green bearing in mind that there is a saving of cost in the long run. CRITS2a explained that the associations for professionals are the main drivers in achieving successful implementation of GBFIs; additionally, the local council should be involved in order to ensure that the GBFIs are incorporated in the drawings that are being submitted for approval.

4.2.6 Motivations

CRITS2a expressed the opinion that in order for GBFIs to develop beyond today, there is a desperate need for the government to champion GBFIs by creating legislation which will regulate and authorise the implementation of GBFIs in the Zambian property market:

"when the law is in place, there is no choice but to follow it – CRITS2a*."*

CRITS1a explained that there is a high possibility that GBFIs can be successfully implemented in the Zambian property market because a few years ago Zambia experienced load shedding and the citizens had no choice but to find alternative sources of power, which is an indication that there is a possibility of adapting to alternative sources of energy. There seems to be a willingness from clients to install GBFIs as long as the initial cost is communicated to the client.

4.2.7 Perceived Impact

According to CRITS2a, if green building standards are developed and if they are followed, there will be an impact in the property market because various stakeholders will find it easy to implement GBFIs even though it may be expensive. CRITS2a further explained that if half of Zambia's population depended on green energy, the perception is that this action will

relieve the strain for ZESCO to provide hydroelectric power to the whole nation thereby reducing exorbitant prices for electricity.

4.3 CS1

4.3.1 Overview

CS1 is a multi-storey building and it is occupied by a single tenant. Members of staff of CS1 were interviewed; these included the Facilities Manager and the Head of the company in Zambia.

CS1 is a building that was completed in December 2012 and certified as a LEED project. The company who is a tenant acknowledges that building location, orientation, design, construction and procurement of materials are important in achieving the certification by LEED. CS1 is a company that is found in various parts of the world and has committed to reducing the carbon footprint through the implementation of various projects that are LEED certified thereby also creating a healthier environment to work as outlined in their employee health and wellbeing goals.

4.3.2 Characteristics of sample building

Case 1 is located in Lusaka at Elunda Park and various GBFIs were incorporated in the building which includes:

- 50 percent of parking for the building is underground which minimises the heat island effect on the building.
- Installation of sustainable materials for the building exterior which minimises environmental impact due to maintenance activities.
- Installation of LED lighting in the building thereby reducing lighting power consumption by 50 per cent compared to typical fluorescent lighting.
- Installation of motion sensing lighting.
- Installation of glazing which minimises heat gain as well as glare thereby regulating internal temperatures.
- Installation of water efficient fittings to the toilets and kitchens.
- The use of volatile organic compound (VOC) paints.

4.3.3 Company's participation in the development of green building

CONS1b explained that the company is pioneering the implementation of GBFIs and engaging with other people who are in environmental control has resulted in a perception that they are the trendsetters in implementing GBFIs

4.3.4 Benefits of GBFIs

The participants described a variety of benefits that they gained as a result of working in a building that contained GBFIs.

Improved indoor environment quality

As a result of implementing GBFIs, both CONS1a and CONS1b agree their office is a comfortable working environment because of the various features that were incorporated into the space.

CONS1a explained that the installation of energy efficient lighting in the building reduces the consumption of power; consumption of power has also been reduced by installation of glazing that retains heat or coolness depending on the temperatures outside the building thereby spending less on electricity supplied by ZESCO. CONS1b mentioned that having worked in both conventional and green buildings; the benefits of GBFIs are not specific to the individual or tenant and wondered if the benefits were felt by the owner of the building.

CONS1a further explained that an office with GBFIs has improved indoor environment quality because of the enhanced lighting from the installed LED lighting in the building which makes the interiors brighter, however, CONS1b pointed out that features such as lighting in a green building are the same as the ones in a conventional building.

One component as outlined by CONS1a is the installation of the LED lighting and the wide size of glass panes that allow light into the building thereby enhancing the interior lighting. In addition, CONS1b stated that the large-sized windows allow in natural ventilation and as a result, the rooms are well ventilated when air conditioning is not being used.

4.3.5 Perceptions of GBFIs

GBFIs as part of CSR strategy

Both CONS1a and CONS1b agree that going green is part of their company's strategies and in order to achieve this; there are various standards and policies that have been laid out and should be followed. The company has formalised that not only should new developments contain GBFIs but that conventional buildings should be retrofitted to include GBFIs before moving in and this is being implemented in all the company's developments. CONS1a further added that the other company that has endeavoured to implement GBFIs according to their CSR policies is a telecommunication company whose building was retrofitted to achieve energy efficiency.

Health of Green building Users

CONS1b noted that improvement of health due to the implementation of GBFIs influences perceptions of buildings that contain GBFIs. CONS1a explained that a component such as air-conditioning that uses clean gases enhances the internal air quality which is healthier for the users of the building. Similar sentiments were echoed by CRITS2a, stating that the desire for an improved lifestyle will drive the need to implement GBFIs.

CONS1b stated that whatever is green is healthier not only for the immediate environment but for the whole eco-environment:

"*The environment is a big place but small players contribute to the bigger picture so obviously every small contribution helps the bigger picture"- CONS1b*

CONS1b further explained that health was a key factor because of the ozone layer depletion and investing in green building makes the environment better and healthier, it means that individuals are investing for the future in health and in a better environment. Therefore, this impacts individual lives because various efforts are being made at an individual level for a better environment and it gives a sense of peace.

4.3.6 Impact of GBFIs

Knowledge of GBFIs

CONS1a and CONS1b agree that anything that is built with the sole purpose to conserve and preserve the environment in a building can be known as a green building feature and these

features can be in terms of energy saving lighting and the type of glazing used on the building. CONS1a further mentioned that the flowers seen around the building do not really mean green building but the flowers are only for aesthetics and ambience.

CONS1b stated that unless it is mentioned about the GBFIs that have been incorporated in a building, it is not easy to recognise them and this makes it difficult to easily appreciate the benefits, this is one of the green building barriers (Hakkinen and Belloni, 2011).

CONS1a further explained that it is not easy to recognise and appreciate the various GBFIs that have been implemented in the building unless they are knowledgeable about them and if it is a hi-tech building. The respondent further elaborated that the first thing they most likely notice is that the building is somewhat automated and different:

"…others have automatic opening and closing sliding doors but they may not know that that is part of the initiative because if the doors are automatically closing and opening you are making sure that the air conditioning is not being overworked with the air curtain which an ordinary person may not understand because the opening and closing of the doors strains the air-conditioning and has an effect on the amount of power you are drawing." – CONS1a

Experiences of GBFIs

Both CONS1a and CONS1b agree that there was a difference in comparing a building that had GBFIs to the one without. CONS1a explained that the lighting is automated to switch on and off depending on the occupational presence, a feature liked by many because no one has to worry about turning lights off after closing of business, though a security team still checks to confirm that the lights are off.

4.4 CS2

4.4.1 Overview

CS2 is located in Roma area and offers retail and office space for rent with ample parking. It houses a wide variety of companies with shops and offices. Interviews were conducted with the owner and developer of the building and a tenant.

CS2 was completed in July 2013 and the complex seeks to provide an environmentally friendly space for business and leisure by implementing various green building features in the design.

4.4.2 Characteristics of sample building

CS2 is a commercial building and it has various green building features and initiatives that were incorporated into the building, these include:

- Rainwater harvesting where water is harvested through gutters and downpipes during the rainy season and stored in the rainwater harvesting tank which is used in the toilets and for irrigation.
- Installation of motion sensors in the corridors were lighting only come on when necessary.
- Installation of LED 15-watt lighting thereby enhancing energy efficiency.
- Installation of solar geysers which service the kitchens for the offices in the building
- Waste management system where plastic and paper is delivered to recycling companies within Lusaka.
- Food waste recycling which is done on site by mixing it with sawdust turning it into compost which is used in the gardens of the property.

4.4.3 Company's participation in the development of green building

CONS2a explained that government involvement in creating legislation that could govern the GBFIs and introduction of tax benefits for those that implement these features could influence the implementation of GBFIs the property industry, in addition, more impact could be felt if there was a better understanding of GBFIs which could grow demand and hopefully that would make the government realise that green building is important.

CONS2a explained that their company invited schools regularly to visit the building and have a feel of the various GBFIs that have been incorporated in the building. The respondent also mentioned that notable companies have come on board to influence perceptions of GBFIs by varying various campaigns on disposal policies and the importance of recycling, these companies include Millennium Challenge Corporation and Zambian Breweries who are educating people in the compounds and providing funding. It is believed that if communities are impacted, the perceptions at an individual level will be more accurate.

4.4.4 Benefits of GBFIs

Improved Indoor Environmental Quality

CONS2a and CONS2b reluctantly agreed that the interior spaces are more comfortable to work in because of features such as the natural light that comes into the building as a result of wide windows. CONS2a explained that they were unable to relate the comfort of the building to GBFIs.

CONS2b explained that it was their first time to work in a building that had GBFIs were not easy to follow because the benefits were not being experienced directly. CONS2a further explained that the open plan design that has been adopted in their office makes it easier to share the natural light without any obstructions.

According to CONS2a, the surrounding greenery provided a sense of coolness to the building, this view of greenery outside the building was shared by CONS2b who further stated that the plants and flowers seemed to be more of a deliberate effort to enhance the building. Furthermore, both CONS2a and CONS2b agree that the lighting in the common areas and the toilets have motion sensors that pick the presence of an individual and turns on and off. The other component of GBFIs that is satisfying according to CONS2b is the balconies which are open spaces to relax and enjoy fresh air during breaks.

4.4.5 Perceptions of GBFIs

Cost of GBFIs

According to CONS2a, the newer the building in Zambia, the more up to date the buildings are in terms of GBFIs and this is attributed to the fact that lessons are being learnt from previous developments and there is better awareness of cost which is also factored in at the planning stage.

CONS2b stated that cost has an influence on the perception of buildings that contain GBFIs because for instance the energy efficient bulb is more expensive compared to an ordinary bulb and as long as people do not understand the importance of using them, the conclusion will be that the bulbs are expensive. CONS2b further elaborated that the perceptions can be

changed if people understood the need to have GBFIs in buildings. CONS2a explained that some stakeholders do not understand why they should choose to build a building at double the cost when it can be built cheaper.

CONS2a said that following the green building guidelines is costly at the initial stage even tough tax had been reduced on the importation of materials such as solar panels. The respondent further elaborated that the current situation in Zambia is that if there is excess in production of energy from alternative methods such as solar, this energy cannot be fed back into the national grid and therefore it goes to waste.

According to CONS2a, the cost was an important aspect to consider because various stakeholders are interested in considering GBFIs. The respondent explained that the aspect of cost in the implementation of GBFIs has had a negative impact. The respondent gave an example that the owner of the building installed the first batch of LED lighting which was energy efficient and the tenant is expected to replace them when need arises, which resulted in a complaint that the cost to replace the LED lighting compared to the ordinary lighting was seven times more which was too high.

GBFIs as part of CSR strategy

CONS2a expressed that the passions of the company were channelled to green buildings and there is a desire to create more awareness of the importance of implementing GBFIs. It is explained to new members of staff about the policies and strategies on conserving the environment through implementation of GBFIs, the same principals are communicated through various awareness campaigns to tenants. It was noted that adherence to these policies is not easy for the tenants as there is some resistance at the beginning but constant reminders and fines on non-adherence to these policies has proved to be fruitful.

CONS2b explained that the company did not necessarily advocate for GBFIs but was forced to adhere to the implementation of GBFIs because this was a requirement from the side of the owner of the building.

Health of green building users

CONS2a elaborated that the benefits of GBFIs cannot be felt directly unless if components such as ceiling could be justified as being healthy but as for materials such as concrete and steel there was not much difference.

4.4.6 Impact of GBFIs

Knowledge of GBFIs

CONS2a stated that green building is beginning to be understood by many people in the construction industry. CONS2a further explained that green building was about how the building has been built, the materials used when building and methods of building, this can go as far as the kind of mortar that has been used and also how foundations have been laid. It can be more technical but such details are the ones that can be known as GBFIs in a building. CONS2b expressed that GBFIs are mostly about doing your part for the environment through recycling and energy efficient lighting; these efforts also include adding greenery and vegetation to the surrounding environment of the building.

Experiences of GBFIs

According to CONS2a, there is not much change in terms of the feel of the green building but rather on the various activities that are done, these are activities that are not consciously done in conventional buildings and these include: reusing grey water for the plants surrounding the building and separating waste for purposes of reuse and recycling. CONS2b admitted that these GBFIs are not easy to follow, an example was outlined about classifying garbage which does not leave the tenant with any option but to follow, eventually, the exercise becomes interesting enough to implement at a household level.

CONS2b stated that there were two notable factors of GBFIs that impacted their experiences in the building; these are the aspect of conserving energy in the bathrooms and common areas and recycling. CONS2b further expressed that there was a strong difference in the building that contains GBFIs compared to one without and this was due to the fact that aspects such as recycling were communicated to them expressly when the company moved into the building.

Education of GBFIs

CONS2a explained that appreciating GBFIs was a slow process but even though that was the case, GBFIs teach people that there are alternative methods of building compared to the conventional way. The respondent further added that education was important in creating awareness of the benefits of GBFIs.

4.5 CS3

4.5.1 Overview

CS3 is a commercial office park which was completed in 2016 and it covers seven floors. The building is occupied by a single tenant; the Facilities Manager of the company was interviewed.

4.5.2 Characteristics of sample building

CS3 is a fully automated building and it is the first of its kind in the Zambian property market. The building is located in Roma, Lusaka along Zambezi road and it has various GBFIs that were incorporated in the building:

- Installation of automated LED lighting in the building with automated sensors which reduces consumption of power.
- Installation of automated air conditioning which is set up depending on the weather and can change indoor temperatures depending on the setting which is done at one central location.
- Installation of automated blinds which are managed using an application which is downloaded on a phone to suit various activities, for example, the boardrooms can be set for the environment to suit discussion, meeting or theatre.
- Use of gas for cooking as opposed to conventional hydroelectric power in the canteen

4.5.3 Company's participation in the development of green building

CONS3a explained that users are made aware of GBFIs in the building because there has been sensitisation that has been done. Communication is often done to inform users of various GBFIs in the building and how best to use the space that individuals occupy. As a result, users understand and are aware of the various GBFIs features in the building and their use.

4.5.4 Benefits of GBFIs

Improved Indoor Environmental Quality

CONS3a outlined that features like the marble floors which are not only hard wearing and high quality floor finishes but also prestigious to have.

CONS3a explained that there is a saving of energy compared to the previous building of about seventy per cent and this has been attributed to the energy-saving features that the current building has.

CONS3a explained that during interruption of power supply, there is a seamless transition to the Uninterrupted Power Supply (UPS) which will support computers and other critical electrical equipment during power outages; this means that members of staff have ample time to save their work and switch of the machines.

According to CONS3a, users are satisfied by the general functionality of the space because it is an open plan which is not only good for interaction but also allows air conditioning to cool the whole area, this is the same for lighting which is LED and bright enough.

4.5.5 Perceptions of GBFIs

GBFIs as part of CSR strategy

CONS3a explained that the company has joined in preserving the natural environment and the is in support of ideas and efforts to save energy for the building tough this should be justified in order to be implemented. A similar opinion was outlined by CRITS1a that there is a great desire from clients to install GBFIs as long as the initial cost is communicated to the client which is a critical factor for planning purposes.

4.5.6 Impact of GBFIs

Knowledge of GBFIs

CONS3a explained that GBFIs are incorporated into a building in order to preserve energy such as lighting and other forms of energy that are used in a building.

Experiences of GBFIs

CONS3a explained that some of these features are the motion sensors on the lighting which allows users to walk in and out of the building without bothering to switch the lights on and off; the other one is the air-conditioning which is automatically set centrally to cool or warm the interiors depending on the weather. One example of a feature that occupants take interest in is smart lighting and air-conditioning.

CONS3a gave an example of an application that was being used to manage activities in the boardroom, this is where the blinds and the lighting is automated to suit the activity in the space, the respondent admitted that it was a good feature on the maintenance side because there are no lights that are left on through the night and this has been easier to manage consumption of power.

Education of GBFIs

CONS3a further stated that users of the building perceived the building in different ways because of the various features that were implemented in the design and this has been possible to notice because there was constant sensitisation that was conducted. .

4.6 Cross-Case Analysis

The purpose of this section is to discuss the similarities and differences between the three cases with regards to what influences the implementation of GBFIs among stakeholders in the Zambian property market. The findings will be evaluated against the literature review in Chapter 2.

Stakeholder integration is necessary for both government and business houses in order to increase awareness of green building (Liu *et al.*, 2012). This is in line with the view that the inclusion of all affected parties is necessary to integrate conflicting ideas which might slow down the development of the building sector (Feige *et al.*, 2011). Research reveals that the legislative framework in developing countries does not cover sufficient environmental aspects (Melchert, 2007). Even though regulations may be present, it is important to compel leaders to invest in green building so that their followers can be influenced positively (Pivo, 2008). Research of this kind will improve awareness of the benefits of GBFIs within the property market (Hwang and Tan, 2012). These views are in line with the views of Muya and Banda (2013) that the involvement of key stakeholders is necessary for achieving an eco-friendly building industry. The quality, cost and timescales of green building projects are likely to improve when standards and specifications are being followed (Fielding *et al.*, 2012).

The major themes and underlying sub-themes are shown below:

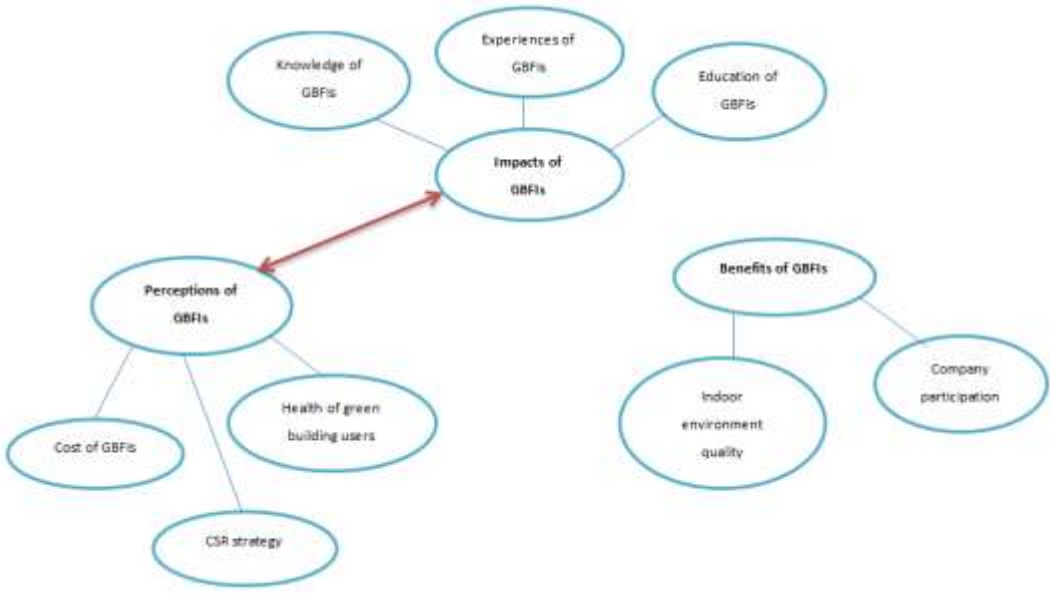

Figure 4.1: Findings themes and subthemes

A link has been made between the impact of GBFIs and the perceptions of GBFIs as these two aspects influence the successful implementation of GBFIs amongst stakeholders in the Zambian property market.

The first major theme surrounded the benefits of GBFIs, and the improved indoor environment quality associated with the benefits of GBFIs. The participants highlighted the importance of drawing benefits from the implementation of GBFIs. It is necessary to note that stakeholders are becoming increasingly more aware of the potential benefits of green buildings (Miller *et al.*, 2008). The extent of the benefits of GBFIs was established and the main reasons that caused satisfaction and functionality of a building with GBFIs where determined. It was evident within the theme that the implementation of GBFIs needs to consider the satisfaction of the user in order to be successful, furthermore, it was revealed that it matters to the user how functional the space in which they work is and that this is far more important than how green the building is.

The second major theme surrounded the perception of GBFIs, and the company's participation in the development of green building, the cost of GBFIs and health of green building users. The participants raised concerns about the cost of implementing GBFIs while perceptions of GBFIS being a healthy option were outlined. It was determined that sensitisation of GBFIs had an influence on how GBFIs where perceived. Lastly, whether or

not acquiring buildings with GBFIs was part of the companies' CSR strategies was established.

The final major theme surrounded the impact of GBFIs, and the knowledge of GBFIs, experiences that users have as a result of using GBFIs and education associated with the GBFIs. It was established that the participants believed that it was necessary to raise awareness through education of GBFIs with the champion of this cause being the government. Education of GBFIs is not limited to professionals but other stakeholders within the property market (Gluch *et al.*, 2014). This would then impact how GBFIs would be implemented in the Zambian property market.

4.6.1 Company's participation in the development of GBFIs

Fuerst and Van de Wetering (2015) agree that environmental labels are perceived to be attractive because they affect the image of the business. CS1 which is a LEED certified building was retrofitted to incorporate GBFIs. The company occupying the building as tenant which is a bank has committed to contributing to reducing the carbon footprint in the property market. CONS1b explained that their involvement in pioneering the implementation of GBFIs has resulted in a perception that they are the trendsetters. This confirms the view that corporate companies attach high value to GBFIs as this benefits the image of their business (Paul and Taylor, 2008; Fuerst and Van de Wetering, 2015).

CRITS2a expressed the view that that government was a critical stakeholder in the implementation of GBFIs in the Zambian property market; these views conform with the view of Melchert (2007), who states that involvement of the government as a key partner can influence the success of green building in the country. It is affirmed that involving government can positively influence the success of green building (Liang *et al.*, 2015). CONS2a further highlighted that their company invited schools to visit the building and experience the various GBFIs that had been incorporated in the building. CONS3a explained that users were actively involved in successful implementation of GBFIs because they were made aware of the green features and the benefits through constant communication with the staff and the company advocates for green building. The integration of the government and business houses is necessary for the successful green building (Liu *et al.*, 2012).

4.6.2 Benefits of GBFIs

Improved Indoor Environment Quality

Lutzkendorf and Lorenz (2007) explain that a green building provides an improved indoor environment for the occupant. CS2 is both retail and office space were as CS3 is mainly an office space housing a single tenant. Research reveals that there is minimal evidence that green buildings are more comfortable in terms of lighting and ventilation (Paul and Taylor, 2008) and the participants interviewed between CS2 and CS3 shared similar views regarding comfort of the space they occupied in that the interior spaces were good enough to work in but they reluctantly agreed that the space was more comfortable. However, the participants from CS1 which is an office space occupied by a bank expressed strong views that offices that contained GBFIs were more comfortable to work. CRITS1a reiterated that providing comfort for the end user stands out as a professional's motivation to implement GBFIs in building designs.

The need to highlight cost saving for various GBFIs in order to easily compare between conventional and green building is necessary (Miller and Buys, 2008). All participants in the three cases agreed that installation of energy efficient lighting was effective in reducing the consumption of power thereby allowing the user to save on electricity cost. Through the findings of CONS3a, it was evident that there was a saving in power consumption of the building. CS3 recorded a saving of about seventy per cent in power consumption which was due to the energy-saving features which were implemented in the building they currently occupied; these features included automatic sensors for lighting. Low-emissivity glass is one of the green building considerations that are energy efficient (Chan *et al.*, 2009). This was echoed by CRITS2a, installing GBFIs in a building will reduce dependency on ZESCO whose tariffs are quite high. This was mentioned by the respondent CRITS2a that installing GBFIs in a building saves cost in the longer term.

Additionally, CONS1a explained that consumption of power had also been reduced by installation of glazing that retains heat or coolness depending on the temperatures outside the building thereby paying less on their electricity bill. This is in conformity with the view that low-emissivity glass is one of the green building considerations that are energy efficient (Chan *et al.*, 2009)

There were similarities in responses of CS1 and CS2 regarding the functionality of their working environment due to GBFIs that where incorporated in the design, these included the wide sized windows which allowed in natural light and motion sensors that switched the overhead light on and off. CONS3a mentioned that the general functionality of the space and the open plan design was good for social interaction. It is therefore important for to consider social benefits when investing in GBFIs (Miller and Buys, 2008) .Social benefits can be achieved as a result of the implementation of GBFIs thereby improving productivity of the occupant (Fuerst and Van de Wetering, 2015).

Findings revealed that user satisfaction of a building with GBFIs was more important than the appearance of the building. Paul and Taylor (2008) affirm that a building should not end at only incorporating GBFIs but should ensure that the buildings offer the maximum satisfaction of the indoor environment. Participants from CS1 and CS2 outlined various factors that were satisfying in the buildings; these included the installation of the automated LED lights, large sized glass panes that allow light and ventilation into the building thereby enhancing the interior lighting. It is evident that Office space planning is important to consider in order to realise the benefits of green building design (Brown *et al.*, 2010). CONS2a explained that surrounding greenery cooled the buildings and flowers contributed to the ambience of the surroundings.

4.6.3 Perceptions of GBFIs

Cost of GBFIs

It is important to document all related costs and include them implementation process (Miller *et al.*, 2008). Cost is a highly influential factor in the delivery of GBFIs (Hwang and Tan, 2012) and CON2a expressed the view that green building guidelines are costly to follow at the initial stage even though a few tax incentives have been introduced. CONS2a further explained that the newer the building, the more up to date it is in terms of GBFIs this is attributed to the fact that various lessons are learnt from previous developments and costs are factored in at the planning stage.

GBFIs as part of CSR strategy

Incorporating GBFIs as part of CSR strategy within a company encourage the companies to be more environmentally conscious and responsible (Nurick and Cattell, 2013). There are similarities in the responses from CS1 and CS3 that going green is part of their company's

strategies and in order to achieve this, various standards and policies were incorporated to encourage conservation and preservation of the natural environment. CONS3a added that the building had to be retrofitted to incorporate GBFIs in order to be an energy efficient building. The findings by Stibbe and Voigtlander (2014) reveal that there are large corporate clients who value CSR in their capacities as investors and tenants and this has been a catalyst in the implementation of GBFIs. In terms of CS2, CONS2a explained that owner is driven by the passion of green building and there is a desire to educate the public on the importance of implementing GBFIs. New members of staff are enlightened about the policies and strategies on conserving the environment through implementation of GBFIs. The same principals are communicated through various awareness campaigns to old and tenants within the building. It was noted by CONS2b that adherence to these policies is not easy for the tenants as there is some resistance at the beginning but constant reminders and fines on non-adherence to these policies has yielded positive results. This proves that voluntary adherence to green building standards creates difficulties in enforcing them (Muya and Banda, 2013).

Health of green building users

Boyd (2006) claims that the kind of features introduced in a building to make them more healthy and environmentally friendly are dependent on the user of the space. Benefits such as improved health can be achieved by implementation of GBFIs (Fuerst and Van de Wetering, 2015). In both CS1 and CS2, the participants highlighted that improvement of health was a factor that influenced perceptions of GBFIs.

CONS2a is of the opinion that the benefits of GBFIs cannot be felt directly unless if components such as ceiling could be justified as being healthy but as for materials such as concrete and steel there was not much difference. These views are similar to the views of Boyd (2006) who claims that the kind of features introduced on the building to make them more healthy and environmentally friendly is dependent on the user of the space.

CRITS2a mentioned that GBFIs provided a healthier environment, for example mechanical ways of cooling interiors were replaced by natural ventilation and CONS1a explained that using clean gases in the air-conditioning units was viewed as a healthier option for the users of the building. In addition to GBFIs contributing to a healthy environment, tenants benefit from occupying energy-efficient building and there are companies that are willing to pay more for buildings that have a green rating as this enhances the company's image (Cajias and Piazolo, 2013).

4.6.4 Impact of GBIs

Knowledge of GBFIs

More awareness campaigns need to be conducted to highlight the benefits of GBFIs (Azizi *et al.*, 2015). The findings from all three cases reveal that the main purpose of GBFIs was to conserve and preserve the natural environment for generations to come. CS1 and CS3 expressed that anything that is built with the sole purpose to conserve and preserve the environment in a building can be known as being a green building feature and these features can be in terms of energy saving lighting and the type of glazing used on the building. Awareness alone is not enough because stakeholders need to be trained and well equipped with knowledge of GBFIs in order to contribute positively to green building (Gluch *et al.*, 2014).

Muya and Banda (2013) agree that there is minimal knowledge of the basics of green buildings among key stakeholders.CS1 explained that it is not easy to recognise the GBFIs in the building unless the users are informed about them; as a result, the GBFIs are unappreciated. Miller and Buys (2008) explain that tenants understand the importance of green buildings even though their knowledge of green building technology and building performance may be low. CONS2a highlighted that green building is still in its infancy in the Zambian property market and this view is shared that green building is not as advanced in the developing countries as in the developed countries (Melchert, 2007; Muya and Banda, 2013).

Experiences of GBFIs

The implementation of GBFIs has impacted the performance of green building and this effect is not only experienced by individuals but by the surrounding environment as well (Ellison *et al.*, 2007). All three cases agree that there is a difference in comparing a building that had GBFIs to the one without. Miller and Buys (2008) emphasises that cost and saving need to be highlighted in order to easily compare between conventional and green buildings. CS1 and CS3 were of the opinion that the feature of automated lighting was appreciated by users. CS3 admitted that automated lighting was a good feature on the maintenance side because there are no lights that are left on through the night and this has been easier to manage the consumption of power. It is evident that the various experiences from the end user has the possibility of shifting the focus of individuals to more green sources of energy thereby reducing the strain on hydroelectric power as outlined by CRITS2a.

CONS3a explained that the application that was introduced to manage activities in the boardroom and specific offices to suit activity was embraced and appreciated. lack of knowledge about how these technologies can be implemented can cause resistance to the implementation of GBFIs (Miller and Buys, 2008). The findings reveal that there was no resistance out of fear, cost or uncertainty to new technologies which could have a negative impact on the implementation of GBFIs (Hakkinen and Belloni, 2011).

Education of GBFIs

Research reveals that various opportunities are also being created to train not only professionals but other stakeholders within the construction sector which will contribute to the successful implementation of GBFIs (Gluch *et al.*, 2014). Through the findings of CS1 and CS2, it was evident that there was a need to create more awareness of GBFIs in order for people to appreciate them and better implement them in the Zambian Property industry. It is evident that clients understanding of GBFIs overcomes one of the green building barriers because they are aware of the benefits of green building (Hakkinen and Belloni, 2011).

Gluch et al (2014) states that education and practice will result in the successful implementation of GBFIs. The findings from CS3 were that users of the building perceived the building in different ways because of the various features that were implemented in the design, this was due to constant sensitisation that was conducted. This is supported by the findings that awareness campaigns will highlight the benefits of GBFIs (Azizi *et al.*, 2015) . Table 4.1 highlights the main findings of the cross-case analysis of the three case studies.

Table 4.1: Cross-case analysis

	Benefits of GBFIs	Perceptions of GBFIs	Impact of GBFIs
CS1	Tenant indoor comfort highlighted Reduced power consumption Reduced dependency on ZESCO Functional work space with enhanced lighting Natural lighting/ventilation satisfying	Setting GBFI trends GBFIs incorporated Green policies incorporated Enhanced lifestyle Improved health	Low levels of awareness Benefits of GBFIs appreciated Existence of GBFIs noticed
CS2	Uncertainty about indoor comfort Open plan seating enhancing natural lighting Motion sensing lighting satisfying Greenery cooling building	High initial cost emphasised Lessons learnt from previous green projects Lack of understanding cost of GBFIs Need for participation from government, schools and companies Uncertainty of health benefits Social benefits noted	Limited knowledge of GBFIs Lack of technical understanding Difficulties in adhering to GBFIs Motion sensing lighting noted Penalty for not adhering to GBFIs Appreciating GBFIs was a slow process Importance of education highlighted
CS3	Feeling of prestige Recorded 70 percent saving of energy Seamless transition of power using UPS Open space good for interaction Functional work space with LED lighting	Constant communication of GBFIs Awareness of GBFIs in the building GBFIs incorporated in policies Energy saving options supported but must be justified Constant communication to staff	Preserving energy noted Motion sensing lighting noticed Automated air-conditioning noticed Use of application to manage interior spaces appreciated Benefits of sensitisation

4.7 Summary

Based on the semi-structured interviews conducted over the three cases, this chapter presents the findings of the data collected. Thematic analysis was used to analyse the data and a cross-case analysis was performed in order to highlight the key findings. The findings of this research have revealed that there is integration with respect to the implementation of GBFIs in the Zambian property market. The levels of integration are dependent on a number of factors. Some of these factors are mostly driven by perceptions that people have concerning GBFIs and this has been mostly as a result of not having a clear understanding of what GBFIs are and their benefits. Other factors are based on the idea that it is only best to implement GBFIs for the sake of conserving and preserving the natural environment for future generations.

Findings from all three cases reveal that there is a basic understanding of what GBFIs are and that there is a need for more awareness and education of GBFIs as these are necessary for the successful implementation of GBFIs in the Zambian property industry. The need to realise the benefits of GBFIs was evident and the functionality of the space should suit user activities.

5 CONCLUSION

5.1 Introduction

This research served to investigate the integration among stakeholders in the Zambian property market with respect to the implementation of GBFIs. This chapter re-examines the research question and the proposition of the research and the finding are outlined. Furthermore, the research objectives are revisited to establish whether they were achieved through the research.

The problem statement as outlined in chapter 1 was:

Little is known about stakeholder integration with respect to the implementation of GBFIs in the Zambian property market. Zambia is a developing country and the green building movement is still in its infancy.

This chapter discusses the findings of the research based on the literature reviewed, interviews conducted and the cross-case analysis. Conclusions are then drawn and finally recommendations based on the conclusions are outlined for any further research.

5.2 Achievement of Research Objectives

The research aim defined in chapter 1 is:

To establish the effect of stakeholder integration in the implementation of GBFIs in the Zambian property market and how stakeholders participate in achieving GBFIs.

i) Determine the awareness and impact of GBFIs.
ii) Establish the perception of the stakeholders in benefits of the implementation of GBFIs.
iii) Determine how stakeholder participation in the Zambian property market affects the implementation of GBFIs

Objective (i), determining the awareness and impact of GBFIs.

Through literature review concerning awareness and impact of GBFIs and findings from the semi-structured interviews, the objective to determine awareness and impact of GBFIs was achieved. It was established that stakeholders in the property market are aware of GBFIs and the impact of GBFIs was determined. Findings from the interviews revealed that even though stakeholders are aware of the existence of GBFIs, there is minimal understanding of the

basics of green building and the benefits thereof. The findings from the interviews further revealed the need for more sensitisation and education for all stakeholders in the property market in order to increase awareness of the benefits of GBFIs and to assist stakeholders to consciously implement GBFIs in the Zambian property market. Furthermore, the findings revealed that GBFIs have had a limited impact especially in terms of influencing investments in the Zambian property market. This limited impact can be accredited to lack of awareness of GBFIs, their benefits and the infancy of implementation of GBFIs among stakeholders in the Zambian property market.

Objective (ii), establishing the perception of the stakeholders in benefits of the implementation of GBFIs.

The findings from the semi-structured interviews revealed that the overall perception of stakeholders was that of uncertainty rather than acceptance. The lack of understanding for the initial cost of the installation of GBFIs created an impression that the cost was too high and could not be factored into the overall pricing of a development. In addition, the adherence to green building guidelines that were developed by the ZGBA was perceived to be costly even though certain materials such as solar panels attracted less tax on importation. This has also affected how much stakeholders get involved in achieving successful implementation of GBFIs. Notable companies were making efforts to contribute to conserving the environment by incorporating GBFIs as part of their CSR strategy. The findings also revealed that the lack of legislation that governs the implementation of GBFIs has negatively affected the commitment of stakeholders in implementing GBFIs and the unavailability of tax benefits for implementing these features which could positively influence the implementation of GBFIs the property industry was identified.

Objective (iii), determining how stakeholder participation in the Zambian property market affects the implementation of GBFIs

Through the literature review and interviews conducted, it was identified stakeholders were environmentally conscious and took part in implementing GBFIs. It was revealed through the interviews that companies are pioneering the implementation of GBFIs by incorporating installation of GBFIs as part of their policies to conserve the environment and to create a healthier environment to work as outlined in their employee health and wellbeing goals. There is evidence that other stakeholders were more passionate about green building and that was the drive to implement GBFIs. Companies are creating awareness in the compounds on

recycling and waste disposal to enhance the awareness of green environment; this is further supported by funding for the various GBFIs that have been introduced. Other stakeholders are creating more awareness on the benefits of GBFIs by inviting different schools to visit their building and have a feel of the various GBFIs that had been incorporated in the building and to also understand that there were different options in building.

5.3 Findings of Research Question

The research addressed the following question:

To what extent does the harmonisation amongst stakeholders impact the implementation of GBFIs in the Zambian property market?

There was research that was conducted concerning how stakeholders harmonised in implementing GBFIs in the Zambian property market and therefore what impacted the implementation of GBFIs was drawn from the findings and analysis from the responses of the participants.

The findings from the interviews and literature reviews reveal that implementing BFIs is not possible if it is driven by a single stakeholder for example the creation of the ZGBA involved more than one stakeholder. This is a supporting effort to sustainably transform the built environment through awareness programmes, training and green certifications. Additionally, various stakeholder were involved which resulted in the development of the Zambian green building guidelines which are to be used in green building.

It was revealed that the law making bodies impact the implementation of GBFIs. The absence of legislation that governs the implementation of GBFIs negatively affected the commitment of stakeholders. Due to the fact that there is little local research about green building, the perceptions of stakeholders on the implementation of GBFIs is impacted. For example, the perception of high initial cost was revealed as a major factor as stakeholders would rather eliminate these features first if the cost is too high. They perceived that the initial cost of implementing GBFIs was expensive regardless of certain materials such as solar panels attracting less tax on importation. Other tenants expressed lack of interest in maintaining the installed green features such as LED lighting because the cost was too high.

Other findings that were revealed were that the benefits of GBFIs had an impact on the implementation of GBFIs as it is evident from how tenants highlight issues such as comfort, saving, functionality, and satisfaction as being important issues in a building. It was evident

that occupants of the buildings were aware of the various GBFIs in the building, which were considered to be beneficial. These experiences were as a result of sensitising the users of the existence of these features. Furthermore, stakeholder's perception of GBFIs began to evolve after experiencing the benefits to the extent that users implemented features such as recycling at household level because of appreciating the benefits.

5.4 Support or Refute the Proposition

The proposition of this research stated:

The integration among stakeholders impacts the implementation of GBFIs in the Zambian property market

The literature reviewed and the findings from the semi-structured interviews establish that the integration among stakeholders impacts the implementation of GBFIs in the Zambian property market. The proposition is supported because the findings suggest that various stakeholders in the Zambian property market are aware of GBFIs and that there are other institutions that are pioneering the implementation of GBFIs.

The integration of business houses and government is important in creating awareness of GBFIs as there is need for more awareness and sensitisation in order to understand the benefits, cost implications and the process of implementing GBFIs; this will assist to coordinate various stakeholders in achieving GBFIs. It was established from the literature review and semi-structured interviews that professional bodies and financial support bodies are critical in the successful implementation of GBFIs.

The findings from interviews revealed that partnerships with stakeholders, governmental and non-governmental within the property market have yielded results as seen through the development of green building guidelines, suppliers of green materials and services directory and Environmental Impact Assessment guidelines for the construction industry.

5.5 Conclusions

Through the research, it was evident that various stakeholders in the Zambian property industry concern themselves with green building in the quest of preserving and conserving the environment for future generations. In order to achieve successful implementation of GBFIs, it is necessary that these stakeholders should integrate because individual contributions help in protecting the natural environment. Furthermore, there is a need to

create more awareness on the benefits of GBFIs and education on the implementation of GBFIs in order to have a green built environment.

It appears that GBFIs are being implemented by stakeholders and the success is measured by adhering to legislation. It was further revealed that the current building regulations do not offer sufficient regulation for implementing GBFIs for the property market. Therefore, the government needs to create legislation that will govern the implementation of GBFIs because it is believed that if laws are present then stakeholders have no option but to adhere to them.

A conclusion can be drawn that there is a need to increase integration among stakeholders in the property industry on how best to implement GBFIs; this includes highlighting the benefits of these features today and for the future. It is clear that the current harmonisation amongst stakeholders has not had sufficient impact to increase demand for GBFIs in the Zambian property industry.

5.6 Recommendations for Future Research

Based on the findings emanating from this research, the following are recommendations for future research:

1. Cost-Benefit analysis of Green building in the Zambian property market

There is limited research on the benefits of green building in the Zambian property market and a cost-benefit analysis is necessary to highlight the financial and social benefits of green buildings within the property market.

2. An investigation into the effectiveness of sustainable housing guidelines in Zambia

The sustainable housing guidelines were developed to support housing developments that respond to global climate. The research is important in establishing that the outlined guidelines are meeting the desired objectives.

3. The risk and benefits of green retrofitting conventional buildings

It is important to understand the possibility of retrofitting conventional buildings but associated risks, challenges and benefits should be considered. There is limited research that has been conducted regarding retrofitting of conventional buildings.

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List of Appendices

APPENDIX 1:

CRITS1a

Researcher: What do you understand by the terms green building features and initiatives and what motivates you to implement them?

CRITS1a: These are the set of rules that you are supposed to implement starting with the first line that you draw, thinking about positioning of the building up to the construction phase. Things that need to be implemented not only for green building alone but because it's supposed to be normal for the care of mother earth and the end user because at the end of the day Green Building is about the comfort of the end of the user: there is

1. Air quality control
2. Water quality control
3. Waste management control/ Refuse collection

It is supposed to be normal and to be implemented all around, it needs to be compulsory because these are things that are taught in the first year of architecture, people lose that and do not care because what matters is that you have done your part in building.

Researcher: How are the various stakeholders taking part in the implementation of GBFIs in the property market?

CRITS1a: So far the key players are Saint Gobain from France and SA and have their presence in Zambia, they have started doing dry wall partitions that are sustainable and good

for the environment and not only for the beauty in offices but these are things that are Eco friendly to the end user and were they are produced. They have started doing research on windows as to how to control the light coming in and out of a building and the changing of windows into more like a solar panel that will generate power from it. Saint Gobain is a manufacture of construction materials.
The key players are the top 5 consultants in the project; if this is implemented then the ones doing the manual work will implement these. Example the architects started looking into green building and green workshops, sensitisations on green building and CPDS on green building. A lot has been done and not officially opened but we have most firms already on board. And Zambia Institute of Architects helps with that. Like now they look at lighting and most of them are no longer saying 100 per cent ZESCO but they are saying find alternatives to ZESCO, it should be there but supplemented. Because there is a project for PSMFC (Public service Micro finance Company) were in the TORs they want us to build a green building were 80 per cent is solar and 20 per cent is ZESCO. When it comes to water, it is also percentage from Lusaka water & sewerage and the other it is harvesting rain and recycling grey water to be used in other areas and also look at other alternatives. So there are so many things we will be implementing, like solar roof tops, solar parking lots covered in solar panels, gym depending on solar and all these terms of reference will go through the Zambia Institute of Architects, they are implementing the same. The initial start-up cost is high but the running cost in the future becomes cheaper because 20 per cent ZESCO means you are buying less electricity for the rest of your life.

Researcher: What motivates professionals to engage in green building in their line of business?

CRITS1a: On a personal level I love nature and am a vernacular person and I do not deal with modernity and I feel like green building takes you back to your roots because it makes you realise that nature can provide for you the things that you need, for example, you do not really need to depend on air conditioning but you can do cross ventilation and the building will be able to be cool without depending on electricity from ZESCO. So there are all these things that at the end of the day are taking you back to Mother Nature and realising that everything is being provided and that is what for me green building is all about and that is what motivates me.

Researcher: What do you think are the main drivers in the implementation of GBFIs?

CRITS1a: It is the associations for consultants, if they made it compulsory and the local councils to make it compulsory, if they can make it a norm to implement GBFIs, I cannot say that the president or the minister, these have so many things that they do . For example if the Zambia Institute of Architects, Engineers Institute of Zambia, etc implemented to say these are to be done, electrical to say nothing can be used apart from LED lighting it means we are getting a step forward. The local council when they are approving the drawings they need to see these features are in the drawings because once everything starts with the top 5 consultants, when we have implemented it means everything that comes after is compulsory because what we say goes, the contractor builds what we design they do not change anything. It means that there is no longer an option and demand for looking into green building is compulsory.

Researcher: Why is there a need to implement green building features and initiatives in construction projects?

CRITS1a: Yes ,because it is something that more like protects us and helps us to conserve not only economically but also we are conserving the land that we are staying on because we are wasting it just doing things because we want to do it, somebody will look at doing like construction, say massive construction, there is a way that we need to be building not just build a mass building because my total coverage of the land matters in green building, I do not want to cover so much in concrete because concrete is not something green, it forces you to remove all the green areas.

Researcher: Why is the partnership with National Council for Construction, Zambia Green Building Association and stakeholders in the building industry necessary?

CRITS1a: The partnership is important because they play a big role and that relationship should be there, if they are not for the idea then whatever we try to do then someone can do the opposite of it and it does not work then at the end of the day we have conflicting ideas.

Researcher: How do you expect the subject of green buildings to grow in the future?

CRITS1a: If you look at Zambia, the past years when we had those problems of load shedding, most people implemented solar geysers, panels something that as a third world

country we are easily adapting when there is no other option, everyone especially the young generation need to adapt, when we are building we are already thinking of putting solar geyser not geyser so we begin to budget for it. The client is always willing and when they are investing they want to see the numbers, they want to see numbers after the initial cost, the start-up cost can be high but the long term cost is this so you break it down for them to say you will spend this much on the initial cost but your long term cost will be this. Like what you spend today you will get it back in the next 5 years and that after that you will be paying nothing compared to what you put in. Example we are doing a building for PACRA and they are in partnership with CCPC and what they have realised is that, it's a multi storey building, it's a building shared by 2 organisation but then there are common areas and now we are looking at the common areas being lit up by solar meaning that there won't be arguments to say let us pay the bills the common areas like verandas, staircases, toilets and they will only be looking at their space and that is something that can easily be done where there are different meters separating them and billing them separately. So its reducing the cost already, another thing is that the social interaction should not be in conflict, people should be able to co-exist, if we include that gym and kitchens to exit, the building should sort out the economic part and the social aspect.

Researcher: What projects have implemented GBFIs?

CRITS1a: Both are at conception stage and Public Service Micro Finance, we also have the Kafue Gorge, with hostels and training centre. We are doing administration buildings and hostels and they are all centred on the green building concept. For this, council has been approved already the drawings are completed and we wait funding for the project to kick off. Citi bank all their branches are centred around the LEED certification, we have studied the concept that they have, to have this idea, example underground parking which will reduce the emission coming from the cars to be up in the air in the end we are releasing the ground to have grass compared to have so many cars parked, there are about 50 lots for cars. When you look at the outside finishes of the building, they used what is called Mamoran, it is a paint which is low maintenance on the outer walls. There is adequate lighting inside coming from the outside, the paint used were Eco friendly paints and only green star rated suppliers where allowed. The contractor was already informed about the situation and like I said
the contractor follows what we specify or give them, everything from tap fitting, light fitting and paint have to be green star rated from a green star rated supplier. For example, in the bathrooms the taps releases enough water to wash hands, on the water from the tap used and

the water management strategies used by the mechanical engineer on the water we were able to save at least 40 per cent of water usage. All light fittings are green star rated, the bulbs have the daylight sensors to take advantage of daylight harvesting, as for the sensors when light coming from outside too much they will reduce the light intensity of bulbs in the room and you do not have to go and switch off and will turn on and off and it is something that is automatic and incorporated. Ware house for Churches Health Association of Zambia is being done also, Solar is not cheap, and there you need batteries, panels, and installation.

Researcher: Which stakeholders are practising the implementation of GBFIs and which one of them is making an impact?

CRITS1a: Manufactures of construction materials, they are suppliers of acoustic insulation and their materials are sustainable do

Mirage - they make tiles which look like wood and that means we will not go and cut trees to make floor boards and when water falls on the wood it does not work well but porcelain can just be wiped and they are South African based but have outlets here in Zambia.

CRITS2a

Researcher: What do you understand by the terms green building features and initiatives and what motivates you to implement them?

CRITS2a: This is a building that has been constructed using green materials and adopted all the elements or design features that come with it, meaning that a green building starts with a green design and the process has to be green and the materials used in construction need to be green, so it is about the process and the product. So the process starts from the design to construction then the product is what you get as the green building. The motivation may actually be two fold, if am in business then am looking at issues of profit and sustainability and if I implement a green building then it means I will be saving over a long period of time and I know that a green building also comes with healthier lives in that we look at issues to do with the design like issues of indoor air quality that is okay for people using the building and if you look at it from the commercial aspect you will find that you may not even need to use the mechanical elements like air-conditioning and the like because this buildings had been set and designed to adopt those features so what motivates that will be from different perspectives depending on who is doing that project, it could be a contractor, individual or commercial entity but from my perspective this is something that I have adopted and

implemented, the house am living in is a green house, it has, of course you know that there are different shades of green from brown green to the actual green and my house has all features, it has a green design, materials are green. Instead of using cement I used lime and if instead of using IBR I used the clay concrete roofing tiles, then big windows for light and air, I have solar energy, my house operates on solar, I also have a water harvesting system, so when it comes to electricity ,am not on the ZESCO grid as I entirely depend on solar so for me the motivation was that I may spend more now but the long term, so I don't pay electricity bills, I have water that I preserve for things like gardening, washing so I don't pay the local authority for water and so I only pay for DSTV

Researcher: How are the various stakeholders taking part in the implementation of GBFIs in the property market?

CRITS2a: When it comes to National Council for Construction, we are a regulator in the sector; we entered into an agreement with the International Labour Organisation under the Zambia green jobs programme. This is a programme that is promoting green growth in construction and green job can consider using green elements in their construction activities. If you look at the profits, if anyone is going in the business it is because they want to make a profit but that should not be at the expense of the planet and the people this is what is called the three Ps. The professionals have accepted that going green is the only way we can manage to be sustainable because when you look at our resources they are being depleted every day. If you look at say in Zambia when we were growing up, because of all these impact of people on the environment. You find that as you move along the way, someone is building 5 by 10 and they clear the whole portion without regarding how the environment will suffer. At the end of the day, it has been accepted, because it is actually been easy to do maintenance, imagine you use wooden mortice lock, you will get it locally and you will empower someone else with a skill that will sustain them. Under the same programme, we have formed the Zambia Green Building Association which is the equivalent of South African Green Building Council, we started with an association because forming a council in Zambian perspective can be problematic and we thought that we start with association that will move this venture and for now National Council for Construction is the secretariat. So you find that even when you tell the contractor to build green they do not have any legal backing. The building regulations we are using are old and have not been revised and the other hindrance or barrier is that the building regulations sit under the principle act of the

public health act which is under the ministry of the health and the implementation is being done by mostly the ministry of Housing and Infrastructure Development.

Researcher: What do you think are the main drivers in the implementation of GBFIs?

CRITS2a: It is the lifestyle broadly, imagine if you go to hotel intercontinental if you are in Lusaka but if you go to a resort like Chaminuka, you will live in a grass thatched nice dwelling, you find that the quality is the same, it is also about appreciating the resources that we have, we have so much but failing to make use of them so it's about having health lives, I do not need to be in the air conditioned room or the artificial lighting all day, I can have natural light. So aspects of improved lifestyles are a motivating factor. It's about what is trending , what is in fashion, like the world today is going green and everyone wants to attach themselves to what is green and there is also an aspect of saving even though the initial cost may be high, the long term cost are almost zero, those are motivation aspects. When you build, you are building for a long time to come.

Researcher: Why is there a need to implement green building features and initiatives in construction projects?

CRITS2a: There is a big need being if you look at a conventional building it consumes so much energy in form of lighting water and usage even the building that we are in. So if you look at the electricity bills that we pay, imagine if we depended on solar, we would be saving a lot more, imagine solar windows, sensors that would cut off, sensors were water usage is concerned. so you find that depending on people you open a tap and it is not closing properly it means we are losing water ,I think it is about saving huge cost were the use of these resources are concerned. If you look at the conventional building, it actually uses a lot of energy in terms of water thermal and everything.

Researcher: Why is the partnership with National Council for Construction, Zambia Green Building Association and stakeholders in the building industry necessary?

CRITS2a: It is necessary because at the end of the day government needs to have a buy in, even though National Council Construction is there as a regulator. And the way the association is functioning it has more of the private sector coming together to move this purpose just like the world building council because government may have needs but these may not be the same as the needs of other sectors so it is important that the private voice is present. This very important because government has regulations in how certain things will

be done, if they make a law they would want to live by that law and this association will be ideal in that we hope some laws in the building regulations can change. I can come up with green design but who is going to build it when the laws are saying something else, even when you go to Zambia Bureau of Standards, will they allow you to use compressed earth brick? They won't because the standards are not there. We are working with Zambia Bureau of Standards but at a very slow pace and what is hampering this are the laws, whatever regulations that are coming in should have a principle law.

Researcher: How do you expect the subject of green buildings to grow in the future?

CRITS2a: The moment government gets involved because it needs a champion and laws as you know in Zambia work better, for example the issue of TPIN, it was law and everyone flocked in because there was no choice. When the government says that it is a law then we are OK.

Researcher: What projects have implemented GBFIs?

CRITS2a: 1. The Foxdale centre which we are used as a case study, it as water reserve system in the basement

2. The American Embassy where we visited the area

3. The Ministry of housing and Infrastructure

Researcher: How will the implementation of GBFIs impact the Zambian property market?

CRITS2a: It will, especially if there is a backing because even in property market. When people are allowed to develop their property but to follow a standard, so if we have these standards then there will be a lot of impact, if anything it will be more expensive. Imagine the current population in Zambia of about 17 million, if half uses conventional energy and half uses green energy, we will save a lot and the water in the Kariba dam and ZESCO will stop charging exorbitant fees

Researcher: Which stakeholders are practising this and which one is making an impact.

CRITS2a: PJP - Kafue Gorge

APPENDIX 2:

CONS1a

Researcher: What do you understand by GBFIs?

CONS1a: This is anything that will conserve and protect the environment in the building, these are elements of the building which are designed with the sole purpose of conserving and preserving the environment for instance in terms of lighting, these LED lighting have helped in reducing the consumption of power in the building even the type of glasses which are used are those which are designed in that when it is cool they are supposed to retain the coolness and when it is hot they are supposed to retain the heat. It is strange that when you say green, people look at the flowers which are not necessarily the case as those were just part of aesthetics to beautify the place.

Researcher: What benefits have you gained from working in an office with GBFIs?

CONS1a: It cuts down on energy consumption even the work environment is better even LED lighting is better in terms of office environment.

Researcher: Would you consider the office with GBFIs to be comfortable and healthy?

CONS1a: Definitely, having worked in a conventional building and now am working in what is called an A grade building in Zambia, in terms of the type of air conditioning, the type of gases they are using health wise are better, cleaner and just the standards are much higher and quality. I have been in a number of offices were the first thing that you notice is the tubes are out and lighting is not so fantastic, it's hot.

Researcher: Which components of the building with GBFIs are occupants satisfied with?

CONS1a: The striking thing is the LED lighting, then the air conditioning which are not the conventional split unit, one outdoor unit and different units in the various office and on the safety side we have sprinkler systems, we have fire and smoke detectors, and the kitchen has heat detectors, offices have smoke detectors. When there is a fire and heat reaches a certain temperatures, the crystal red part will blow up and water will flood the area.

Researcher: What factors impact the experience of users in buildings that contain GBFIs? Can you explain more on these factors?

CONS1a: One of the factors that are lighting is that we rarely switch off lights; we simply walk out of the office after work. Like where we sit there, it is a pool office, as you walk in also the lights come on and as you walk out in the evening they will just go out but of course security will just pass through to check but after a few minutes if there is nobody there the lights will go off automatically, the lights are not motion sensors alone but they are also able to pick the motions. The sensor works on dual thing.

Researcher: In your opinion, what are the key drivers that influence perceptions of buildings containing GBFIs?

CONS1a: Unless it is a hi-tech building, most people may not realise these initiatives so far one may need to be knowledgeable in order to appreciate these features. The first thing they most likely notice is that the building is somewhat automated and it is a bit different, others have automatic opening and closing sliding doors but they may not know that that is part of the initiative because if the doors are automatically closing and opening you are makings sure that the air conditioning is not being overworked with the air curtain which an ordinary person may not understand because the opening and closing of the doors strains the air-conditioning and has an effect on the amount of power you are drawing. They have to be aware but others ask that the space seems different, all you notice that the place has a good look, the windows also allow in as much natural light as possible but not necessarily the specific features.

Researcher: Is considering buildings that contain GBFIs part of CSR strategy?

CONS1a: For Citi there are various standards and policies that need to be followed. When this building was constructed and Citi moved in, there was no LED lighting and the original lights had to be taken out and put LED lights. The way Citi works is that even the seat you are seating on is the same across the world. The type of taps, spray of water is aerated, sprays out with air bubbles, a huge percentage is air and water making you use less water and thereby conserving water. They use the flash master system, the flashing system as a dual function.

Researcher: Did you experience a difference in perception of users before moving into the building compared to when they understood the principals of GBFIs?

CONS1a: The move from the previous building then most definitely.

APPENDIX 3:

CONS1b

Researcher: What do you understand by GBFIs?

CONS1b: I have a bit of understanding on the whole concept of green essentially. These are initiatives that are in place to preserve our environment

Researcher: What benefits have you gained from working in an office with GBFIs?

CONS1b: I have worked in both types of buildings and I would say that individually the impact is not that much in that you still get the same kind of lighting but I mean generally on the user side not so much but maybe on the side of the owners of the building.

Researcher: Would you consider the office with GBFIs to be comfortable and healthy?

CONS1b: Definitely, whatever is green is healthier not just in terms of the immediate environment but just generally the whole eco environment it's always positive to have that. The environment is a big place but small players contribute to the bigger picture so obviously every small contribution helps the bigger picture.

Researcher: Which components of the building with GBFIs are occupants satisfied with?

CONS1b: Big windows are good, very well ventilated rooms, natural air flowing through

Researcher: What factors impact the experience of users in buildings that contain GBFIs? Can you explain more on these factors?

CONS1b: I think that health is important aspect and obviously whatever small thing we do to make our environment better it means we are investing for the future in our own health and it gives you that sense of peace for our own health.

Researcher: In your opinion, what are the key drivers that influence perceptions of buildings containing GBFIs?

CONS1b: Health is a key factor because we have major health issues that arise out of ozone layer contamination.

Researcher: Is considering buildings that contain GBFIs part of CSR strategy?

CONS1b: I do know that when the fit out was being done there was a policy objective to make sure that there were certain things because this is what they wanted because most of the new Citi buildings have this implemented.

Researcher: Did you experience a difference in perception of users before moving into the building compared to when they understood the principals of GBFIs?

CONS1b: Obviously we are engaging with people who are in environmental control and we are somewhat like trendsetters. Unless you are told, you are unaware ordinarily.

APPENDIX 4: CONS2a

Researcher: What do you understand by GBFIs?

CONS2a: Basically it is how you have built, how you have built and the materials that you used, it could be the bricks that were used and how much energy was being used so it gets quiet technical. You can say what concrete that we have used whether it is green or not, it is a big thing that is why in Zambia that is when a lot of people are understanding what the green aspect is because it does not mean to say it is the mortar only that qualifies as green but it goes down to the foundations and how they have been built and what methods you used and how you have built it and if it concrete blocks if you used a lot of energy to produce.

Researcher: What benefits have you gained from working in an office with GBFIs?

CONS2a: The good thing about this building is that it might be a slow process but it is something to teach people that there is alternative methods the only problem is trying to follow those guidelines and trying to be green is quiet expensive initially but long term it might be a good thing for instance electricity, having solar panels in Zambia right now is a good thing but it is incredibly expensive to start with, but once you have got it you have no more expenses, tough tax has been reduced from importation of solar panels one thing that has not happened yet is the fact that if you exceed in your production with what you want to use, you can't feedback into the grid yet so hopefully long term that will happen, right we have solar panels which can produce not enough for us right but long term we would be producing much more even to feed into ZESCO.

Researcher: Would you consider the office with GBFIs to be comfortable and healthy?

CONS2a: To be honest, no, I cants see any benefit now unless you talk about the type of ceiling boards are in the health sense, you don't use asbestos sheets or ceiling panels but with concrete there isn't much difference and most buildings in this country are concrete blocks, steel windows but we have wide windows allowing in more natural light and our offices are built to be open plan so we share the light.

Researcher: Which components of the building with GBFIs are occupants satisfied with?

CONS2a: Windows are wide open plan in the office which gives us more space. The other thing is actually the trees and the green. The lighting in corridors and bathrooms have motion sensors that are able to pick a presence and switch the light or off. The newer the building is in Zambia, the more up to date the buildings are and there are a lot of new projects that are going on and are a far more modernised also aware of the cost and they will factor these in.

Researcher: What factors impact the experience of users in buildings that contain GBFIs? Can you explain more on these factors?

CONS2a: Again it comes down to cost for instance the LED lights we put in the first batch of the LED lights but the cost difference is huge K17 to k150 to LED light so for people to be green in this country sometimes they cannot afford it so that the biggest thing against the green initiative in this country and that is the cost. I will give you an example, if you want to build a building with the red bricks which is green, they have all the methods that are green but the normal brick is K4 compared to block at K5 so you almost doubling the cost and that is a pullback of green initiatives in this country. If there was government involvement and we have tax benefits because you are going green, I think it goes so much to education an understanding but it starts somewhere and hopefully people understanding will grow and their demands will grow and once that happens then the government will see the initiative to be important. .

Researcher: In your opinion, what are the key drivers that influence perceptions of buildings containing GBFIs?

CONS2a: Unfortunately, again it goes back to education when the general people do not understand then they don't see why you want to double the cost of building a building just because you have produced the building in a certain way, people will argue that we do not produce that much emissions but it has to start somewhere but until people realise that, do not look at another country, look at your space, and again we get schools to come here to see, we

do not offer then the technical details on how building is built but we tell them about the basic initiatives such as recycling, water management and sewerage management so we think when we start at that level then when they go to university then they will know how to build these building and incorporate the initiatives. That is why there is a huge need to invest in education, like the big companies such as the millennium challenge corporation and Zambia breweries have a big project going on that have initiatives in the compound educating people on the same, donating and funding, if the big companies can start then it can slowly go down to the individuals so the education is starting.

Researcher: Is considering buildings that contain GBFIs part of CSR strategy?

CONS2a: It is not really written out but on our side our passions are channelled to the subject and we want to educate, when we have a new staff we walk them through, as for the tenants we insist on certain issues like recycling bins and we send through leaflets. The adherence is hard, slightly resistant because others just say after all it is dumping waste so why do we need we bother but slowly it is changing but they need to be reminded every now and then, every year we sit with them and talk to them why we recycle to the point where we introduce a fine especially for the restaurant because you find they just damp their rubbish together.

Researcher: Did you experience a difference in perception of users before moving into the building compared to when they understood the principals of GBFIs?

CONS2a: Yes but not so much on the green building but on the feel and what we do with grey water and the recycling sewerage and there are many other who are coming on board like Garden city where they recycle their waste and they get to re-use it in their gardens.

APPENDIX 5: CONS2b

Researcher: What do you understand by GBFIs**?**

CONS2b: Having greenery and vegetation. It's about doing your bit for the environment, like recycling as well in the building like saving lights

Researcher: What benefits have you gained from working in an office with GBFIs?

CONS2b: I think the most interesting thing is the issues of recycling and classifying the garbage, it is hard to follow though. First building that I have seen though so it's good

Researcher: Would you consider the office with GBFIs to be comfortable and healthy?

CONS2b: Yes comfortable. To be honest for me there isn't much difference. Though the windows are bigger and that allows in more light so we can work in the office without necessarily switching on the lights.

Researcher: Which components of the building with GBFIs are occupants satisfied with?

CONS2b: The open spaces like the balconies and energy saving in the bathrooms and the plants that we have around which seems like a deliberate effort.

Researcher: What factors impact the experience of users in buildings that contain GBFIs? Can you explain more on these factors?

CONS2b: Recycling issues, conserving lights/power and energy saving in the bathrooms

Researcher: In your opinion, what are the key drivers that influence perceptions of buildings containing GBFIs?

CONS2b: The first thing they will think about is that it is an expense, like how much water will the plants take and all these small things a for example ZESCO was taking an ordinary bulb and they would give you an energy saving bulb, that was going a step further so that people can understand and they explain that this bulb stays longer apart from the incentive part it is a way of educating people

Researcher: Is considering buildings that contain GBFIs part of CSR strategy?

CONS2b: Not sure/unclear in our company.

Researcher: Did you experience a difference in perception of users before moving into the building compared to when they understood the principals of GBFIs?

CONS2b: I can tell a few differences obviously here there is lot of green and the rain water harvesting systems something I just learnt about it, we learnt about it because we were told about it.

APPENDIX 6: CONS3a

Researcher: What do you understand by GBFIs?

CONS3a: These are features that are found on the building in order to preserve energy, these can be lighting and general energy

Researcher: What benefits have you gained from working in an office with GBFIs?

CONS3a: There is a lot of gain and saving of energy like for instance, if we compared to the previous building we have made a saving on power by 70 per cent. The other aspect is that we do not wait for someone to switch off lights or switch them on; this is because we have a motion sensor that is installed on to the building. So when the building senses that there is no one on the floor, all the lights will go off. It is the same with air conditioning units, these are operated at a central place and no one has access to alter the temperature of the air conditioning but is automatically set to cool or warm the room using software. Of course we have service level agreements with various companies that will assist us in execution of certain maintenance jobs say air conditioning, at first the temperature adjustment used to be manual but the introduction of the software has been very efficient and of great help.

Researcher: Which components of the building with GBFIs are occupants satisfied with?

CONS3a: Users are satisfied with the lighting and the general functionality of the space, we have an open plan seating plan which allows air conditioning to be cooling the whole area, the lighting is also satisfying, and there are also features like the marble floors which is top notch quality and the general feel in the building is such that it gives a level of prestige.

Researcher: What factors impact the experience of users in buildings that contain GBFIs? Can you explain more on these factors?

CONS3a: It's basically the space that they use, for example for the cubicles; one can switch off the lights just for their area. There are two types, one for the main floor but there are others that can be operated by an individual, same applies to the power outlets, there is no need share an extension cable as there are designated power outlets for the users. There is also biometric access control for the building and that in a way we are able to manage people that come in and out of the building. There are also features such as the mirrors in the bathroom that have a light such that if the light is not enough then you can press a button on the mirror and it will be lit.

There is also another impact that might impact the users which is the use of hydro power, you recall that some time back there was an issue of the Kariba dam having a crack, so in a an event that such similar issues arises, you can easily switch to solar power. The same applies to our canteen were we use both gas for cooking as well as conventional power.

Researcher: In your opinion, what are the key drivers that influence perceptions of buildings containing GBFIs?

CONS3a: Perceptions are influenced yes, people are aware that the building they're sitting in has unique features and this has been mainly due to the fact that we send communication to them often about what is happening and how best they should use the space. For instance, just today, we were communicating to them that there will be interruption in power supply. And the other thing is that during times when there is no power, we have a seamless transition to alternative power using things like the UPS which supports the computers in case of power cuts. It is also important to note that we have boardrooms whose function is operated by an application. One has to download it to the phone and it helps manage the boardroom activities, if it a discussion or theatre event the blinds and light will be automatically switched on to suit the purpose.

Researcher: Is considering buildings that contain GBFIs part of CSR strategy?

CONS3a: It is in some way because the company has generally joined hands to preserve and conserve the natural environment; there is communication that is sent out to everyone so that they are aware of what is happening. It is also important to mention that management supports these efforts if there is an aspect of saving power but this has to be justified.

Researcher: Did you experience a difference in perception of users before moving into the building compared to when they understood the principals of GBFIs?

CONS3a: Yes, they perceive this building as being different because there are features that are in this building that were not there at the old building but this also been possible because of a lot of sensitisation