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Users' experiences and feelings of a green building and perceived organisational outcomes

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BA Masters Research Report (Organisational Psychology)

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February 2014

DECLARATION

I, Sharni Hart, know and accept that plagiarism (i.e., to use another‘s work and present it as one‘s own) is wrong. Consequently, I declare that:

- I declare that this research report is my own, unaided work. It has not been submitted before for any other degree or examination at this or any other university.
- I have correctly acknowledged all direct quotations and paraphrased ideas/content. In addition I have provided a complete, alphabetised reference list, as required by the APA method of referencing.
- I have not allowed, and will not allow, anyone to copy my work with the intention of passing it off as his or her own work.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my unaided work, or that I failed to acknowledge the source of the ideas or words in my writing.

.....
Sharni Hart

.....
Date

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ABSTRACT

There has been numerous research that has hypothesised that 'green' buildings contribute to more positive outcomes than that of their conventional counterpart, such as increased well-being (psychological and physical) and productivity. However, recent studies have shown that results have been inconclusive, showing a discrepancy within this realm. In the present study, the researcher investigated the relationship between 'green' buildings and organisational outcomes (well-being, productivity, job satisfaction, absenteeism, and presenteeism), as well as, factors that may impact on this relationship. This was achieved by examining a sample of participants within the Nedbank Menlyn Maine building, whereby, a 5-star 'As-Built' Green Rating has been achieved. A non-experimental, longitudinal, correlational mixed methods design was employed. Quantitative data was collected using a demographic questionnaire, Warwick-Edinburgh Mental well-being scale, Sick Building Syndrome Questionnaire, perceptions of physical work conditions questionnaire, and single item scales measuring productivity, job satisfaction, absenteeism, and presenteeism. Data was compared over three time frames (approximately 6 months apart) in order to see if there was a change. Qualitative data was collected by means of nine in-depth interviews. Most the results demonstrated that the 'green' building did not produce significantly better physical or psychological wellbeing, increased job satisfaction or higher perceived productivity. Qualitative data revealed that green buildings could not be examined in isolation, and that aspects, such as legitimacy of the green concept, education, resistance, unconscious impacts, office design, culture, and health effects needed to be examined in order to understand the quantitative results. The implications of the results and the limitations of the study are discussed, and suggestions for further research are made.

Key Words: Green buildings; productivity; job satisfaction; well-being; absenteeism; presenteeism

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CHAPTER ONE
INTRODUCTION TO THE STUDY

Organisational practices are changing dramatically, due to the increasing social, legal and economic pressures that are imposed on them with respect to the adoption of environmentally sustainable practices (Butler, 2011). Thus, it is evident that organisations are not only focused on their financial profitability, but are also increasing their awareness and need for environmental sustainability, which falls under the umbrella term of Corporate Social Responsibility (Butler, 2011). The motivation for this move towards environmental sustainability is based on many dynamic motivational forces, such as the need to impress stakeholders; the long-term benefits that are associated with environmental sustainability; positive organisational outcomes, and the impact that this exchange has on the organisation's reputation (Richardson & Lynes, 2007).

One specific domain of sustainability within the working world is that of investing in green buildings. The building and construction industry has been recognised to contribute and support sustainable development through the acknowledgement of environmental concerns (Shiers, 2000). It is these concerns that have led to the implementation of specific processes and designs that are implemented in methods that contribute to the increasingly renowned concept of sustainability (Shiers, 2000). These are implemented in the designs of the buildings; controlling of buildings with respect to location and transport matters; environmental impact assessments; indoor air quality and user well-being; use of sustainable building materials, as well as energy consumption (Shiers, 2000). This is not an easy task to follow, hence the construction and building industry is governed by an extensive range of environmental assessment guides and tools, including BREEAM, LEED, GBTool and GreenStar South Africa (Gibberd, 2002).

The guides are followed to verify and support the success of green building designs by directing all the relevant parties, including architects, building owners and engineers, towards a construction environment that is directed towards sustainability (Bauer, Mosle & Schwarz, 2010). Green building practices are predominantly implemented to reduce negative environmental impacts and improve sustainability, but are also claimed to contribute to additional benefits for the organisation, such as reduced operating costs, increased staff

productivity, and reduction of liabilities associated with poor indoor air quality problems (Bauer, et al, 2010; Eichholtz, Kok & Quigley, 2010; Von Paumgartten, 2003; Miller, Spivey & Florance, 2008).

It must be noted that the implementation of green buildings doesn't only affect environmental sustainability; however it also has an impact on the employee population. It can be hypothesised that high performance levels at work are associated with high levels of well-being (Bauer, et al, 2010; Eichholtz, et al, 2010; Von Paumgartten, 2003). The effect of indoor environmental quality (IEQ) in the workplace on employee well-being and productivity has been widely emphasised within the realm of occupational health and organisational psychology (Singh, Syal, Grady & Korkmaz, 2010). Employee well-being can be negatively affected through poor air quality, extreme temperatures, insufficient ventilation and humidity, to name a few (Singh, et al, 2010). It is these conditions that can result in absenteeism, loss of working hours and reduction in employee productivity (Singh, et al, 2010). Furthermore, the establishment of green buildings has also been acknowledged to affect employee behaviours and behavioural outcomes, including employees' feelings and level of belonging and commitment towards the organisation (Vischer, 2011).

Thus, it is not surprising that the phenomenon of green buildings is on an increase, and has overcome significant barriers in recent years (Hoffman & Henn, 2008). Even though this is the case, adoption of green buildings within the construction industry still remains relatively low (Hoffman, et al, 2008). Contributing factors to this could include aspects such as issues associated with the driving force of leadership, collaboration among all parties involved and barriers, such as expenses (Richardson, et al, 2007). For the successful implementation of green buildings, there needs to be strong leadership to direct and support the overall project (Richardson, et al, 2007). Secondly, sustainable targets need to be established before construction can proceed. For example, targets include the policies that are put in place to establish the degree of recycled material used in the specific regions of the building (Richardson, et al, 2007). Finally, to achieve high levels of efficiency within the building, there needs to be consensus among the designers, employees, and construction team (Richardson, et al, 2007).

This study will therefore examine the impact 'green' buildings have on employees' perceived well-being, satisfaction, overall productivity, as well as, employees' experiences and feelings.

The reasoning for this analysis will be to achieve an in depth investigation of this phenomenon through a mixed method approach. According to Leaman and Bordass (2007), it is important to obtain a deeper understanding of the context that surrounds the 'green' building in order to achieve more accurate and realistic conclusions. Hence, detailed accounts of the context will create increased knowledge to support the statistical inferences (Leaman & Bordass, 2007). The building that will be the foundation of this study will be that of the Nedbank Falcon Building in Menlyn Maine, east of Pretoria Central. This has achieved a 5-star 'As-Built' Green rating, with an accumulation of 62 points (Green Building Council, 2012).

CHAPTER TWO
LITERATURE REVIEW

The purpose of this chapter is to document the theoretical foundation behind the 'green' building phenomenon. Firstly, the focus will be directed towards acknowledging the reasoning behind performing this specific research analysis. Secondly, the researcher will examine different facets that are important to consider in order to acquire a broad understanding of 'green' buildings, such as environmental ergonomics and sustainable development; green buildings; GreenStar Rating Systems and physical work conditions. Furthermore these facets will be directly linked to organisational outcomes, namely perceived productivity, well-being, job satisfaction, and presenteeism and absenteeism. The final section in this chapter will focus on the importance of integrating quantitative and qualitative methods in order to create an indepth understanding of this phenomenon.

2.1. Rationale for the study

It has been emphasised that the built environment has become an increasingly important topic in the realm of the environmental movement (Hoffman, et al, 2008). Research has depicted that buildings consume 40 percent of the world's materials; use approximately 55 percent of the wood for activities that are not associated with fuel use; use 12.2 percent of the total amount of water consumption; consume 40 percent of the world's energy. Furthermore, they are a primary contributor in global warming, with 36 percent of the carbon dioxide emissions (Hoffman, et al, 2008). Thus, it is the job of the rating systems to establish guidelines for the construction industry that help prevent further degradation by emphasising the importance of sustainable development, water efficiency, energy efficiency, indoor air quality, and innovation within the construction design of the buildings (Hoffman, et al, 2008). It can be hypothesised that the understanding of the dynamic aspects within the umbrella term of 'green' buildings, can contribute to a sustainable and improved environment.

Furthermore, numerous empirical studies have examined the relationship between the impacts of green buildings, as well as, their comparison with existing conventional buildings (e.g. Thatcher & Milner, 2012; Leaman & Bordass, 2007; Abbaszadeh, Zagreus, Lehrer & Huizenga, 2006). These studies have used background knowledge and theory to hypothesise

that ‘green’ buildings impact physical and psychological well-being positively, furthermore, contributing to overall productivity (Thatcher & Milner, 2012; Leaman & Bordass, 2007; Abbaszadeh, et al, 2006). Many of these studies have reported increased satisfaction with certain features that are depicted within ‘green’ buildings, such as air quality and thermal comfort (Abbaszadeh, et al, 2006; Heerwagen, 2000). However, the overall results in most studies have appeared to be inconclusive, showing discrepancies within the ‘green’ building studies (Thatcher & Milner, 2012; Rajendran, Gambatese & Behm, 2009).

Thus, it is vital for researchers to undertake research that underpins the particular aspects that contribute to the contrary views held by empirical research and existing theory. The proposed research uses a mixed methods approach to understand the concept of green buildings. It has been stated that a mixed methods approach allows for superior research results to be obtained through its in depth and detailed methodological style (Johnson & Onwuegbuzie, 2004). This approach has been credited as it allows for a broad range of information, both of a quantitative and qualitative nature, to be documented in order to create and advance research concepts and to explore the practicalities that exist (Johnson & Onwuegbuzie, 2004). The mixed method approach allows for discovery of patterns to occur (induction); testing of hypotheses (deduction), as well as uncovering the most appropriate understanding of results obtained (abduction) (Johnson & Onwuegbuzie, 2004).

For the purposes of this study, the mixed method approach explores the statistical significant/insignificant results by means of documenting employees’ experiences and feelings that are associated with the implementation of ‘green’ buildings. This allows for a creative form of research that does not limit the results found (Johnson & Onwuegbuzie, 2004). This research will be used to open up new opportunities for future research on the ‘green’ building phenomenon, and therefore it can be used as a reference for businesses to improve the effectiveness of green buildings. This will be achieved by observing and interpreting information that will generate new ideas in a more ‘thick descriptive’ manner, thus building a greater understanding of the most simple principles by going deeper into these concepts (Geertz, 1973).

This research uses a mixed methods approach to understand the concept of green buildings. It achieves this by examining the ‘green’ phenomenon by comparing three different Time frames. It then tries to understand the statistical significant/insignificant results by means of

documenting employees' experiences and feelings that are associated with the establishment of 'green' buildings. Furthermore, the purpose of the qualitative analysis of this study is to create a deeper understanding of the context that surrounds the 'green' building phenomena. The aim is to create an understanding of this concept through the experiences and feelings associated with the likes, dislikes, problems and challenges that employees are faced with on a daily basis with respect to their 'green' building.

Lastly, it must also be noted that South Africa has been established as a country that is involved in the Green Building Challenge (Larsson & Cole, 2001). The primary goals of this challenge are to advance building environmental performance assessment methodologies; to recognise and look out for sustainability issues related to green buildings, and to create knowledge among the parties involved in green building developments (Larsson & Cole, 2001). However, there is still limited research within the South African context on the outcomes and advances of 'green' buildings (Thatcher & Milner, 2012; Musa, 2013). Thus, this study will be focused within the South African context.

2.2. Theoretical framework

2.2.1. Environmental ergonomics and sustainable development

For the dynamic and complex understanding of the 'green' building phenomenon, it is critical to underpin the core theoretical foundation in which it branches from. Environmental ergonomics is the umbrella term that depicts the empirical study of ambient conditions on human factors, such as comfort and health (Hedge, 2000). Its primary assumption is that individuals operate within their environment, thus the environment impacts on various aspects within their working activities (Parsons, 2000). From a broad perspective, environmental ergonomics incorporates social, psychological, cultural and organisational factors of the system (Parsons, 2000). Although, often when referring to this concept, it emphasises the environment in terms of concrete factors, such as lighting, noise, vibration, temperature, air pressure, and particles in the air, to name a few. Hence, it is vital that environmental ergonomics examines the impacts that these factors have on human occupants, with respect to well-being, comfort and performance (Parsons, 2000).

This field of study has grown over the last century, moving its concerns from only examining factors, such as thermal conditions, ventilation and odours, towards a more dynamic

investigation emphasising the effects of harsh environmental conditions (Hedge, 2000). It is the changes in building technologies and design that triggered increased interest within this field (Hedge, 2000), thus establishing good reason for the transfer to 'green' buildings. Furthermore, Vischer (2008) has emphasised the important role that the environmental setting has on employees, and organisational outcomes.

It must be emphasised that even though environmental ergonomics is not the same concept as sustainable development, past literature has depicted that sustainability should be evident in the improvement of human factors (Zink &Fischer, 2013; Haslam & Waterson, 2013). Ergonomics is more based on the improvement of 'human factors', whereas, environmental sustainability is focused on the preservation of our natural resources for future use (Zink & Fischer, 2013). Previous research on ergonomics/human factors has been predominantly based within the organisational context; hence it is imperative that it considers not only the 'human' but also the 'environmental' context that surrounds the working world (Zink & Fischer, 2013). Thus, it is not unforeseen that the ergonomics paradigm has shifted to incorporate general sustainability into ergonomics (Zink & Fischer, 2013). As Zink and Fischer (2013) established "Not only economic but also social and environmental prerequisites and impacts as well as the interdependencies between them have to be taken into account" (p. 349).

The emphasis of this paradigm shift has caused research to emerge within the realm of 'green ergonomics', which acknowledges that there is a continuous human-nature interaction (Thatcher, 2013). Thus, it has been proposed by Thatcher (2013) that systems can be implemented in order to benefit the human employee as well as allowing for the conservation of the natural environment. This directly links the concepts of ergonomics and sustainable development. Some of the examples of 'green ergonomics' have been the design of low resource systems; the design of green jobs; operation of wind energy generation, and recycling practices (Haslam & Waterson, 2013). Within this realm, many organisations are investing in the phenomenon of 'green' buildings, whereby it has been stated that 'green buildings need good ergonomics' (Hedge & Dorsey, 2013)

2.2.2. Green Buildings

There has been an increasing surge of interest within the realm of sustainability, specifically the adoption of the 'green' building (Shiers, 2000). It was depicted in 1991 that environmental issues would take on an increased level of importance, hence resulting in

building occupants changing their built environment to one that is characterised to portray aspects within the 'green criteria' (Shiers, 2000). Thus, environmental considerations are seen as core elements influencing the design, development and management of buildings (Shiers, 2000). It must be acknowledged that 'green' buildings don't only refer to indoor air quality, health and comfort, but also incorporate the location of the building; choice of building materials and energy efficiency, to name a few (Shiers, 2000).

Thus, it is imperative to define 'green' in a manner that allows for a broader understanding. 'Green' buildings can be established as buildings that have been designed to specifically incorporate features and principles that are acknowledged as environmentally sustainable (Leaman, Thomas & Vandenberg, 2007). Furthermore, the United States Green Building Council (USGBC) defines green buildings as 'ones that have significantly reduced or eliminated negative impacts on the environment and the occupants' (Abbaszadeh, Zagreus, Lehrer & Huizenga, 2006). This is consistent with the definition proposed by Kibert (2003), who emphasised the importance of a high performing green building. This definition stated that 'High performance green buildings are facilities designed, built, operated, renovated, and disposed of using ecological principles for the purpose of promoting occupant health and resource efficiency plus minimising the impacts of the built environment on the natural environment' (Kibert, 2003, p. 491).

It can be acknowledged that there are three main differences between green buildings and conventional buildings (Kibert, 2003). Firstly, green buildings are associated with ethical and legal dimensions, as it is the right thing to do in terms of conserving the environment and our natural resources (Kibert, 2003). Secondly, it has been stated that green buildings reduce costs in the long-run, through mechanisms that allow organisations to reduce their energy and water consumption (Kibert, 2003). Finally, one of the main reasons that green buildings are constructed is in order to reduce the negative health impacts on occupants by promoting occupant health (Kibert, 2003).

Heerwagen (2002) hypothesised that organisations enter into the realm of 'green' because it can be established as a means of achieving organisational outcomes, such as profitability and increased performance. The growing interest and development of 'green' buildings is often associated with positive results, such as increased health; less expenses associated with the operating of the building; a more socially responsible image; greater attractiveness to the occupants and the public, as well as, having the potential to increase financial profitability

(Shiers, 2000; Bauer, et al, 2010; Eichholtz, Kok & Quigley, 2010; Von Paumgartten, 2003; Miller, Spivey & Florance, 2008). Leaman, et al (2007) also established that when 'green' buildings are functioning properly, they impact environments positively and create positive feedback in terms of comfort and productivity. However, if 'green' buildings are not performing at the correct standards, they can lead to more user dissatisfaction than that of a normal conventional building (Leaman, et al, 2007).

Leaman and Bordass (2007) also found aspects that were contradictory to the general positive findings associated with the 'green' building implementation. Their study emphasised that there is a great need for improvement within the realm of 'green' buildings, and that previous mistakes have to be acknowledged and corrected (Leaman, et al, 2007). The management of 'green' buildings is a key contributor in successful outcomes (Leaman, et al, 2007).

To achieve the highest level of success, rating systems have been developed to support and certify successful green building design, construction and operation (Bauer, et al, 2007). Furthermore, these systems set out guidelines for all parties involved in the construction and implementation of sustainable buildings (Bauer, et al, 2007). Some of the well-known rating systems are LEED, BREEAM, CASBEE, as well as, the South African rating system, GreenStar (Brauer, et al, 2007).

2.2.3. GreenStar Rating System

The primary goal of any green building rating tool is to create a framework that sets out the specific standards that can be used to acknowledge that a building has appropriate features to be established as 'green' (Green Building Council, 2012). The GreenStar system originated in Australia, however after much investigation, South Africa decided to adopt this system and customise it to depict their own tool for 'green' rating (Green Building Council, 2012). The GreenStar guide sets out a list of measures that are considered as 'green'; if a building has any of these features, they are awarded points. Finally, these points are weighted and summed up to achieve a total, and this total determines the 'green' star rating a building has achieved (Bauer, et al, 2007). To be considered for a GreenStar rating, owners have to submit documentation to an assessment committee within the Green Building Council, where the building will be categorised as either 4-star, 5-star or 6-star, with the latter suggesting the

highest degree of sustainability (Green Building Council, 2012). The following table depicts the rating system (Green Building Council, 2012):

Table 1: *GreenStar Rating System*

Points Aquired	GreenStar Rating	Meaning
45-59	4 Star Rating	Best Practice
60-74	5 Star Rating	South African Excellence
75-100	6 Star Rating	World Leadership

The categories that are used to assess the green buildings and achieve points are that of management, indoor environment quality (IEQ), energy, transport, water, materials, land use and ecology, emissions, as well as, innovation (Green Building Council, 2012). To achieve a 'greenstar rating', buildings need to obtain points that range between 45 and 100. Nedbank Menlyn Maine will be the sample in this study as they acquired 62 points, thus falling into the category of a 5-star 'As-built' green building.

It must be noted, that the categories that were previously stated are not as clean cut as they may be portrayed on the surface. For example, the design of a 'green' building incorporates many different aspects that can be rated, such as the use of natural lighting in offices; individual environmental control; techniques designed to recover heat and achieve low-energy lighting; carefully thought out landscaping minimising environmental impact; bicycle racks designed for employees to reduce CO2 emissions, as well as, specially selected building materials allowing for the reduction in environmental degradation (Shiers, 2000).

Furthermore, the underlying objectives of the rating system need to be acknowledged. These include the promotion of a holistic building design; the promoting of green awareness within South Africa; to acknowledge environmental leadership, as well as- the ability to reduce the environmental impact of development (Green Star Council, 2012). On the organisational level, the GreenStar rating system affords the opportunity to create a working environment for employees that increases positive experiences, and allows for better physical conditions that impact positively on their overall feelings (Cole, 2010). Kaatz, Root, Bowen and Hill, (2006) suggest that building assessment tools should not be seen as merely a measurement of sustainability, but a means of improving decision-making, and integrating sustainable policies

within the organisation. This statement can be problematic, as one can achieve a rating in various categories with very little emphasis on the IEQ factors, which are seen as the most important factors for building occupants when trying to create a sustainable environment through the erection of green buildings.

2.2.4. Physical work conditions

The fundamental reason for erecting buildings is to create a place that is sheltered against the dangerous elements of the outdoor climate (Holm & Engelbrecht, 2005). Often this naturally ventilated 'shelter' can be used to achieve organisational goals, such as the increase in productivity through the establishment of an environment that is conductive to human comfort (Holm & Engelbrecht, 2005). One of the primary purposes of the 'green' building phenomenon is to attempt to address the issue of Indoor Environmental Quality (IEQ), examining its impacts on employees physically and psychologically (Singh, Syal, Grady & Korkmaz, 2010). This purpose is not surprising, as it is the employees that occupy the 'green' building, thus they are affected by this environment to a great extent (Thatcher & Milner, 2012).

The physical work environment can be detrimental to employees, as it produces sensory demands, which directly impact on employees' abilities to function in the most effective manner (Stellman, 1998). These physical features include aspects such as air quality, temperature, noise and humidity, to name a few (Hedge, et al, 1995). It is these conditions that can lead to negative impacts on employees; hence it is imperative that physical conditions are in line with the needs and capabilities of employees (Stellman, 1998). Stellman (1998) acknowledged in her review, that often when the fit between the environment and the employee is flawed, it can lead to negative outcomes such as fatigue and performance frustration, showing the direct link associated with physical conditions and well-being, as well as, performance outcomes. This is consistent with most of the research that demonstrated that appropriate physical conditions lead to increased positive outcomes, such as increased productivity, improved well-being, increased job satisfaction as well as, decreased absenteeism (Vischer, 2008; Singh, et al, 2010; Cole, 2010).

2.2.5. Perceived productivity

Productivity can usually be defined as the quantity of output produced in respect to the amount of input used (Price, 2007), however perceived productivity takes on a more subjective approach, where ratings are achieved by means of employee self-assessment (Heerwagen, 2000). Measures of perceived productivity are advantageous in the way that it allows for direct comparison to be made between people in different departments of the organisation, or individuals working under different job titles (Leaman & Bordass, 1999). The quantity produced is impossible to determine for all building occupants, especially if their outputs are in different forms, hence perceived productivity allows for a more standardised means of comparison (Leaman & Bordass, 1999). Nonetheless, there are still disadvantages to perceived productivity, such as the whole issue of subjective ratings, and time dependent ratings (Leaman & Bordass, 1999). Ratings can be flawed due to the fact that the context in that specific time can contribute to a decrease in productivity. For example the organisation could be going through a time of change which consequentially impacts perceived productivity (Leaman & Bordass, 1999).

The American Society of Interior Designers set out to examine the relationship between building designs and perceived productivity (Heerwagen, 2000). This was achieved by sending out surveys to approximately 200 business decision makers. Results depicted that 90% of participants believed that by improving the design of the building, employee productivity would increase (Heerwagen, 2000). Many organisations allow subjective measures of productivity, however it must be noted that often results are flawed, due to the fact that self-assessments often depict high levels of overestimation (Heerwagen, 2000). Often baseline measures are used to counteract overestimations; however these are not always easy to record (Heerwagen, 2000).

2.2.6. Psychological (mental) and Physical well-being

Harter, Schmidt and Keyes (2002) emphasised the importance of well-being within their Gallup studies. It was stated that an adult spends most of their life working (Harter, et al, 2002). Thus, it can be hypothesised that they spend a lot of their time within their working environment (building), provided their work takes place within the building. Parsons (2000) acknowledged that there is a constant and complex interaction between individuals and their

environmental setting that can contribute to both physiological and psychological strain on an individual. This strain can directly lead to discomfort, and other negative physical and psychological well-being effects (Parsons, 2000). It was emphasised that poor well-being can have negative impacts on not only the worker, but also on the organisation (Dana & Griffin, 1999).

From a theoretical perspective, it is hard to pinpoint an exact definition of well-being, due to the fact that these definitions vary according to practitioners (Dana & Griffin, 1999). However, there seems to exist two salient person-related concepts to well-being, namely the physical health of the worker and the mental or psychological health of the worker (Dana & Griffin, 1999). The former acknowledges the symptomatology and epidemiological rates of illness, whereas, the latter is concerned with the emotional states of the worker, and the presence of mental disorders (Dana & Griffin, 1999).

The physical well-being of employees within the building is often referred to with respect to the associated symptoms of the Sick Building Syndrome (Heerwagen, 2000). These include symptoms such as headaches, nausea, dizziness and irritability, to name a few (Wargocki, Wyon, Baik, Claussen & Fanger, 1999). The primary theoretical link between the office environment and well-being is that environmental determinants can lead to a change in human well-being and health, which can directly cause both physical (signs, illness) and mental outcomes/states (symptoms, perceptions) (Jaakkola, 1998). Jaakkola (1998) tried to explain this link by creating a framework known as the Office Environment Model, whereby the office environment is divided into the social and physical environment, which both impact on human well-being. The social aspects consist of factors such as organisational factors, rules and norms, whereas, the physical environment is composed of physical factors, chemical factors, and biological factors. These all can have physical impacts on the occupant (Jaakkola, 1998).

It is hard to pinpoint the exact factors within a building that contribute to each symptom, however there is evidence showing a causal link between certain building factors and these specific symptoms (Heerwagen, 2000). Research has shown that poor indoor air quality can occur due to the pollutants inherent in building material and furnishing. This can directly affect the physical well-being of occupants, as it increases the frequency of general symptoms that are usually referred to as the Sick Building Syndrome (SBS) symptoms (Wargocki, Wyon, Baik, Clausen, & Fange, 1999). Wargocki and colleagues (1999) examined the

difference in Sick Building Symptoms in two buildings, namely a low-polluting building and a normal polluting building. Results showed that perceived air quality in the low-polluting building improved much more than that of the normal building, thus resulting in a decrease of Sick Building symptoms in the low-polluting building (Wargocki, et al, 1999).

On the other hand, psychological well-being is a very dynamic and complex concept to define. Boniwell and Henry (2007) define psychological well-being by means of two specific approaches, namely the hedonic and eudaimonic approaches. The hedonic approach is specifically related to well-being as experiences associated with positive feelings and life satisfaction, whereas the eudaimonic approach tries to find purpose and understanding of experiences, specifically through self-realisation and psychological functioning (Cartright & Cooper, 2009). The Warwick-Edinburgh Mental Well-Being scale (WEMWBS), takes on these perspectives of well-being, as it concentrates specifically on positive aspects of mental well-being in the form of differing dimensions, such as the affective-emotional aspects (Tennant, et al, 2007).

2.2.7. Job Satisfaction

Firstly, the basic definition of overall job satisfaction is the individual's assessment of a job, which is determined by accounting for all factors within that specific job (Ferratt, 1991). The concept of job satisfaction has evolved over time, as researchers used to emphasise job satisfaction as a 'need for fulfilment', whereas, nowadays it is more based on cognitive processes (Spencer, 1997). Thus, the perspective is now focused on looking at a more attitudinal perspective of job satisfaction (Spencer, 1997).

Locke (1969) stated that job satisfaction is the "pleasurable emotional state resulting from the appraisal of one's job as achieving or facilitating the achievement of one's job values" (p. 316). On the other hand job dissatisfaction is "the unpleasurable emotional state resulting from the appraisal of one's job as frustrating or blocking the attainment of one's job values or as entailing disvalues" (p. 316). Furthermore, he emphasised that there are different elements that contribute to the overall evaluation of one's job, such as the perception of a certain aspect of the job, and an implicit or explicit value standard (Locke, 1969).

Previous research has acknowledged that building design has had a positive impact on the way employees perceive their job (Dravigne, Waliczek, Lineberger & Zajicek, 2008). Thus, it

is not surprising that many of the theoretical foundations associated with a green building predict increased levels of job satisfaction within green buildings compared to that of conventional ones (Singh, et al, 2010).

2.2.8. Presenteeism and Absenteeism

It is imperative to distinguish the difference between absenteeism and presenteeism. Absenteeism is when an employee is not at work, due to an injury or illness, whereas, presenteeism can be established as the ability of an employee to work through illness and injury (Dew, Keefe & Small, 2005). It must be noted that various aspects have been studied when examining absenteeism, such as factors that are related to social, economic and medical phenomenon (Biron, Brun, Ivers, & Cooper, 2006).

However, this is not the case when exploring that of presenteeism. Presenteeism has previously been defined as "The measurable extent to which health symptoms, conditions and diseases adversely affect productivity of individuals who choose to remain at work" (Chapman, 2005, p. 2). Thus, this concept is based on the assumption that some people will come to work, even if they are too sick to function efficiently (Chapman, 2005). Research on presenteeism has lagged compared to that of absenteeism and productivity (Biron, et al, 2006). This is very surprising, due to the fact that presenteeism can be established as a high contributor to decreases within productivity (Biron, et al, 2006). In the very limited research that has been conducted, factors that have been documented to contribute to presenteeism is that of heavier workload, role conflict, and higher skills discretion (Biron, et al, 2006).

2.2.9. Previous Research

There has been numerous literature that has outlined the importance of 'green' buildings. Some benefits have been associated with the organisation, such as increased positive corporate image; favourable organisational reputation; increased chances of attracting investors and a productive workforce, as well as the financial benefits of a healthier workforce (Eichholz, et al, 2010). Other studies have emphasised the significant results with respect to positive outcomes, such as employee well-being, productivity, decreased absenteeism, as well as, overall better physical working conditions (Shiers, 2000;

Abbaszadeh, Zagreus, Lehrer & Huizenga, 2006; Vischer, 2008; Singh, et al, 2010; Cole, 2010; Dravigne, et al, 2008).

Contributing to this research, Smith and Pitt (2011) used a meta-analysis to emphasise the importance of sustainable buildings not only in terms of its impact on environmental sustainability, but its indirect positive impact on occupants in terms of increased health, satisfaction, and productivity. They concluded that sustainable building practices will reduce ill health and dissatisfaction, consequentially leading to a better quality of working life for the occupants (Smith & Pitt, 2011).

It must be noted that the 'green' building phenomenon has a positive effect on organisational outcomes when the indoor environment of an organisation is functioning at the correct standard. However this is not always as clear cut as it may seem. Roelfson (2002) stated that the indoor environment of an organisation is often regarded as problematic. This is the case, as if building characteristics are not up to standard, they are deemed inadequate. This inadequacy is often directly associated with disturbances within the daily routines of employees (Roelfson, 2002). Parsons (2000) argues that it is imperative to examine all the interrelated features within the working environment in order to document their impact on the occupants.

Many studies have looked at comparing the physical and psychological well-being of occupants within a green building to that of a conventional building (Klitzman & Stellman, Thatcher & Milner, 2012; Musa, 2013; Singh, et al, 2010). However, it must be noted this is a very dynamic and complex area to investigate. It has been noted that the indoor building conditions can cause indoor stressors that can exert their effects additively on the occupants' health (Bluyssen, Janssen, van den Brink & de Kluizenaar, 2011). Many of the studies conducted examine Indoor Environmental Quality on well-being by means of self-report surveys and questionnaires. Bluyssen and colleagues (2011) argue that a sceptical view needs to be taken when examining these self-reported results. They stated that is important to acquire more accurate data by collecting a combination of medical examinations, observations, and survey collection (Bluyssen, et al, 2011). Nonetheless, most the following literature is based on self-report questionnaires.

Singh and colleagues (2010) concluded in their research that occupants' perceptions of their health improved since moving into a green building. It was established that symptoms

associated with asthma, respiratory ailments, depression and stress decreased once in the green building.

Hwang and Tai Kim (2010) also examined the impact of 'green' buildings on occupants in respect to physical well-being. However, they were specifically concerned about the impact that lighting had on visual comfort and eye health. After examining a sample of approximately 2744 participants, they failed to find evidence to support their original claim that lighting was a key contributor to decreased health. From this, they decided to interview a number of participants in order to obtain a solution. Finally, they concluded that the symptoms of the Sick Building Syndrome was not actually caused by the lighting environment but was rather associated with the overall indoor air quality (Hwang & Tai Kim, 2011). Thus, portraying that poor indoor air quality has an impact on individuals' well-being. Their study can be credited as it examined the impacts over an extended period of time. However, it must be acknowledged that they did qualitative interviews to find a solution but failed to report on all these findings within their research.

Klitzman and Stellman (1989) also found significant evidence to show that the physical environment had an impact on the wellbeing of occupants. The results obtained indicated that the two main contributors to decreased psychological wellbeing were that of noise and air quality. This research concluded that improvements within the physical work environment would impact positively on the health of occupants. Muhic and Butala (2004) also found positive results with regard to the impact of Indoor Environmental Quality on wellbeing. The results of this study established that occupants in an artificially air-conditioned building reported more building-related symptoms than that of a naturally ventilated environment (Muhic & Butala, 2004).

It can be noted that there is evidence to suggest that 'green' buildings impact wellbeing positively, however a wide range of research has been contrary to these general findings, reporting inconclusive evidence to show a significant difference between 'green' and conventional buildings with respect to wellbeing. This claim is supported by research conducted by Thatcher and Milner (2012). They found that there was inconclusive empirical evidence to suggest that 'green' buildings had a positive impact on wellbeing. They examined productivity and well-being by comparing these outcomes in a green building with that of baseline measures that were taken before employees moved into the building (non-conventional) (Thatcher & Milner, 2012). Results showed no conclusive evidence to suggest

that ‘green’ buildings were superior to that of conventional buildings (Thatcher & Milner, 2012). This is consistent with research conducted by Musa (2013), whereby it was stated that the impact of physical conditions on psychological wellbeing was not significantly substantial. Both these studies can be credited as they were performed within a South African context.

Issa and colleagues (2009) also conducted a study, whereby they investigated various costs and benefits associated with the ‘green’ building. They conducted their study by using a sample of 1200 LEED accredited professionals. Some of the variables that they looked to examine were the long-term costs associated with the ‘green’ initiative, productivity benefits, as well as health benefits. In terms of health, their results were also non-significant, thus they concluded that it was hard to actually pinpoint the actual impact of ‘green’ buildings on occupants’ well-being (Issa, Rankin & Christian, 2009).

Another variable that has received increased attention within the ‘green’ building literature is that of job satisfaction. It is hard to pinpoint the exact factors that lead to job satisfaction as there are multiple factors that can change a person’s perception of how satisfied they are with their job (Locke, 1969). Locke (1969) proposed that ‘Overall job satisfaction is the sum of the evaluations of the discriminable elements of which the job is composed’ (p. 330). Hence, it is imperative to note that many different factors will be contributors to how a person perceives their job.

Newsham and colleagues (2009) hypothesised that indoor environmental conditions, such as thermal and lighting conditions, had an impact on job satisfaction. The results portrayed that there was a definite link between the physical environment and job satisfaction (Newsham, Brand, Donnelly, Veitch, Aries & Charles, 2009). They emphasised that satisfaction with the physical environment of a building in terms of lighting, ventilation and acoustics, created overall environmental satisfaction, which resulted in job satisfaction (Newsham, et al, 2009). Other research linked job satisfaction with the image of being ‘responsible’ (Valentine & Fleishman, 2007). Valentine & Fleishman (2007) found evidence to show that when companies implemented corporate social initiatives, employees had a positive response to their work and organisation. Thus, it can be hypothesised that employees’ job satisfaction would increase when they are working in a ‘green’ building that is benefiting society. However contrary to the general positive findings, Leaman and Bordass (2007) established that in any ‘green’ building, there will be a range of between 5 to 100% of occupants who are

dissatisfied or uncomfortable with certain aspects within their building- depending on the building dynamics. This dissatisfaction could possibly lead to job dissatisfaction.

Numerous literature has also briefly focused on the impact that 'green' buildings have on absenteeism and presenteeism (Issa, Rankina, Attallab & Christian, 2011;Thatcher & Milner, 2012; Rask & Kato, 2008). Rask & Kato (2008) documented that most of the employers within their study reported the perception that absenteeism had reduced by a substantial amount when employees moved into a 'green' building. However, contrary to this, Thatcher and Milner (2012) reported that there was insignificant evidence to report a substantial difference in both absenteeism and presenteeism rates from a conventional building to a 'green' building. This was consistent with research done by Issa and colleagues (2011), whereby they compared 10 conventional buildings with three green buildings. Results showed that absenteeism was less within the green buildings, however there was no sufficient evidence to show a significant difference. A limitation within all of these studies was that they didn't have actual records of absenteeism rates, so both absenteeism and presenteeism were both very subjective measures, hence reducing the degree of accuracy (Issa, et al, 2011; Thatcher & Milner, 2012; Rask & Kato, 2008).

Many studies have linked well-being, job satisfaction and absenteeism rates of 'green' buildings to that of perceived productivity. Fisk and Rosenfeld (1997) performed research on the level of improved indoor air quality on performance outcomes. Their study estimated that productivity increased dramatically when absenteeism and illness were reduced; thus, most of the increase in productivity was associated with the decrease in symptoms associated with the Sick Building Syndrome (Fisk, et al, 1997). It has been noted that there is a chain reaction between 'green' buildings and organisational productivity (Paul & Taylor, 2008). Green buildings create an environment which is characterised by improved indoor environmental quality, which directly generates a greater degree of employee satisfaction, leading to a more productive labour force (Paul, et al, 2008). Ries and Bilec (2006) found that productivity in a 'green' building improved due the size of the new workstations, the temperature levels, as well as the lower degree of humidity.

Furthermore, it was established that an organisations turnover can increase, depending on the positive aspects associated with design, management, as well as, the state of the indoor environment (Leaman & Bordass, 1999). Past research has emphasised that perceived rates of productivity usually increase with factors, such as comfort, health, and satisfaction of

employees (Leaman & Bordass, 1999). This was consistent with results obtained from a study conducted by Wyon (2004), whereby results showed that poor indoor air quality can decrease actual performance in a building by 6 to 9%. This study also showed that there was a strong relationship between dissatisfaction and decreased performance; that noise impacted negatively on performance, furthermore, it was stated that poor indoor air quality can directly lead to decreased physical well-being which can be hypothesised to cause decreased productivity (Wyon, 2004). This study can be credited, as it used both laboratory experiments and field experiments, in order to increase the validity of results found.

This was consistent with results from a study conducted in a Toronto school, whereby student, teacher and staff absenteeism in 'green' schools improved by 2 to 7.5%, also contributing to an increased performance of 8 to 19% when compared to a conventional school environment (Issaa, Rankina, Attallab, & Christian, 2011). Practitioners need to be wary when relying on these results as this was done within a schooling environment so it is hard to generalise it to other working contexts.

Consistent with these positive results obtained was Fisk's (2000) report that used a meta-analysis methodology in order to make inferences about the effects of 'green' buildings. The results that were obtained depicted that the improvement of indoor environments has an impact on occupants' health and productivity. The study inferred from existing research that characteristics of buildings and their indoor environment can significantly alter rates of illness, and sick building symptoms. Fisk (2002) established that the decrease in these rates definitely impacted on productivity positively.

However, it was problematic to obtain specific magnitudes of productivity gain due to improved health, thus only estimations could be documented (Fisk, 2000). Furthermore, this research emphasised the indirect impact that poor indoor environmental quality has on absenteeism. Employees who display signs of Sick Building Syndrome may be absent from work due to hospital visits and sick leave (Fisk, 2000). A limitation of this study was that it only examined a limited amount of literature, thus results can be biased and hard to generalise to the broader context.

It has been established that 'green' buildings can lead to positive outcomes, however a wide range of research has been contrary to these general findings, reporting inconclusive evidence to show a significant difference between 'green' and conventional buildings. Altomonte and Schiavon (2013) supported this claim when they compared occupant satisfaction in LEED

and non-LEED certified buildings. It was concluded that occupants of LEED certified buildings showed the same degree of satisfaction with the building as employees in the non-LEED buildings. Additionally, they examined perceptions of various aspects of the indoor environmental quality, again showing no significant differences (Altomonte & Schiavon, 2013).

Furthermore, conflicting findings have been portrayed when examining different aspects of 'green' buildings within the same studies. Paul and Taylor (2008) found that there was no evidence to show that 'green' buildings were more comfortable for employees. Surprisingly, they found their 'green building to be extremely warm, hence reducing positive perceptions of their working environment. Additionally, there was no difference found in aspects such as lighting and ventilation- between the green and conventional buildings (Paul, et al, 2008). It must be noted that the results could have been flawed in their study as there was a malfunction in the cooling system at the time (Paul, et al, 2008). This is vital in the study of 'green' buildings as malfunctions in other aspects not related to the 'greenness' of the building can influence results.

Lee and Guerin, (2009) performed their analysis on employees within 15 LEED-certified buildings in the US, by asking them to rate their job satisfaction and overall performance. Results depicted that office furnishing quality had an impact on both job satisfaction and performance, however indoor air quality only affected occupants' performance (Lee, et al, 2009). Although, these results were significant, it was concluded that sustainable buildings fail to acknowledge the occupant's perceived environmental quality as they are too engrossed with the engineering aspects associated with factors such as water conservation, energy and the delivery of air (Lee, et al, 2009). Thus, it can be hypothesised that employees' feelings and experiences are not directly accounted for. This was consistent with research that compared 22 'green' buildings with that of 23 conventional buildings in an Australian population, whereby, results showed that if 'green' buildings were designed and operated properly then they would have positive impacts in respect to comfort and productivity (Leaman, Thomas & Vandenberg, 2007). However, if the building doesn't account for the occupants needs, they can directly lead to less job satisfaction and comfort than that of conventional buildings (Leaman, et al, 2007).

Finally, Kato, Too and Rask (2009) reported that occupants perceive the 'green' building as more effective in respect of psychological benefits rather than physical benefits. This

conclusion was made by examining a sample of 128 respondents who had been working in Green-Star Rated Buildings for more than 12 months. The findings revealed that green buildings emphasis more psychological benefits associated with the 'value' attached to the 'green' building rather than the physical benefits of health and productivity gains (Kato, et al, 2009). Furthermore, higher hierarchical levels perceive greater benefits of the 'green' building environment than their lower level employees (Kato, et al, 2009).

2.2.10. Incorporating qualitative data

It must also be acknowledged that it is very difficult to examine the impacts of green buildings quantitatively, due to the inadequacy of controlled test environments (Ries, et al, 2006). Ries and colleagues (2006) emphasised this difficulty in their study with respect to the complications of measurements, such as productivity, health and safety and absenteeism, to name a few. Furthermore, they highlighted the fact that various other factors linked to change within the organisation can contribute to a change in these outcomes. However, it is not possible to separate which changes are associated with the 'green' building and which were linked to other factors (Ries, et al, 2006). Hence, it is imperative to collect qualitative data that can be used to back up the statistical results, creating conclusions that are more rounded and accurate.

Leaman and Bordass (2007) concluded that it is imperative to conduct post-occupant interviews in order to understand the roots of dissatisfaction, and be able to improve these circumstances and create appropriate responses to these problems (Leaman & Bordass, 2007). Farmer and Guy (2002) further support this notion by emphasising the importance of not only focusing on the technicalities that exist within the green building phenomenon, but also acknowledging the motivations of the differing interest groups that are involved in the implementation of 'green'. Thus, it can be hypothesised that they are trying to acknowledge the transition of 'green' as a social construct and not only a means of performance (Farmer & Guy, 2002).

Consistent with this, research conducted by Rohracher and Ornetzeder (2002) can be credited for emphasising the importance of 'green' buildings within the context that they exist, specifically the socio-technological surroundings. This research used a mixed methods approach by collecting data quantitatively through surveys and qualitatively through semi-structured interviews (Rohracher & Ornetzeder, 2002). The results obtained depicted that researchers can't examine the building in isolation, and have to account for the social context

in which it exists (Rohracher & Ornetzeder, 2002). This context allows for an understanding of how an individual makes sense of the building, develops patterns of use and integrates this into their daily functioning (Rohracher & Ornetzeder, 2002). The main results suggested that for the success of the 'green' building, users needed to be involved in the planning and development of the building and technologies had to be developed in order to account for their needs (Rohracher & Ornetzeder, 2002).

This can be hypothesised to impact on the perceptions that members have of the 'green' building, and the degree to which they accept the building (Rohracher & Ornetzeder, 2002). A limitation in this study was that it was conducted using buildings in Austria, thus the results obtained are specific to that population. The research obtained in the proposed study will be able to investigate factors that are relevant within the South African population that impact on the perceptions of 'green' buildings.

The importance of the qualitative findings can be used to create a more in-depth understanding of the barriers and motivations that guide the successful implementation and outcomes of 'green' buildings. According to Richardson and Lynes (2007), there are numerous barriers that can impact on the intention to construct 'green' buildings, such as the lack of internal leadership within the institution; the failure to recognise sustainable targets; the lack of operational structure that encourages these 'green' building designs, as well as, limited financial and structural means to move towards this initiative. On the other side of the continuum, benefits from going green are that of reduced costs, better indoor working environments that lead to increased productivity, decreased absenteeism, and presenteeism, as well as, lower environmental impacts. It must be noted that all of these barriers and motivations are documented from high level stakeholders within the organisation, with little regard for the perceived 'likes' and 'dislikes' that exist among the employees.

It must be noted that often change is seen as problematic to them, as they take time to adapt and generally seem more comfortable in their original environment (DuBose, Bosch & Pearse, 2007). This could influence their feelings and experiences associated with the whole 'green' move. It is in the nature of humans to be resistant to change, with respect to the green building phenomenon. This resistance can come from factors such as a lack of understanding, and fear of the consequences of moving towards new prospects (DuBose, et al, 2007).

While considerable knowledge has been accrued from examining various literature with respect to the realm of 'green' buildings, it is vital to acknowledge that there are still gaps

that need to be explored to understand the contradictory results that have been portrayed. To strengthen the framework that grounds the phenomenon of green buildings, it is imperative to achieve an in-depth understanding of employee feelings and experiences, to account for any inconsistencies that have been depicted. Thus, the proposed study will perform a subjective analysis to try and find the underlying aspects that can better understand the results explained.

This chapter examined the conditions that surround the 'green' building phenomenon, and how these conditions can have an impact on perceived productivity, well-being, job satisfaction, as well as presenteeism and absenteeism. However, from the mixed results portrayed, it was evident that a deeper analysis would have to be achieved by not only examining the quantitative nature of results but also investigating the context that surrounds the whole concept of 'green' buildings.

2.3. Hypotheses

1) The ‘green’ building increases perceived physical well-being.

2) The ‘green’ building increases psychological well-being.

3) The ‘green’ building increases job satisfaction.

4) The ‘green’ building increases perceived productivity.

CHAPTER THREE
METHOD

The following chapter will be separated into various sections which will explain the different dynamics that were evident within the various methodological considerations of this research. This chapter can be acknowledged as the guiding blueprint that was used in order to direct the research and obtain data in the most feasible manner. The sections will be presented in a sequential manner by creating a mapping of the methodology used, thus the information will be presented in a logical order, namely an explanation of the research design, sample, the instrumentation used (quantitative and qualitative), steps within the procedure (quantitative and qualitative), analysis (quantitative and qualitative), and finally, ethical considerations that had to be established in order to continue with the research.

3.1. Research Design

The research design used was a mixed method approach that incorporated both quantitative and qualitative methods. It has been stated that a mixed methods approach allows for superior research to be obtained through its in depth and detailed methodological style (Johnson & Onwuegbuzie, 2004). This is true as it allows the discovery of patterns to occur (induction); testing of hypotheses (deduction), as well as uncovering the most appropriate understanding of results obtained (abduction) (Johnson & Onwuegbuzie, 2004). This was broken up into the quantitative section which was formulated as a longitudinal, non-experimental, correlational study. Whereas, the qualitative analysis was formulated by means of a thematic content analysis from data obtained from an in depth interview schedule.

There was no control group, no manipulation or random assignment of participants (Rovai, Baker & Ponton, 2012). Manipulation was not present, due to the fact that Nedbank Menlyn Maine already has an existing ‘greenstar’ building, thus the researcher did not manipulate this independent variable. It must also be noted that a control group was not present due to the fact all the employees in the potential sample moved into the new building. A control group could have only been established, if comparisons were made with employees that moved and those that were in a conventional building (control). However, this was not feasible in this research.

The overall study took the form of a non-experimental, longitudinal, correlational design, employing both quantitative and qualitative data gathering and data analysis techniques in the form of a mixed methods study utilising a sequential explanatory strategy. Basically, this method follows a sequence that firstly collects and analyses quantitative data, which is then directly followed by the collection of qualitative data (Creswell, 2003). The qualitative data is specifically collected to help assist in the interpretation and understanding of the quantitative data, and is highly relevant when quantitative data projects results that are unexpected (Creswell, 2003).

3.2. Sample

The sample that was obtained for this study was employees from the Nedbank 'green' building in Menlyn Maine. This is the same population group as that of the archival data that was used for Time 1 and Time 2, thus comparisons can be made between the three time frames. The sample consisted of a combination of employees, who were South African citizens of various demographic statuses. Thus, the empirical sample was obtained by recruiting participants within the Nedbank group, these employees only came from Nedbank Menlyn Maine as this is a five Star Green building. Employees could only be recruited from this branch, as all employees in the region moved to this building, thus they had been exposed to both a conventional building (prior to the move) and the Green Building (after the move).

After matching the three time frames, the researcher obtained samples of differing amounts of employees for the quantitative questionnaires, depending on the quantitative analysis that was used (Matched paired t-tests or repeated measure ANOVAs). A further 9 employees were recruited for in depth interviews. It must be noted that for the repeated measures ANOVA, only 44 employees were matched throughout time 1, time 2 and time 3. Thus, there was a total of 132 observations. The study used a non-probability sample, due to the fact that not every employee had a fair chance of being selected (Stanger, 2011). It fits into the categories of a convenience and quota sample. Convenience sampling was used to allow for a large and heterogeneous sample. This was achieved by sending out approximately 715 emails to accessible employees within the population group of the Menlyn Maine Building.

Ultimately, the quantitative samples were made up of participants between the ages of 21 and 62 years of differing genders, different tenure, in varying departments, holding differing

organisational positions and of different racial groups. The different positions ranged from lower administration staff to higher level senior managers. The following tables depict the sample size and limited dynamics within the quantitative samples, using the demographic information obtained from each employee.

3.2.1. All three time frames: Descriptive Statistics of the sample

Descriptive statistics were generated for the demographic variables obtained from the sample. It must be noted that the total sample for this specific analysis was 44 participants. This was achieved by matching employee numbers from time 1 with that of time 2, and then again, with that of time 3. The average age of participants was 40 years (*SD* = 9.21). The age of participants ranged from 21 to 62 years. The average tenure in the organisation was 9.79 years (S.D=8.75), with a range from 2 to 45 years. Furthermore, additional descriptive statistics for the sample, in the form of gender and racial group are presented in table 2 below:

Table 2: *Descriptive statistics for matched sample (T1, T2 and T3)*

Sample	Frequency	Percentage (%)
All three time frames	**44**	**100**
Gender	44	100
Male	19	43.18
Female	25	56.82
Race	44	100
White	31	70.45
Black	5	11.36
Indian	3	6.82
Coloured	4	9.10
Other	1	2.27
Position	44	100
Admin	17	38.64
Senior Management	6	13.64
Middle Management	14	31.82
Lower Management	6	13.64
Omitted	1	2.27

3.2.2. Time 1 and Time 2: Descriptive Statistics of the sample

Descriptive statistics were generated for the demographic variables obtained from the sample. It must be noted that the total sample for this specific analysis was 108 participants. This was achieved by matching employee numbers from time 1 with that of time 2. The average age of participants was 40 years (*SD* = 9.15). The age of participants ranged from 21 to 62 years. The average tenure in the organisation was 9.79 years (S.D=8.75), with a range from 2 to 45 years. Furthermore, additional descriptive statistics for the sample, in the form of gender and racial group and position are presented in table 3 below:

Table 3: *Descriptive statistics for matched sample (T1 and T2)*

Sample	Frequency	Percentage (%)
Time 1 and Time 2	**108**	**100**
Gender	108	100
Male	45	41.67
Female	63	58.33
Race	108	100
White	67	62.04
Coloured	8	7.41
Indian	7	6.48
African	26	24.07
Other	0	0
Position	108	100
Admin	38	35.19
Senior Management	11	10.19
Middle Management	27	25.00
Lower Management	22	20.37
Omitted	10	9.26

3.2.3. Time 2 and Time 3: Descriptive Statistics of the sample

Descriptive statistics were generated for the demographic variables obtained from the sample. It must be noted that the total sample for this specific analysis was 63 participants. This was achieved by matching employee numbers from time 2 with that of time 3. The average age of participants was 40.26 years (*SD* = 9.51). The age of participants ranged from 21 to 60 years. The average tenure in the organisation was 10.31 years (S.D=8.97), with a range from 2 to 45

years. Furthermore, additional descriptive statistics for the sample, in the form of gender, racial group and position are presented in table 4 below:

Table 4: *Descriptive statistics for matched sample (T2 and T3)*

Sample	Frequency	Percentage (%)
Time 2 and Time 3	**63**	**100**
Gender	63	100
Male	24	38.10
Female	39	61.90
Race	63	100
White	41	65.08
Coloured	5	7.94
Indian	6	9.52
African	9	14.29
Other	2	3.17
Position	63	100
Admin	25	39.68
Senior Management	7	11.11
Middle Management	16	25.40
Lower Management	12	19.05
Omitted	3	4.76

3.2.4. Time 1 and Time 3: Descriptive Statistics of the sample

Descriptive statistics were generated for the demographic variables obtained from the sample. It must be noted that the total sample for this specific analysis was 73 participants. This was achieved by matching employee numbers from time 1 with that of time 3. The average age of participants was 41.61 years (*SD* = 9.12). The age of participants ranged from 21 to 60 years. The average tenure in the organisation was 10.68 years (S.D=8.65), with a range from 2 to 36 years. Furthermore, additional descriptive statistics for the sample, in the form of gender and racial group are presented in table 5 below:

Table 5: *Descriptive statistics for matched sample (T1 and T3)*

Sample	Frequency	Percentage (%)
Time 1 and Time 3	**73**	**100**
Gender	73	100
Male	42	57.53
Female	31	42.47
Race	73	100
White	50	68.49
Coloured	8	10.96
Indian	3	4.11
African	10	13.70
Other	2	2.74
Position	73	100
Admin	27	36.99
Senior Management	8	10.96
Middle Management	16	21.92
Lower Management	15	20.55
Omitted	7	9.59

3.2.5. Qualitative sample

The qualitative sample was made up of participants from various departments, holding differing organisational positions and of different ethnicities. The following table depicts the dynamics within the qualitative sample, using the limited information obtained from each employee.

Table 6: *Information obtained for the qualitative sample*

Participant	Gender	Current Position
Participant 1	Male	Facilities Manager
Participant 2	Female	Secretary
Participant 3	Male	Administrations
Participant 4	Male	Banker
Participant 5	Male	Developer
Participant 6	Female	Administrations
Participant 7	Female	Administrations
Participant 8	Male	Security
Participant 9	Male	Co-ordinator

3.3. Instruments

3.3.1. Quantitative instruments

1) Demographic questions **(See Appendix F)**

   This questionnaire included questions such as age, gender, race, organisational level, tenure, disability, and chronic illnesses (if applicable).

2) Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) **(See Appendix H)**

The WEMWBS' primary purpose is to measure mental well-being by covering aspects associated with subjective well-being and psychological functioning (Stewart-Brown & Janmohamed, 2008). The scale contains 14 items, which are all formatted in a manner that emphasises positive mental health (Stewart-Brown, et al, 2008). Responses for each item are attained by means of a likert type scale ranging from 1 to 5 (i.e. none of the time, rarely, some of the time, often, all of the time). Furthermore these are summed up to a scale score that ranges between 14 and 70 (Stewart-Brown, et al, 2008). Tennant and colleagues (2007) performed a study to validate this new scale. Their results showed good content validity. Furthermore they established a Cronbach alpha of 0.89, depicting a high level of internal consistency (Tennant, Hiller, Fishwick, Platt, Joseph, Weich, Parkinson, Secker & Stewart-Brown, 2007).

3) Sick Building Syndrome (SBS) questions **(See Appendix I)**

This measures physical well-being by means of a combination of 15 questions, which contain responses on a 4-point scale. These responses are set out to establish physical well-being within a time frame of one month. (i.e. never, 1-3 times per month, 1-3 times per week, every day). Hedge et al. (1996) did not comment on the validity and reliability of these scales. However, a similar study conducted by Musa (2013) revealed good internal consistency with a cronbach alpha of 0.93.

4) Perceptions of physical work conditions taken from Hedge et al (1996). **(See Appendix G)**

This is assessed on a 14 item scale. Participants are required to indicate the regularity of negative aspects within their working environment. There are 4 possible responses for the items, and these are established over the previous month (i.e. never, 1-3 times per month, 1-3 times per week and every day). Hedge et al. (1996) did not comment on the reliability or validity of this scale. However, a similar study conducted by Musa (2013) revealed good internal consistency with a cronbach alpha value of 0.84.

5) Job satisfaction single item scale **(See Appendix J)**

Job satisfaction was measured by means of a single item, "Taking everything into consideration how do you feel about your job as a whole?" This was measured on a 5-

point likert scale, ranging from very dissatisfied to very satisfied. Wanous, Reichers, and Hudy (1997) stated in their published article that the single-item of overall job satisfaction correlated highly with that of multiple measures of job satisfaction. Furthermore, Nagy (2002) built on this argument by establishing that single-item measures seem to contain more face validity, and can allow for more flexibility when measuring job satisfaction through more items. It must be noted that single-item measures of job satisfaction have been established to be as reliable as that of multiple-facet item scales (Nagy, 2002). Nagy (2002) established in his study, that even multiple item scales often leave out specific sub-scales that are vital to the understanding of overall job satisfaction. This is important for the proposed study, as job satisfaction was measured using a single item scale.

6) Absenteeism taken from Thatcher and Milner (2012) **(See Appendix J)**
   This was measured using a single item, established as "During the last 12 months, how many days sick leave have you taken?" It would have been beneficial for a more accurate absenteeism rating to get actual absenteeism records from the organisation's personal files, but this was not permitted.

7) Presenteeism taken from Thatcher and Milner (2012) **(See Appendix J)**
   This was assessed by a single item asking "During the last 12 months, how many days did your work despite being ill because you felt you had to?" This rating is a bit problematic, as it is very subjective; however, there is no other way to obtain this data.

8) Perceived productivity taken from Thatcher and Milner (2012) **(See Appendix J)**
   This was assessed on a single item asking "On a scale of 0-100 percent (where 100% is full capacity), rate how well you have been working over the last month in relation to your full capacity."

3.3.2. Qualitative instruments

For the purpose of this study, the qualitative data conveyed a richness of detail that the quantitative data could not obtain (Rogelberg, 2004). It can be acknowledge that the context of the research is a key driver in this particular research process (Rogelberg, 2004). Thus, by interviewing individuals, greater detail was yielded about all the different concepts within the 'green' building (Rogelberg, 2004). The interviews were used as a mechanism to answer questions relating to the effects of the building on individuals; what factors create positive perceptions and what factors contribute to negative attitudes, and how the employees' respond to changes in their building.

The tool that was used to collect qualitative data was that of an interview schedule **(See Appendix K)**. The interview schedule was used to provoke feelings and experiences from employees about the 'green' building that they work in. An example of a question was that of 'What do you believe are the main differences between the green building that you are exposed to every day and that of a conventional building that you have previously been exposed to?"

3.4. Procedure

This research used volunteers from the organisation, Nedbank. This therefore enhanced the study as individuals did not feel obligated or forced to partake in the research (Blanck, Bellack, Rosnow, Rotheram-Borus & Schooler, 1992). The first step in this procedure was to provide a detailed letter to the relevant parties within Nedbank where the sample was extracted from. This letter was in a proposal format, explaining the study, establishing the requirements and the specific objectives. Furthermore, it asked for permission to employ and receive data-bases of their employees for the research. Additionally, it also enquired about the possibility to conduct approximately 10 interviews on the organisational premises with Nedbank employees. The study could only commence once this had been authorised **(See Appendix A for a copy of the authorisation letter).**

Once given the go-ahead, the data was obtained in two stages, with each stage consisting of various levels. Stage one focused on the collection of quantitative data. The quantitative data

was statistically examined by comparing three different time frames. Time frame 1 and 2 consisted of data that was collected prior to this study in January and October 2012. The Time 1 data was before occupants moved into the building and the Time 2 data was approximately 6 months after moving into the building. The researcher had access to this archival data, and merged this with time 3's data that was collected in July 2013.

Time 3 data was collected by sending out approximately 715 emails to Nedbank staff in the North Gauteng region. Furthermore, these were all staff located in the Menlyn Maine falcon building. The email consisted of a participant information sheet, which explained the proposed study, as well as, a hyperlink to the questionnaires that were used to obtain the relevant information **(See Appendix B)**. The questionnaires that were included were that of the biographical questionnaire; Warwick-Edinburgh Mental Well-Being Scale; the Sick Building Syndrome (SBS) questionnaire; Perceptions of physical work conditions taken from Hedge et al; Job satisfaction single item scale; Absenteeism and Presenteeism questions, and Perceived productivity. It must be acknowledged that this process was a replica to the process that was used to obtain data in the other two time frames, thus reducing biases. Once this was accomplished, the researcher waited two and a half weeks for online responses. In this time, reminders were sent out after one week of data collection and again the day before data collection stopped. After the Time 3 data had been collected, the researcher merged Time 3 data with that of the archival data, and the relevant statistics were performed in accordance with the purposes of the proposed study.

The researcher matched Time 1, Time 2 and Time 3 respondents based on valid employee numbers, thus allowing for the relevant statistical comparisons to be performed.

Stage two focused on the interview process. The researcher asked approximately 10 volunteers in the Menlyn Maine Falcon building to participate in a brief interview process to establish their feelings and experiences associated with the Green Building. The researcher with consensus from authorities identified the volunteers by approaching employees within the building and enquiring if they were interested in participating in the research. Prior to the interview, participants were given the participant information sheet **(See Appendix C)**, confidentiality **(See Appendix D)** and permission forms **(See Appendix E)**, and reassured that anything they said would be kept confidential. Once the forms had been signed, the interviews were conducted in a venue arranged prior to the interviews by the researcher and

authority within Nedbank. Once all the interviews were performed, the researcher transcribed these and used thematic content analysis when analysing the data and reporting the findings.

3.5. Analysis

3.5.1) Quantitative Analysis

Once the questionnaires were analysed to check for any discrepancies, missing information, and the matching process had been completed, the researcher used the SPSS statistical package to perform the relevant statistics.

Descriptive statistics were obtained for all the variables under investigation. The statistical procedures of the data consisted of using matched-paired t-tests (e.g. Time 1 to Time 2; Time 2 to Time 3 and Time 1 to Time 3) and repeated measures ANOVAs to analyse whether there were significant differences between levels of job satisfaction, physical and psychological well-being, and productivity for the three time frames. Even though these statistical techniques produce relatively similar results, the researcher wanted to confirm these results. Furthermore, a repeated measures ANOVA is a tighter analysis, thus reducing the influences of extraneous variables. This concluded the proceedings for stage one, allowing the researcher to compile a report on the statistical results obtained.

3.5.2) Qualitative Analysis

The qualitative data obtained from the interviews with participants were examined from a phenomenological perspective, due to the researcher's interest in understanding the unique experiences and feelings of individuals who are present in the 'green building' (Fossey, Harvey, McDermott & Davidson, 2002). This perspective differs from the positivist paradigm from which the quantitative data within the study were analysed. A phenomenological perspective was adopted, as this allowed the researcher to address issues regarding the meaning and understandings that underpin the dynamic concept of 'green buildings' (Fossey, et al, 2002). This method allowed the researcher to explore the significance/insignificance of the quantitative data through the incorporation of individual viewpoints, allowing for the

exploration of aspects associated with the likes, dislikes and challenges faced by employees with respect to the 'green' building.

Furthermore, Thematic content analysis was used to analyse the information within the interviews. This method analyses the interviews in a manner that allows for the identification and reporting of themes within the data (Braun & Clark, 2006). Themes are imperative as they are established to identify specific patterns and trends within the qualitative data that is obtained (Braun, et al, 2006).

3.6. Ethical considerations

It was vital for the proposed study to commence, that the researcher abided by the correct ethical procedures. This is important as ethics are seen as the foundation underpinning psychological research (Kent, 1996). Prior to the collection of data, the researcher applied for ethical clearance from the Human Research Ethics Committee of the School of Human and Community Development of the University of the Witwatersrand. Hence, the researcher was given appropriate approval that was established as a protocol for correct research conduct (Stangor, 2011) **(See attached proposal acceptance).**

It must also be noted that before the study proceeded, the researcher ensured permission from a person in authority at Nedbank to acquire informed consent to use their employees as the representative sample. This informed consent was in the form of a letter establishing the purpose of the study; expected time frame; and the relevant procedures (Stangor, 2011). Furthermore, the hyperlink that contains the questionnaire had a participant information sheet explaining the study to employees as well as informing participants that they can withdraw from the study at any time prior to the submission of the questionnaire, and that confidentiality and anonymity were obtained. Additionally, consent forms with regard to the interviews were sent out establishing permission to be interviewed; permission for recording the interview, and permission to use direct quotations in the report (Stranger, 2011). It must be noted that for all data collection, participation in the study was voluntary and individuals were not disadvantaged if they chose not to participate (Blanck, Bellack, Rosnow, Rotheram-Borus & Schooler, 1992).

Anonymity was ensured when analysing the questionnaires, as employees were merely required to state their employee numbers. The researcher could not identify employees by

these numbers as these were not linked to employee information and were not given to the organisation, and this was used simply as a means for coding, keeping the participants' identities anonymous. This was also achieved by keeping data in an anonymised, password protected file. However, anonymity was not guaranteed in the interview process, thus a strict code of confidentiality was implemented. The researcher respects the volunteers' privacy and no other researcher will be able to use these details without permission from the volunteer himself/herself (Blanck, et al, 1992). Furthermore, the data was only accessible to the researcher and her specified supervisor.

The original recordings and questionnaires were destroyed, while the data is being kept in the form of electronic transcripts. These transcripts after transcription and checking have been kept in a password-protected file, until they are no longer required, which will lead to the destruction of this data. The results are only used for academic purposes and may be published or presented at relevant conferences.

Finally, debriefing is the process where the researcher allows the opportunity for participants to obtain feedback on the appropriate results obtained in the study (Stangor, 2011). Thus, the overall results were sent to Nedbank in a summary report format. Furthermore, the report did not reveal any identifying employee numbers or characteristics. Only group data was reported.

CHAPTER FOUR
RESULTS

The primary aim of this chapter is to document the results obtained from both the quantitative and qualitative data collections. Firstly, the focus will be directed towards the quantitative results by examining aspects associated with the reliabilities and validities of the data produced by the relevant scales; the normality of the data produced; the results obtained from the t-tests conducted when comparing time frames as well as the results that emerged from the repeated measures ANOVAs. The second section will focus on the emergent themes that emerged from the qualitative data in order to formulate a better understanding of the quantitative results obtained.

4.1. Quantitative Results

The results obtained for the following study were that of reliability coefficients, normality tests, paired samples t-tests, and repeated measures ANOVA. Furthermore, descriptive statistics are presented. Headings will be provided to separate the following quantitative analyses.

4.1.1. Time 1 and Time 2: Comparison tables of well- being, productivity, and physical work conditions

Reliabilities

Table 7: *Cronbach's alpha for the three scales*

Variable	N	Time 1	N	Time 2
Warwick-Edinburgh Mental Well-Being Scale (WEMWBS)	14	0.90	14	0.94
Sick Building Syndrome (SBS) questions: Physical well-being	15	0.94	15	0.90
Perceptions of physical work conditions taken from Hedge et al (1996)	14	0.89	14	0.78

The results depicted in table 2 show the internal reliability of the scales used in this study, in respect to Time 1 and Time 2 data. According to the theory of reliability, Cronbach's alpha is used to measure internal reliability in a versatile manner, as it can measure items scored with three or more possible values (Huck, 2009). It must be noted that reliability measures are not presented for productivity, absenteeism, presenteeism, and job satisfaction. The reasoning for this is that all these variables were measured using single item scales.

According to George and Mallery (2003), alpha levels greater than 0.9 show excellent reliability; values greater than 0.8 are seen as good, and values above 0.7 are acceptable. It

can be noted that all of the above reliabilities fit within the excellent, good and acceptable ranges, thus showing good internal reliability.

Normality

All data obtained from the sample were also subjected to a distribution analysis, in order to establish whether the data was normally distributed. Measures of skewness and kurtosis were of particular interest in this regard (Huck, 2009). This was especially important as normality is a pre-requisite for a parametric test. The results of the distribution analyses, in the form of skewness coefficients and kurtosis values were acceptable; however absenteeism, presenteeism, and productivity revealed a number of problematic trends within the data. This was not unforeseen due to the fact that these variables had a large range and were very subjective in nature. The distribution of the Time 1 data was, however, normally distributed for mental well-being (skewness = -0.25; kurtosis = -0.50), physical well-being (skewness = -.76 ; kurtosis = 0.23), physical work conditions (skewness = -0.53; kurtosis = -0.12), and job satisfaction (skewness = -0.85; kurtosis = 0.92). The distribution of Time 2 data was also normally distributed for mental well-being (skewness = -0.17; kurtosis = -0.16), physical well-being (skewness = -0.35 ; kurtosis = 0.78), physical work conditions (skewness = -0.568; kurtosis = -0.13), and job satisfaction (skewness = -0.49; kurtosis = 0.07).

In order to allow for parametric tests to be performed on the productivity and absenteeism data, the square root transformation was used. Due to the fact that this transformation is normally used on positively skewed data, the researcher inverted productivity from a negative distribution to a positive distribution before analysis. This was done by adding the two values (minimum and maximum) for the data and then deducting the original productivity score. Then both productivity and absenteeism were square rooted and a normality analysis was performed. After transformation, the distribution of the Time 1 data was, normally distributed for productivity (skewness = 0.39; kurtosis = -0.07), and absenteeism (skewness = 0.59; kurtosis = 0.08). This was also the case for Time 2 data as well, productivity (skewness = 0.23; kurtosis = -0.44), and absenteeism (skewness = 0.13; kurtosis = -0.63). It must be noted that log transformations, square root transformations and other transformations (Presenteeism\absenteeism) were performed on presenteeism. However, the data was still non-normal, thus, non-parametric Wilcoxon paired t-tests were performed on the original variable that had not been transformed.

Matched pairs t-tests were performed to establish if there were differences in perceived psychological and physical well-being, job satisfaction, productivity, absenteeism, presenteeism, and physical work conditions. The results are depicted in the tables below:

Table 8: *Matched pairs t-tests comparing variables (T1 and T2)*

Variable	Time 1	Time 2	t-statistic	p-value	Sign.
Psychological well-being	3.62	3.51	1.77	0.08	N/S
Physical well-being	3.02	3.12	-1.72	0.09	N/S
Job Satisfaction	3.66	3.43	2.63	0.01	Significant
Productivity (last month)	3.76	3.63	0.41	0.68	N\S
Absenteeism	1.84	1.89	-0.33	0.74	N/S
Presenteeism	18.01	13.24	0.57	0.57	N/S

From the above table, it can be stated that there was no significant difference between perceived psychological well-being, physical well-being, productivity, absenteeism and presenteeism between Time 1 and Time 2. However, significant results were evident within job satisfaction, with p-value<0.05. This result showed a slight decrease in job satisfaction from Time 1 to Time 2. The above table shows the parametric test for presenteeism, when performing the non-parametric Wilcoxon signed rank test, the p-value= 0.61> 0.05. Thus, there was no significant difference. This shows that the parametric and non-parametric tests showed similar results.

Table 9: *Matched pairs t-tests comparing physical work conditions*

	Time 1	Time 2	t-statistic	p-value	Sign.
Temperature too warm	2.65	2.84	-1.55	0.13	N/S
Temperature too cold	2.80	2.63	1.70	0.09	N/S
Lighting too dim	3.67	3.73	-0.81	0.42	N/S
Lighting to bright	3.37	3.58	-1.78	0.08	N/S
Insufficient Ventilation	2.81	3.09	-1.91	0.06	N/S
Too drafty	3.57	3.51	0.62	0.54	N/S
Too little air movement	2.82	3.05	-1.73	0.09	N/S
Air too dry	2.93	3.33	-3.09	0.00	Significant
Air too humid	3.44	3.57	-1.52	0.13	N/S
Distracting ambient noises	2.67	2.55	0.92	0.36	N/S
Unpleasant odour in the air	3.12	2.84	2.27	0.03	Significant
Stale air	3.09	3.35	-2.25	0.03	Significant
Dusty air	3.25	3.64	-3.73	0.00	Significant
Electrostatic shocks	3.45	3.85	-4.99	0.00	Significant

In order to assess the extent to which physical work conditions changed between Time frames 1 and 2, matched paired t-tests were performed. From table 9, it can be established that Time 2 results seemed to yield more positive results than that of Time 1. However, most results showed non-significant outcomes, namely in the variables of temperature, lighting, ventilation, draft, air movement, humidity, as well as, noise levels. Significant results were found when looking at certain physical conditions, whereby the p-values<0.05. From the mean values for the significant results established above, it can be noted that the mean scores were higher in Time 2 than that of Time 1 for the variables: air too dry (2.93<3.33); stale air (3.09<3.35); dusty air (3.25<3.64), and electronic shocks (3.45<3.85). Thus, it can be stated that Time 2 showed an improvement within these variables, showing less dryness, less stale air, less dusty air, and a decrease in electronic waves. Contrary to this, a significant result was also found within the 'unpleasant odour in the air', however this was in the other direction, whereby, Time 1 (3.12) yielded a higher mean than that of Time 2 (2.84). This means that odours were more unpleasant at Time 2.

4.1.2. Time 2 and Time 3: Comparison tables of well- being, productivity, and physical work conditions

Reliabilities

Table 10: *Cronbach's alpha for the three scales*

Variable	N	Time 2	N	Time 3
Psychological well-being	14	0.93	14	0.94
Physical well-being	15	0.92	15	0.92
Physical work conditions	14	0.78	14	0.81

The results depicted in table 6 show the internal reliability of the scales used in this study, with respect to Time 2 and Time 3 data. Again, it must be noted that reliability measures are not presented for productivity, absenteeism, presenteeism, and job satisfaction. The reasoning for this is that all these variables were measured using single item scales. It can be noted that all of the above reliabilities fit within the excellent and good ranges, thus showing good internal reliability.

Normality

As performed in the last analyses, skewness and kurtosis were of particular interest for the following analyses, as normality has to be present when performing parametric tests (Huck, 2009). The results of the distribution analyses, in the form of skewness coefficients and kurtosis values were acceptable; however absenteeism, presenteeism, and productivity revealed a number of problematic trends within the data. Again, this was not unforeseen due to the fact that these variables had a large range and were very subjective in nature. The distribution of the Time 2 data was, however, normally distributed for mental well-being (skewness = -0.31; kurtosis = -0.33), physical well-being (skewness = -.33 ; kurtosis = -1.07), physical work conditions (skewness = -0.31; kurtosis = -0.88), and job satisfaction (skewness = -0.66; kurtosis = 0.30). The distribution of Time 3 data was also normally distributed for mental well-being (skewness = -0.54; kurtosis = -0.04), physical well-being (skewness = -0.47; kurtosis = -0.60), and physical work conditions (skewness = -0.57; kurtosis = -0.56). Job satisfaction in this case was also outside of the acceptable range.

In order to allow for parametric tests to be performed on the job satisfaction, productivity, and absenteeism data, the same transformation processes were used as explained in the previous normality analyses. After transformation, the distribution of the Time 2 data was, normally distributed for job satisfaction (skewness = 0.45 ; kurtosis = 0.69), productivity (skewness = 0.20 ; kurtosis =-0.43), and absenteeism (skewness = 0.38 ; kurtosis = -0.13). This was also the case for Time 3 data as well, job satisfaction (skewness = 0.79 ; kurtosis = 1.02), productivity (skewness = 0.12 ; kurtosis = -0.35), and absenteeism (skewness = 0.80 ; kurtosis = 0.93). It must be noted that transformations were performed on both presenteeism scores, however, the data was still non-normal, thus, non-parametric tests were performed.

Table 11: *Matched pairs t-tests comparing variables (T2 and T3)*

Variable	Time 2	Time 3	t-statistic	P-value	Sign.
Psychological well-being	3.57	3.54	0.44	0.66	N/S
Physical well-being	3.10	2.99	2.21	0.03	Significant
Job Satisfaction	1.56	1.54	0.81	0.42	N/S
Productivity (last month)	3.61	3.93	-0.79	0.43	N/S
Absenteeism	1.79	1.77	0.13	0.90	N/S
Presenteeism	15.78	17.76	-1.06	0.29	N/S

From the above table, it can be stated that there was no significant difference between perceived psychological well-being, job satisfaction, productivity, absenteeism and presenteeism between Time 2 and Time 3. However, contrary to research, significant results were evident within physical well-being, with p-value<0.05. This result showed a slight decrease in physical well-being from Time 2 to Time 3. The above table shows the parametric test for presenteeism, when performing the non-parametric Wilcoxon signed rank test, the p-value= 0.32> 0.05. Thus, there was no significant difference. This shows that the parametric and non-parametric tests showed similar results.

Table 12: *Matched pairs t-tests comparing physical work conditions*

	Time 2	Time 3	t-statistic	P-value	Sign.
Temperature too warm	2.71	2.75	-0.29	0.77	N/S
Temperature too cold	2.68	2.73	-0.40	0.69	N/S
Lighting too dim	3.68	3.59	0.90	0.37	N/S
Lighting to bright	3.46	3.44	0.14	0.89	N/S
Insufficient Ventilation	3.05	3.02	0.23	0.82	N/S
Too drafty	3.52	3.44	0.70	0.49	N/S
Too little air movement	2.97	2.95	0.10	0.92	N/S
Air too dry	3.27	3.03	1.65	0.10	N/S
Air too humid	3.60	3.65	-0.40	0.69	N/S
Distracting ambient noises	2.51	2.76	-1.66	0.10	N/S
Unpleasant odour in the air	2.84	2.60	1.56	0.13	N/S
Stale air	3.40	3.16	2.12	0.04	Significant
Dusty air	3.68	3.40	2.61	0.01	Significant
Electrostatic shocks	3.78	3.51	2.38	0.02	Significant

In order to assess the extent to which physical work conditions changed between Time frames 2 and 3, matched paired t-tests were performed. From the above table, it can be established that the mean scores for most of the variables seemed to vary slightly, showing no overt positive effect between the two time frames. Thus, it was not surprising that most results were non-significant, namely temperature, lighting, ventilation, draft, air movement, dryness, humidity, noises, and unpleasant odours. Significant results were found when looking at certain physical conditions, whereby the p-values<0.05. From the mean values for the significant results established above, it can be noted that the mean scores were higher in Time 2 than that of Time 3. These results were surprising as research shows improvements in physical conditions, within the 'green' building. These results showed air to be more stale (3.40>3.16); air to be more dusty (3.68>3.40), and an increase in electronic shocks (3.78>3.51) from Time 1 to Time 2.

4.1.3. Time 1 and Time 3: Comparison tables of well- being, productivity, and physical work conditions

Reliabilities

Table 13: *Cronbach's alpha for the three scales*

Variable	N	Time 1	N	Time 3
Psychological well-being	14	0.90	14	0.95
Physical well-being	15	0.94	15	0.93
Physical work conditions	14	0.86	14	0.83

The results depicted in table 10 show the internal reliability of the scales used in this study, with respect to Time 2 and Time 3 data. Again, it must be noted that reliability measures are not presented for productivity, absenteeism, presenteism, and job satisfaction. The reasoning for this is that all these variables were measured using single item scales. It can be noted that all of the above reliabilities fit within the excellent and good ranges, thus showing good internal reliability.

Normality

According to the central limit theorem a sample that consists of more than 30 participants is considered normal. However, to achieve a more reliable measure, skewness and kurtosis was performed in order to check for normality. The results of the distribution analyses, in the form of skewness coefficients and kurtosis values were acceptable; however absenteeism, presenteeism, and productivity revealed a number of problematic trends within the data. As stated before, this was not unforeseen due to the fact that these variables had a large range and were very subjective in nature. The distribution of the Time 1 data was, however, normally distributed for mental well-being (skewness = -0.70; kurtosis = -0.20), physical well-being (skewness = -.57; kurtosis = -0.44), physical work conditions (skewness = -0.46; kurtosis = -0.61), and job satisfaction (skewness = -0.89; kurtosis = 0.74). The distribution of Time 3 data was also normally distributed for mental well-being (skewness = -0.73; kurtosis = 0.39), physical well-being (skewness = -0.68 ; kurtosis = -0.07), physical work conditions (skewness = -0.85; kurtosis = -0.13) and job satisfaction (skewness = -0.95; kurtosis = 0.90

In order to allow for parametric tests to be performed on the productivity, presenteeism and absenteeism data, the same transformation processes were used as the prior normality testing. However, after transformation, the distribution of the Time 1 data was, normally distributed for productivity (skewness = 0.25 ; kurtosis = -0.10) and absenteeism (skewness= 0.68; kurtosis= -0.06. This was also the case for Time 3, productivity (skewness = 0.18 ; kurtosis = -0.17) and absenteeism= (skewness= 0.41; kurtosis= -0.36). It must be noted that transformations were performed on both presenteeism scores, however, the data was still non-normal, thus, non-parametric tests were performed.

Table 14: *Matched pairs t-tests comparing variables*

Variable	Time 1	Time 3	t-statistic	p-value	Sign.
Psychological well-being	3.65	3.58	0.84	0.40	N/S
Physical well-being	3.01	3.03	-0.02	0.98	N/S
Job Satisfaction	3.68	3.54	1.42	0.16	N/S
Productivity (last month)	3.77	4.58	-2.26	0.03	Significant
Absenteeism	1.67	1.80	-0.55	0.59	N/S
Presenteeism	21.15	17.22	1.66	0.10	N/S

From the above table, it can be stated that there was no significant difference between perceived psychological well-being, perceived physical well-being, and job satisfaction between Time 2 and Time 3, with p-value>0.05. However, there was a significant difference within productivity (0.03<0.05). Showing that Time 3 productivity was much higher than Time 1. The above table shows the parametric test for presenteeism, when performing the non-parametric Wilcoxon signed rank test, the p-value= 0.49> 0.05. Thus, there was no significant difference. This shows that the parametric and non-parametric tests showed relatively results.

Table 15: *Matched pairs t-tests comparing physical work conditions*

	Time 1	Time 3	t-statistic	p-value	Sign.
Temperature too warm	2.56	2.52	0.28	0.78	N/S
Temperature too cold	2.83	2.93	-0.72	0.47	N/S
Lighting too dim	3.48	3.75	-1.96	0.05	N/S
Lighting to bright	3.36	3.45	-0.72	0.47	N/S
Insufficient Ventilation	2.75	3.04	-1.76	0.08	N/S
Too drafty	3.47	3.57	-0.87	0.39	N/S
Too little air movement	2.74	2.94	-1.48	0.14	N/S
Air too dry	2.82	3.18	-2.60	0.01	Significant
Air too humid	3.33	3.58	-2.24	0.03	Significant
Distracting ambient noises	2.58	2.74	-0.95	0.35	N/S
Unpleasant odour in the air	2.93	2.58	2.18	0.03	Significant
Stale air	2.95	3.23	-2.26	0.03	Significant
Dusty air	3.04	3.44	-3.46	0.00	Significant
Electrostatic shocks	3.41	3.52	-1.09	0.28	N/S

In order to assess the extent to which physical work conditions changed overall from Time 1 to Time 3, matched paired t-tests were performed. From examining the means in the above table, it can be established that Time 3 results yielded more positive outcomes than that of Time 1. However, again, most results were non-significant, namely temperature, lighting, ventilation, draft, air movement, noises, and electronic shocks. Significant results were found when looking at certain physical conditions, whereby the p-values<0.05. From the mean values for the significant results established above, it can be noted that the mean scores were higher in Time 3 than that of Time 1. Thus, these results depicted improved conditions in Time 3. These results showed air to be less dry (2.82<3.18); air to be less humid (3.33<3.58); air to be less stale (2.95<3.23), and air to be less dusty (3.04<3.44). However, again, the unpleasant odours seemed to increase from Time 1 to Time 3 (2.93>2.58).

4.1.4. Repeated-measures ANOVA analysis (Time 1, Time 2 and Time 3)

Repeated measures ANOVAs were performed after the matched-pairs t-tests. Even though the results were expected to yield the same degree of significance, the repeated measures ANOVA was used in order to confirm the above results with a tighter measure. It must be noted that when performing a repeated measures ANOVA, a significant amount of data is lost when matching the three different time frames. This can be portrayed as the sample decreased to approximately 44 participants.

Reliability

Table 16: *Cronbach's alpha for the three scales*

Variable	N	Time 1	N	Time 2	N	Time 3
Psychological well being	14	0.89	14	0.94	14	0.93
Physical well-being	15	0.93	15	0.93	15	0.93
physical work conditions	14	0.86	14	0.82	14	0.83

The results depicted in table 14 show the internal reliability of the scales used in this study, in respect to Time 1, Time 2 and Time 3 data. It must be noted that reliability measures are not presented for productivity, absenteeism, presenteeism, and job satisfaction. The reasoning for this, is that all these variables were measured using single item scales. These values all show high levels of internal reliability. Thus, it can be noted that all of the above reliabilities fit within the excellent, and good ranges, thus showing good internal reliability.

Normality

Skewness and kurtosis was performed in order to check for normality. The results of the distribution analyses, in the form of skewness coefficients and kurtosis values were acceptable; however absenteeism, presenteeism, and productivity revealed a number of problematic trends within the data. As stated before, this was not unforeseen due to the fact that these variables had a large range and were very subjective in nature. Psychological well-

being, physical well-being, job satisfaction, and physical work conditions were all in the skewness and kurtosis range of (1.00>x>-1.00), thus the data was deemed normal.

In order to allow for parametric tests to be performed on the productivity, absenteeism and presenteeism, the square root transformation was used. This transformation is the same technique used in the t-test normality analyses. After transformation, both productivity and absenteeism were normally distributed and thus ready for parametric testing. However, a repeated-measures ANOVA could not be performed on presenteeism as the data was not transformable. Hence, the matched paired t-test non-parametric test was the only analysis for this variable.

4.1.4.1 Repeated measures ANOVA results for psychological well-being

Table 17: *Descriptive Statistics for psychological well-being between Times*

	N	Mean	Standard Dev.
Time 1	44	3.72	0.58
Time 2	44	3.62	0.69
Time 3	44	3.57	0.67

From the above table, it can be established that the psychological well-being means are relatively similar between the time frames, thus showing no overt difference between the times. However, it is surprising to note, that it seems like the mean psychological well-being decreased from Time 1 (3.72) to Time 2 (3.62), and then again in Time 3 (3.57).

Next was to test for the assumption of sphericity, which is important when performing a repeated measure ANOVA. The measure that was examined was that of the Mauchly's test of Sphericity. The result depicted a value of 0.96 for Mauchly's W (χ^2 = 1.54, p= 0.46) > 0.05 for the overall Time frames, suggesting that the assumption of Sphericity has been met.

Table 18: *Tests of Within-Subjects Effects*

Source	Type III Sum of Squares	Degree of freedom	MS	F	Sig.
Sphericity Assumed	0.49	2	0.25	1.18	0.31

The Sphericity Assumed Row in the above table contains a p-value of 0.31 which exceeds that of $\alpha = 0.05$. Thus, there was a non-significant effect indicating that psychological well-being does not change over Time, F(2)=1.18, p=0.31.

It must be noted that Post-hoc tests were not performed as the above results depicted that there were no differences between any time frames.

4.1.4.2 Repeated measures ANOVA results for physical well-being

Table 19: *Descriptive Statistics for physical well-being between Times*

	N	Mean	Standard Dev.
Time 1	44	2.99	0.69
Time 2	44	3.13	0.64
Time 3	44	3.00	0.65

From the above table, it can be established that the physical well-being means are relatively similar between the time frames, thus showing no overt difference between the times. However, from the means it can be established that physical well-being increased from Time 1 (2.99) to Time 2 (3.13), and decreased to Time 3 (3.00).

The result for sphericity depicted a value of 0.911 for Mauchly's W (χ^2 = 3.90, p= 0.14) > 0.05 for the overall Time frames, suggesting that the assumption of Sphericity has been met.

Table 20: *Tests of Within-Subjects Effects*

Source	Type III Sum of Squares	Degree of freedom	MS	F	Sig.
Sphericity Assumed	0.52	2	0.26	2.15	0.12

The Sphericity Assumed Row in the above table contains a p-value of 0.12 which exceeds that of $\alpha = 0.05$. Thus, there was a non-significant effect indicating that physical well-being does not change over Time, F(2)=2.15, p=0.12.

4.1.4.3 Repeated measures ANOVA results for physical conditions

Table 21: *Descriptive Statistics for physical conditions between Times*

	N	Mean	Standard Dev.
Time 1	44	3.02	0.65
Time 2	44	3.19	0.55
Time 3	44	3.24	0.57

From the above table, it can be established that the physical conditions means are relatively similar between the time frames. However, from the means it can be established that physical conditions steadily increased from Time 1 (3.02) to Time 2 (3.19), and then again, to Time 3 (3.24). Hence, showing an improvement in physical conditions of the 'green' building.

The Sphericity Assumed Row in the above table contains a p-value of 0.95 for Mauchly's W (χ^2 = 1.90, p= 0.39) > 0.05 for the overall Time frames, suggesting that the assumption of Sphericity has been met.

Table 22: *Tests of Within-Subjects Effects*

Source	Type III Sum of Squares	Degree of freedom	MS	F	Sig.
Sphericity Assumed	1.18	2	0.59	4.04	0.02

The p-value of 0.02 is less than that of $\alpha = 0.05$. Thus, there was a significant effect indicating that physical conditions did change over Time, F(2)=4.04, p=0.02.

It must be noted that Post-hoc tests were performed as the above results depicted that there were differences between time frames. Thus, it was beneficial to find out which Time frames were significantly different to one another. According to the pairwise Post Hoc comparisons, Time 1 and Time 3 were significantly different (p=0.048<0.05). Thus, by examining the means, it can be established that there was an improvement in physical conditions from Time 1 to Time 3.

4.1.4.4 Repeated measures ANOVA results for job satisfaction

Table 23: *Descriptive Statistics for job satisfaction between Times*

	N	Mean	Standard Dev.
Time 1	44	3.75	1.01
Time 2	44	3.50	1.02
Time 3	44	3.55	1.07

From the above table, it can be established that the job satisfaction means are relatively similar between the time frames, thus showing no overt difference between the times. However, from the means it can be established that job satisfaction decreased from Time 1 (3.75) to Time 2 (3.50), and then increased from Time 2 (3.50) to Time 3 (3.55).

The result for sphericity depicted a value of 0.983 for Mauchly's W (χ^2 = 0.74, p= 0.69) > 0.05 for the overall Time frames, suggesting that the assumption of Sphericity has been met.

Table 24: *Tests of Within-Subjects Effects*

Source	Type III Sum of Squares	Degree of freedom	MS	F	Sig.
Sphericity Assumed	1.56	2	0.78	1.99	0.14

The Sphericity Assumed Row in the above table contains a p-value of 0.14 which exceeds that of $\alpha = 0.05$. Thus, there was a non-significant effect indicating that job satisfaction does not change over Time, F(2)=1.99, p=0.14.

4.1.4.5 Repeated measures ANOVA results for perceived productivity

Table 25: *Descriptive Statistics for perceived productivity between Times*

	N	Mean	Standard Dev.
Time 1	44	3.58	2.56
Time 2	44	3.30	2.45
Time 3	44	4.11	2.46

From the above table, it can be established that the perceived productivity means seem to vary between the time frames, thus showing an overt difference between the times.

The result for sphericity depicted a value of 0.997 for Mauchly's W (χ^2 = 0.10, p= 0.95) > 0.05 for the overall Time frames, suggesting that the assumption of Sphericity has been met.

Table 26: *Tests of Within-Subjects Effects*

Source	Type III Sum of Squares	Degree of freedom	MS	F	Sig.
Sphericity Assumed	14.74	2	7.37	1.45	0.24

The Sphericity Assumed Row in the above table contains a p-value of 0.24 which exceeds that of α = 0.05. Thus, there was a non-significant effect indicating that perceived productivity does not change over Time, F(2)=1.45, p=0.24.

4.1.4.5 Repeated measures ANOVA results for absenteeism

Table 27: *Descriptive Statistics for absenteeism between Times*

	N	Mean	Standard Dev.
Time 1	44	1.68	1.33
Time 2	44	1.60	1.34
Time 3	44	1.67	1.41

From the above table, it can be established that the absenteeism means seem to vary between the time frames, however, this variation was relatively small.

The result for sphericity depicted a value of 0.86 for Mauchly's W (χ^2 = 6.14, p= 0.046) > 0.05 for the overall Time frames, suggesting that the assumption of Sphericity has not been met.

Table 28: *Tests of Within-Subjects Effects*

Source	Type III Sum of Squares	Degree of freedom	MS	F	Sig.
Greenhouse Geisser	0.18	1.76	0.10	0.08	0.90

Due to the fact that Sphericity was not met, the Greenhouse Geisser value in the above table was analysed. The p-value of 0.904 exceeds that of α = 0.05. Thus, there was a non-significant effect indicating that absenteeism does not change over Time, F(2)=0.08, p=0.90.

4.2.Qualitative Findings

Interviews were conducted with volunteers within the Nedbank Menlyn Maine building, who were willing to participate in the proposed study. The interviews were approximately 20 to 25 minutes long. The primary aim of this qualitative part of the research was to develop an understanding of the likes, dislikes, problems, and experiences of members who are exposed to this building on a daily basis. This part of the research is vital in order to understand the contradictory results that were obtained from the actual practical data collection, and that of literature that is based on theoretical foundations. Thus, the researcher conducted in depth interviews in order to achieve a deeper understanding of the dynamics and complexities that lie beneath the 'positive aura' that surrounds the phenomenon of 'green' buildings.

It can be noted that the thematic context analysis revealed a number of underlying themes in the qualitative data which was derived from the interviews. These themes can be established as factors that could have an impact on how people perceive their well-being, perceive their productivity, and feel about their job in general. The themes are presented in the table below, and further discussed within this chapter.

Table 29: *Emerging qualitative themes*

Themes	**Brief Description**
4.2.1 Legitimacy of the concept of 'green' buildings	Feelings around the whole concept of 'green'
4.2.2. Education	Illiteracy and knowledge
4.2.3. Change and Resistance	Problems around change
4.2.4. Office Design likes and dislikes	• Open plan office • Recycling station • Ventilation • Water facilities
4.2.5. Impacts on an unconscious level	Participants struggled to identify effects of the 'green' building on a conscious level
4.2.6. Teething problems	Issues present in the beginning and their impacts
4.2.7. Passion for the 'green' culture	Are employees passionate?
4.2.8. Health Effects	Do employees feel healthier?

4.2.1. The Legitimacy of the concept of 'green' buildings

On the whole, all the participants interviewed felt that the phenomenon of going 'green' with respect to erecting 'green' buildings was legitimate and justifiable. This was evident in the responses that were obtained, showing that most participants emphasised the importance of saving resources for future generations, and looking after our natural environment. As one participant stated, "*For those who haven't made a change, have to make a change very quickly as it definitely does have an impact on the environment, I mean with the advent of all the buildings that we have or developments, there are a lot of hard surfaces that have been created, and need to be rectified"* (Participant 1). Similarly, another participant stated that *"By going green and going towards sustainability, they are allowing us to have resources for a longer period of time; they are preserving what we need for future use. By looking after the environment, we will have more to work with in the future" (Participant 7).*

It was also depicted among a few participants that the legitimacy was afforded by the overall

perceptions inflicted by society. As one participant stated, *"It is good, I mean, the whole media is talking about sustainability and the importance of green. I see it all the time in the newspapers and on the television, it is huge"* (Participant 1). This was supported by another participant who stated that, *'Green is the way to go, as a business we need to move with the demands imposed on us by society as a whole, um, and sustain for their future'.* (Participant 5). From this, it can be acknowledged that societal beliefs impact greatly on perceptions that people have about certain concepts, such as the concept of 'going green'.

Furthermore, most participants emphasised that the legitimacy of the 'green' building phenomenon was inherent within the reasoning behind adopting the 'green mind set'. Participant 6 explained, ", *I definitely think that it is logical, however it is only logical when the 'sustainability' is done for the right reasons."* Thus, indicating the important role which moral reasoning plays within perpetuating the practice of green. Consistent with this, one participant explained, *"If Organisations are using this as a 'profit' driver, with no actual care for the environment or the employees, then I want out"* (Participant 7). From this, it can be depicted that the motivational forces behind going 'green' can impact on the perceptions and experiences held by employees. This specific employee emphasised that the intention to stay in the organization was dependent on the fairness and justice that existed in the reasoning for going green.

While most participants only portrayed positive beliefs about sustainability and green buildings, others did show some scepticism when referring to certain aspects. As one participant stated, *"There are a lot of complaints but it has to be done"* (Participant 2). Another participant highlighted the legitimacy, however emphasising that it has to be implemented correctly, *"So, it is very logical and legitimate, however it has to be implemented by people that believe in it"* (Participant 3). Furthermore, it was also established that certain features within the 'green' building don't work, hence they are not contributing to the whole 'green' concept, *"Some things aren't to me efficient and hence forth don't actually make it a green building"* (Participant 5). Some examples of aspects that were seen as inefficient were the green wall in front of the building as well as the ventilation and water systems implemented.

Finally, it was revealed within the interviews, that people believe that for 'green' buildings to be legitimate it needs to perpetrate throughout the entire community. This means that

members within Nedbank Menlyn Maine believed that the erection of one 'green' building is not contributing to wider good, unless it is aligned with the erection of many 'green' buildings. Thus, emphasising the importance of a collaborative effect. As stated by participant 9:

"Well it is the way of the future, I think that all buildings should be green and sustainable, but, there are too many of them that are not, so in this case I don't know how efficient the impact of green actually is. I don't even know if they are intending on going green or what. You must understand that for the environment to become sustained, it has to have many people making a difference, so there needs to be more organisations taking on this green initiative, not just Nedbank and a few others".

4.2.2.Education

The majority of the participants who were interviewed admitted that being exposed to the 'green' building increased their knowledge of this phenomenon. Many, however, felt that a lot of their colleagues didn't understand the dynamics of the 'green' building, and thus didn't benefit from the whole experience. Furthermore, one participant disclosed that he had no idea what the 'green' building actually was (Participant 8). This is a very important theme, as if employees are not aware of the benefits of the actual initiative; they might only be exposed to the problems.

When participants were asked what they believed the main problems were with implementing a 'green' building, most the answers emphasised lack of education. This was summed up in an extract from one of the participants:

"What is that saying, 'Rome was not built in a day'- it is a lengthy process, and we are still developing and learning every day. I also believe that people need to be educated, many of the staff members here, couldn't care less about green, they don't even know that this building is green" (Participant 7).

This was further supported by participant 5 who emphasised this problem in the statement *"Again, the disarray of education around; it is multilevel challenges at every single level"* (Participant 5). Furthermore, it was established by one of the higher level participants that

due to the lack of literacy and knowledge about the 'green' building, employees don't see that certain minor issues are evident in order to reduce huge problems. As participant 1 stated *"They come to me and say I can't work because it smells bad, but they don't understand that that slight smell is the natural, fresh air that benefits them- so they are disappointed because they don't know what green is".*

On the other side of the spectrum, certain participants believed that by going 'green', they were exposed to an environment that was deductive to new knowledge and a better working environment. As participant 5 stated *"The strengths that I actually see within the green effect is that it is educational, it is there to educate the greater public"* (Participant 5). This was supported by another participant, who stated, *"I feel like I have been provided with new knowledge on green and sustainability, in a funny way, it makes me want to do better in my job"* (Participant 7). This can be vital within this study, as members who are connecting with the culture of 'green' feel more attached and satisfied with their job.

It was also acknowledged that people are prepared to become a part of the 'knowledge' and they want to be involved with this phenomenon. As this participant stated *"I know I said I don't know much about the green thing, but I think I can learn, like I have learnt all other things. This building is a direction for me"* (Participant 8).

Under the umbrella term of education, it can also be noted that participants also liked the fact that they could educate their children about the 'green' phenomenon, and also carry out this concept at home. As a participant stated, *"Even at home, we are doing more recycling of paper, so I have become more conscious of green and sustainability, definitely"* (Participant 3). This was supported by participant 9 in his statement, *"I realise that hey, I can't do that as it is not sustainable, wait I can't do that as it is not sustainable. It has an effect on you"* However, contrary to these general findings, some participants believed that 'green' was left at work, this was supported in this statement, "*It is a person's way of life, and way of living, so I don't believe that a person does change their home life accordingly, unless you really are so 'green' or are so concerned with your environment. Basically to me, when I leave work, I leave the green building and sustainability behind."*

4.2.3. Change and resistance

It must be noted that both change and resistance were themes that were evident throughout the interviews that were conducted. Participants emphasised change and resistance in their own capacity, and also that of their fellow colleagues. This is not a surprising theme, as previous research has established that change can be recognised as both a personal and emotional issue that is very difficult for an employee, especially when it involves a change in the working environment (Laframboise, Nelson, & Schmaltz, 2003). This change often leads directly to resistance, which can impact significantly on organisational outcomes, as well as, employees' feelings and experiences (Laframboise, et al, 2003). It must be emphasised that every participant spoke of change in one form or another.

It was acknowledged that going 'green' is a relatively new emergence within society, and thus this change is characterised by resistance and problems. Individuals use this change as a defence mechanism, by establishing it as the reason for all their problems. One participant summed up the issue of change and resistance in a very informative manner:

"Especially since Nedbank is one of the first organisations to take this leap, we are experiencing new problems that haven't yet been dealt with. A lot of things go wrong, and we need to sort it out, but in the process of sorting it out, all the employees go: we knew this was bad and like in human nature, they have to blame something, so they blame the building" (Participant 9).

It was depicted by many of the participants that the change was not only about moving to a new building, but there were also changes present at an emotional level. As stated by one participant "*I think that the big thing is that people are sort of scared in our field. Your threshold changes"*(Participant 1). This was supported by another participant, who explained, *"It is like a whole new mindset and it isn't so easy to adapt. The main aim is to make everyone comfortable, as a lot of people are complaining and trying to get used to it"* (Participant 2). It was also stated by participant 1 that things were now changing within the hierarchical structure, as offices are now designed in a manner that breaks down the hierarchical structure, and seats employees in order of function, *"Just take me, where I was sitting before, I was the top manager, I had my own office, and now I don't have my own office as we have changed function, it is not for seniority-the guys don't like this"*

Within the theme of change, it was acknowledged that employees also feel that *"one change leads to another, which leads to another."* (Participant 3). Many of the other changes that were noted were ones that were characterised by negative experiences and feelings. Participant 5 stated, *"It is about changing not only your employees but changing your culture to align it with this new 'emergence' if you want to call it that "* Another participant claimed, *"We were also worried that the move would lead to retrenchments and things, this didn't happen though"* (Participant 7).

Resistance was a central theme; this seemed to be more prominent at the beginning of the move. Thus, resistance could have contributed to a decrease in positive perceptions of the building within the first few months of observations. One of the participants also noted that he was so against the change in the beginning that he just wanted to revert back to his original job and working environment, *"You know, it came to my mind that one day, I said that I am going to run back to Sandton [laughs]. But it was a long run"* (Participant 8). As participant 7 stated *"There is always resistance from employees, and it is hard to make them happy"* Furthermore, these negative perceptions often carry over to how employees see their work, as depicted by one employee, *"To me, the green building hasn't really done anything to my working experience. It maybe has had a bit of an opposite effect, because I am still adapting to all these new changes that we have had here"* (Participant 6).

Contrary to these general findings, some people established that they weren't resistant to the change, but they rather saw it as an opportunity to progress. Nonetheless, they all noted that their feelings were not shared with their fellow colleagues. As one participant stated, "*I didn't really have to change much or adapt to anything really. I did see a bit of resistance from the other employees around me, but I believe this is an opportunity to prosper"* This was supported by a higher level employee, who stated *"I like the change and believe it contributes to so many benefits, such as a healthier and happier environment, but, people will kick against anything, even if it is good for them*" (Participant 1).

Participants also noted that this change did not only come from the move but also from the processes within the organisation. Some participants believed that they were being watched, and monitored all the time. *"It is in a way like we are under supervision, ya I saw you do that, you must do this [She laughs]"* (Participant 2). This was supported by another

participant, *"So you are constantly reminded wherever you walk in the building that you are part of this set-up"* (Participant 3). It was established that the adaptation process was difficult, due to the fact that employees had never been exposed to a 'green' building before-things needed to change quickly. Participant 2 stated *"We also need to be corrected all the time, as I remember the one time we got told, you want to be green but you are offering people water in plastic all the time, instead of in glass jars, you know".* Furthermore, employees have their own scorecards, whereby, *"They give you 5% for each green task you do, and they give you a percentage for contribution - this does make us a bit nervous" (Participant 2).*

4.2.4. Office Design Likes and Dislikes

A variety of perspectives were presented by participants with regard to the actual design of the building. Some participants seemed to believe that the building was a much better place to work in, and described it as *"Much bigger and brighter"* (Participant 1). Whereas, another participant believed that the design of the building was not satisfactory, and actually stated that *"The move to this building was just an inconvenience at first to me"* (Participant 7). It must be noted that the feelings and experiences depicted about the building design seemed to be linked to corresponding emotions or task efficiency.

An important aspect that was highlighted in this theme was that of the actual practicalities of the 'green' design in itself. It can be hypothesised from the findings that the facility managers battle to perform their jobs efficiently due to the problems that they are exposed to on a daily basis with respect to the 'green' building, such as the office design, recycling stations, ventilation systems, and water facilities. Whereas, there is the perception that 'green' should enhance their working experience, it seems that there are aspects that are burdening them. As one participant stated:

"I think that engineers are brilliant in designing stuff, but they have to be practical, and put that in there when designing green buildings. It is all in the design but is green actually practical? At the end of the day, the designs are perfect but then you get twits like us that have to deal with the practical side of things, see if everything is grafting" (Participant 9).

Below are sub-headings that fit within the umbrella term of office design:

4.2.4.1. Open plan office

The design of the Nedbank building was established as *"90% of your office space is open plan, 10% being cellular space, which will be private"* (Participant 1). This seemed to impact people differently according to their individual differences. The general findings showed that some people like openness and exposure to others, whereas, other people don't like working in an open environment with noise. This was captured by one participant claiming *"Spacing is excellent"* (Participant 4), however, he also stated that, *"The only problem is that it is a bit hard inside, as if people get a bit talkative, the noise is enhanced and it is quite hard to concentrate*". This second statement was in accordance with participant 2, who noted *"It feels like we lack privacy- this impacts on my way of working"* (Participant 2). The two extracts below show contradictory perspectives on this:

"I must say that the building has a lot more noise, especially upstairs. You have to actually learn how to switch off and that took a while, it is very noisy, and that gets to me. I don't know if that would be a psychological thing, but I get irritated a lot quicker and tired out". (Participant 6).

"Well, the building in itself is much bigger and spacey, which is nice, you feel more 'free' in a sense. The features are also quite nice and we have a nice canteen here. In terms of the actual 'green' aspects, there is good air flow, it is open, not stuffy and just having that space helps work go easier" (Participant 7).

4.2.4.2. Recycling station

Another aspect of the design that was emphasised by most of the participants was that of the recycle bins that were situated within a centralised position within the levels of the building. There were contrary views expressed by participants about this concept, some showing an appreciation of the sustainable system, whereas, others believed that this was just an inconvenience. This seemed to be a challenge facing the facility managers of the green building- *"From a South African mentality perspective- I want a thing by my desk. So you have to fight against this in terms of change management*". This was further supported by a participant who stated, *"They have got these recycle bins in a lot of places, but not every section, so you have to get up to throw away waste- which I believe takes away a bit of time in my day"* (Participant 5). Another participant explained, *"On top of it, you have to get out of your desk to throw away the rubbish in like a sort of communal waste area, where you*

have to put the rubbish in different areas, such as plastic. In a way, it is a bit inconvenient. I mean, I know that it is for a good cause and all, but ja" (Participant 6).

4.2.4.3. Ventilation

Ventilation seemed to be a topic that was discussed in most of the interviews with participants. It was established that there were definitely problems with the heating system. Some participants reported that they found it too hot, whereas others believed that the building was too cold. These differing degrees of ventilation seemed to impact on employees' well-being and level of productivity to some extent. This was concluded as participants did report some signs of sickness, and reduced ability to concentrate. The dynamics of the system was explained in a technical manner by one of the interviewees:

"In the aircon, some air comes in and some goes out, but then some gets trapped- this trapped air causes the whole system to go down and then the workforce isn't productive as they aren't getting that fresh air that has been promoted through this whole green concept" (Participant 9).

It can be established from this extract, that ventilation definitely has an impact on the employees' level of productivity. This was further supported by a participant who stated *"But certain things affect us. It is very cold in our office and the high ceilings allow for this constant draft coming through all the time- in winter, it is too cold to work"* (Participant 2). Furthermore, it must be noted that the ventilation is not cold throughout the building. One participant emphasised the fact that hot air rises, so the people in the higher levels of the building are actually *"cooking"* (Participant 4). However, he did state that he was lower down and loved the cold air, *"People also need to realise that our resources (ie. Water) are coming from underground natural places, so the natural air will be cold sometimes- I love the natural air and cold- so I'm happy".* (Participant 4).

Some participants showed contradictory viewpoints in their statements. However, they seemed to be happy and energised from the overall ventilation and air conditioning facilities. *"Well, the ventilation in a way makes me feel energised; if I don't have colds all the time [laughs]."* (Participant 3). Although, this statement does depict that the participant is happy with the ventilation, it does emphasise the fact that she believes that it contributes negatively to her overall health. Another participant stated, *"I do find that the ventilation is quite good*

and we all feel more alive, so to speak, however it often does get a bit warm, but generally it is fine" (Participant 6).

An interesting finding that was observed within this theme was the fact that there were problems with the air conditioning system in the first few months in the building. *"It has been really cold in the building, but the facilitators [facility managers] have realised that there was something missing, so they fixed that"* (Participant 3). This is very important when analysing results, as this could have impacted scores that were obtained in the first set of data collection with respect to the question on ventilation and air movement.

4.2.4.4. Water facilities

The biggest complaint associated with that of the water facilities was that there was a *"lack of hot versus cold water"* (Participant 2 and 5). Furthermore, participants complained that there were *"horrible smells in the building"* (Participant 2,5 and 6). Many of the participants weren't aware of this but it was coming from the water tank, as the rain tank was stagnant, so the water was not flowing properly, which was resulting in damp smells.

4.2.5. Impacts on an unconscious level

Many participants did not feel that the impacts of the 'green' building were visible, thus it was difficult to acknowledge the benefits they reaped. Although this was the case, most of the participants did acknowledge that there was some kind of effect even if it was below the surface of their consciousness (Participants 1, 2, 3, 4, 5, 7 and 9). Hence, it can be established that the benefits inherent within the 'green' building phenomenon were established on an unconscious level, as stated *"Basically, you see it as any other building that you have worked in, unless you are consciously thinking about it, you don't really identify it as a green building*" (Participant 5). Nevertheless, many of the individuals interviewed continued to believe that *"I feel healthier just knowing that I am in this building"* (Participant 1).

Overall, participants seemed to believe in the positive effects that the building had, due to what they had been told. As participant 2 explained, *"There are certain things that we were told that we won't see, so it is quite hard to acknowledge them, but we believe they are there"* (Participant 2). This was supported by participant 7, who said *"Look, I'm not going to tell you that the building makes me feel amazing, I just know from what I have heard that it is*

meant to benefit us all".

Many of the participants gave logical examples of 'green' aspects; however they didn't believe that these effects could be noticed. One participant established that if you can't see something then it isn't really there, *"We can see the effects of global warming, but we can't really see the effects of being sustainable".*

However, examples were identified, such as *"we use less volatile organic compounds, so even though they don't see this, they benefit from it as it will cause less respiratory problems" (*Participant 1). Another participant stated *"Whether I give you a bottle of water that was made the green way, or a bottle of water that was made the conventional way, it all tastes the same- one is just meant to be more healthier"* (Participant 9). Furthermore, one participant emphasised the aspect of the unconscious, *"When I am printing or doing a balance sheet, just for instance, it is no different to how I would have done it anywhere else and I don't stop to think, wait, this process is enhanced because the environment is being preserved"* (Participant 5). Participant 5 believed that *"There is no specific way to see if they are reused materials or not, but we know that they are and that they are making a difference to the environment and the people around us, to me, that in itself makes my working experiences enhanced, as I know that I am making a difference, well the company is, but I am contributing as well"*

On the whole, it appeared that participants were trying to find clarity on the actual effects of the 'green' building. Participant 1 stated *"I am waiting to see a study done to understand the changes that are prevalent. The psychological affect- can you even measure that?"* Another participant supported this assumption by stating *"Some people say that you have less negative physical effects, like tiredness and things, but how must I measure that?"* Overall, none of the participants could recognise effects that were present on the surface level, thus the overall perspective was *"In terms of the actual building, it isn't much different to the conventional one, but the actual processes are. So you don't really know the difference when you are just working in the building"* (Participant 9).

4.2.6. Teething problems

One of the major challenges that was highlighted by almost all of the participants was that of teething problems. For the purpose of this analysis, teething problems refer to the initial faults that were present when employees first moved into the building. These are vital for this analysis, as challenges that were present could have possibly impacted on how employees worked, perceived the building and their health in general. As the technician stated, *"In the beginning there were a lot of issues that needed to be sorted out, not only in the design but in the practicalities"*(Participant 9).

These teething problems were not in line with the high expectations that employees had when moving into the building, as participant 3 stated, "*Believe me, people do think this- you think by moving here, everything is going to be perfect"* This was further supported by another participant who explained, *"I think people expected miracles from what they had heard, so it was a bit of a shock when things didn't go 100% according to plan*" (Participant 4). It is often the case, that initial experiences determine how an individual will perceive the 'intervention' in the future. This is problematic as problems occurred within this building for *"3 to 4 months, because things were just a mess"* (Participant 8).

It was portrayed from most of the participants that these teething problems linked to a variety of outcomes, such as negative perceptions of the organisational environment, poorer health, and unfavourable perceptions of the building and performance. The extract below sums up the findings:

"Certain things were definitely missing in the beginning. It was not a nice atmosphere to be in, but that was due to malfunctions. Everyone was complaining that they couldn't work" (Participant 3).

Some of the teething problems and outcomes can be extracted from the quotes that follow. Participant 4 stated *"In the beginning the air smelt miff, and it was hard to concentrate"*. Another participant stated *"In the beginning, there were a lot of malfunctions with the water tank things especially, and we only knew that we had moved into a 'green' building because of the faults [laughs]".* (Participant 6). Participant 7 explained, "*It didn't help that in the beginning things weren't running so smoothly, such as the water system, and we even had a flood when we first moved in. The heating was also messed up and everyone was getting sick due to the coldness in the office"* (Participant 7).

Furthermore, the facilities managers and technicians had a stressful time dealing with the problems and coping with the employees. As participant 9 stated *"Small problems that cause such big effects, it has just been a bit of a nightmare for us"*

4.2.7. Passion for the 'Green' culture

Interviews revealed that participants referred to the building as not only a place of work but also established that *"Greenness is a culture, it has to be internally accepted"* (Participant 1). From the responses that were obtained, it was depicted that participants were proud to say that they worked in a green building. It was evident that some participants felt that they were 'superior' because of the whole aura that surrounds the whole concept of 'green' within society. It was established that for 'green' to actually be effective, it needs to be embedded within the organisation:

"Many organisations do a lot of green initiatives, but often this is because of resources and legislation, so it is not existent in the actual firm's culture, which I believe can be a huge weakness with the implementation of green and green buildings. Nedbank lives, breaths and sleeps Green" (Participant 5).

Furthermore, many of the interviewees established that just being a part of this whole 'green' culture contributed to their efficiency at work, as participant 7 explained, *" To me, just working in an environment that is 'green' enhances my work experience, as I feel like I want to come to work every day"*. However, it must be noted that most the participants felt more strongly about the positive aspects at the beginning of the move, whereas, once they had been in the building for a while, they had forgotten about the whole 'culture' they claimed existed. This was supported by participant 3, who stated *"Look, when you first moved in, it was this shiny building and everything impressed you. The more you get use to the environment, the more it seems the same"* Consistent with this, participant 6 claimed "*I would say that a building is a building. At first, when we moved this was much bigger, brighter and spacious but now it is my workplace. I can't really say that I find much of a difference from there to here with respect to the whole 'greenness'*.

The general findings within this theme seemed to branch from the fact that people need to buy into the 'green' culture, and internalize it to reap the benefits. However, *"It is not something that management can give you . It is something that you as an individual have to*

believe in. If you believe in green and sustainability- that is what needs to drive you" (Participant 1). Certain participants established that they were 'green' at heart, as participant 2 stated, *"I seem to have internalized it now"* (Participant 2). Another participant stated *" I have always been a green person, trying to save stuff, so, for me it wasn't really a big step towards myself"* (Participant 4). However, one participant did state that *"People are spending so much time on this green issue that no one is actually working properly - to me, the building is no different to my previous one"* (Participant 8).

Furthermore, it must be acknowledged that the passion for the 'green' building seemed to be evident among the higher levels of the organisation. As one participant stated, *"It isn't easy to just become green, there needs to be structures in place for this, and people at the top need to value it and believe in it"* (Participant 7). This statement shows little regard for the lower levels in the organisation. Furthermore, participant 1 explained, *"But whatever it is, you have to believe in that. Nedbank strategy is: we have become green champions. But if you don't believe in that, that is never going to filter into your staff, because you have to be passionate about it* (Participant 1).

4.2.8. Health effects

It was evident from the responses of the participants that they liked the fact that the 'green' building made them feel healthier in some way or another- consciously or unconsciously. Many of these feelings were due to the fact that they felt that they were more energised. As one participant stated *"I do feel more energised. You know I am actually meant to be here at work from 7 o'clock to half past 4, but you know sometimes I leave here at 5:15 or 5 o'clock. I don't want to leave, I'm here and it is like home. I am just enjoying here, I could be here all day"* (Participant 8).

One of the main improvements in relation to health was that people believed that the building allowed them to be healthier in a more physical manner. As one participant stated *"For myself there is the showers downstairs, ja so that is actually excellent. I leave my bike here, so in the mornings I come to work, instead of hitting the traffic, I come here early and I cycle outside. It also gives me the opportunity to stay healthy without impacting on the environment at all. This building definitely has its advantages compared to what I have previously worked in"* (Participant 4). This was further supported by other participants, who claimed that the

recycling station allowed them to take on a healthier physical role, *"You are also much more healthier because you actually have to get up and go put your rubbish in the bin, and get up and go have a smoke (which is farrrr you know)".* (Participant 6).

CHAPTER FIVE
DISCUSSION

The final chapter of this report aims to integrate the theoretical foundations and results obtained in order to create an understanding of the complexity of the green building phenomenon. Firstly, the focus will be directed towards the quantitative sector of this research by providing an explanation of the results obtained. This will be separated into the relevant time frames. The second section will be focused on the underlying explanations relating to the emergent themes that emerged from the qualitative data. It is vital that these sections are combined in order to create an in depth understanding of the results obtained. Finally, this chapter will also include a section that examines both the strengths and limitations of the research, furthermore, providing suggestions for future research.

5.1. Quantitative Results

The majority of research that has been conducted has investigated the impact that 'green' buildings have on various types of well-being, productivity, and job satisfaction. Many of these studies have been conducted by comparing 'green' buildings to that of conventional buildings. These results have been contradictory in nature; however, most of the literature shows inconclusive evidence to support that 'green' buildings impact on the above noted variables (Thatcher & Milner, 2012; Paul & Taylor, 2008). On the other hand, some research has emphasised that there are contradictory findings between certain factors, and that aspects such as satisfaction will increase with certain features and decrease with others (Abbaszadeh, Zagreus, Lehrer & Huizenga, 2006; Lee, et al, 2009). This research was thus somewhat innovative, by exploring the relationship between 'green' buildings and various organisational outcomes, and then performing in depth interviews in order to understand the results obtained.

Considerable concern has been directed towards 'green' buildings, due to the increasing pressures from stakeholders on organisations to become 'green', and decrease the negative impacts on society and the working population as a whole (Hoffman, et al, 2008). This research was also important as it examined a group of employees within a 5-star 'green' building that has been erected in South Africa. Even though South Africa is involved in the

'green' challenge, it is still lagging behind other countries in this realm (Larsson, et al, 2001). The next section of this discussion will examine and explain the results depicted within the quantitative analysis. It must be noted that even though there were pre-test measures obtained in Time 1, the absence of a control group can be acknowledged as a limitation of this research. Hence comparisons were only made between Time 1, Time 2 and Time 3.

5.1.1. Time 1 and Time 2: Comparison tables of well- being , productivity, physical work conditions

The first analysis was conducted in order to establish if there were significant differences in psychological well-being, physical well-being, job satisfaction, absenteeism, and presenteeism between Time 1 and Time 2. The results depicted that the only significant difference was present for job satisfaction. It was surprising to note that the overall average of job satisfaction decreased from Time 1 to Time 2 thus showing that employees were more satisfied at Time 1. This is inconsistent with previous research that states that employee's level of job satisfaction normally increases when the physical conditions of an organisation improve (Dravigne, et al, 2008). Furthermore, it was stated from a theoretical point of view that job satisfaction increases from a conventional building to a 'green' building (Singh, et al, 2010). Although, this is the case, it must be noted that a control group was not present in this research. A control group would have been beneficial in order to document the differences between employees in a conventional building and those in the green building. Hence, it can also be stated that these studies are not generalisable to this research, as they looked at comparing conventional buildings to 'green' buildings. It must also be noted that certain extraneous variables can impact on results. For example, it must be noted that Time 1 data was collected at the beginning of the year, whereas, Time 2 data was collected at the end of the year- it can be hypothesised that employees are under more stress to get things done at the end of the year, hence they are less satisfied with their jobs. It has been acknowledged in prior research that the nature of the work, including increased difficulty and increased quantity, can impact on job satisfaction negatively (Spector & Paul, 1997). Furthermore, other factors can also influence the results obtained, such as the fact that employees may be exhausted after a busy year of work and looking forward to a holiday break.

There can also be an understanding depicted when looking at the other non-significant variables. Firstly, there were non-significant results obtained for both psychological well-being and physical well-being. Although, there is research that has established that 'green' buildings do positively affect well-being (Wargocki, et al, 1999), overall, there has been inconclusive evidence to prove these findings (Thatcher & Milner, 2012). When examining productivity, it has been noted that there is a chain reaction that directly links 'green' buildings to increased productivity, and organisations have seen improvements in percentage productivity within the 'green' building (Leaman & Bordass, 1999; Wyon, 2004). This is to a degree contrary to the findings within this study, however, it must be noted that even though productivity showed non-significant results, the mean productivity rating did increase from Time 1 (79.15) to Time 2 (80.08). With respect to absenteeism and presenteeism, not much research has been conducted on this. However, it has been hypothesised that improved air quality, leads to decreased sickness, and therefore, less absenteeism and presenteeism (Issaa, et al, 2011). Again results were non-significant in this research but both mean absenteeism rates and presenteeism seemed to decrease from Time 1 to Time 2. Thus, these results did not provide significant support for positive impacts with respect to the 'green' initiative.

Comparisons of the physical working conditions from Time 1 to Time 2 produced very interesting findings. It must be noted that the researcher separated these aspects, in order to obtain an understanding of which aspects were significant and which weren't. The results obtained were mixed in nature, with some findings being significant and others being non-significant. This result is aligned with prior research done by Paul and Taylor (2008), which stated that they found significant results with respect to certain physical conditions, such as temperature, whereas, other factors such as ventilation and lighting showed non-significant results. Results that were significant depicted the following results from Time 1 to Time 2: Air was less dry (2.93<3.33); air was less stale (3.09<3.35); air was less dusty (3.25<3.64, and there were less electrostatic shocks (3.45<3.85). All these results showed a positive impact, aside from odour, which seemed to increase within the building (3.12>2.84). This is a surprising result and this could be due to many different aspects. However, a possible reason for this could be that there was a malfunction within the 'green' system within the Time 2 data collection resulting in unpleasant odours. This is consistent with research done by Paul and colleagues (2008), whereby it was hypothesised that results were non-significant due to a problem with the cooling system at the time of data collection.

5.1.2. Time 2 and Time 3: Comparison of well-being, productivity, absenteeism, presenteeism, and physical work conditions

The second analysis was conducted in order to establish if there were significant differences in psychological well-being, physical well-being, job satisfaction, absenteeism, and presenteeism between Time 2 and Time 3. The results depicted that the only significant difference was present for physical well-being. Again, this result was surprising, due to the fact that perceived physical well-being decreased from Time 2 to Time 3. This result was inconsistent with most of the research which either stated that 'green' buildings decreased Sick Building Syndrome (SBS) symptoms as it improved indoor air quality (Wargocki, et al, 1999) or that there was no significant difference in physical well-being (Thatcher & Milner, 2012).

The non-significant results obtained were not unforeseen. Firstly, there were non-significant results obtained for psychological well-being. Although, there is research that has established that 'green' buildings do positively affect well-being (Wargocki, et al, 1999), overall, there has been inconclusive evidence to prove these findings (Thatcher & Milner, 2012). When examining productivity, it has been established that 'green' buildings indirectly increase productivity, and organisations have seen improvements in percentage productivity within the 'green' building (Leaman & Bordass, 1999; Wyon, 2004). Despite the fact that productivity showed non-significant results, the mean productivity rating did increase from Time 2 (78.06) to Time 3 (83.16). With respect to absenteeism, presenteeism, and job satisfaction- results were non-significant, and mean scores varied very slightly.

Comparisons of the physical working conditions from Time 2 to Time 3 produced unexpected findings. The results obtained were mixed in nature, with some findings being significant, whereas, most were non-significant. This result is aligned with prior research done by Paul and Taylor (2008), which stated that they found significant results with respect to certain physical conditions, such as temperature, whereas, other factors such as ventilation and lighting showed non-significant results. Results that were significant depicted the following results from Time 2 to Time 3: Air was staler (3.45>3.16); air was dustier (3.68>3.40), and there were more perceived electrostatic shocks (3.78>3.51). All these results showed a negative impact. This was unforeseen, as when significant results are obtained, most research states that these results should be depicted positively, especially due to the fact

that ‘green’ buildings are meant to improve physical conditions (Singh, Syal, Grady & Korkmaz, 2010; (Vischer, 2008; Singh, et al, 2010; Cole, 2010). It can be hypothesised from this, that there was a problem within the system or design of the building, or that the increase in these factors were smaller than that of the increase from Time 1 to Time 2.

5.1.3. Time 1 and Time 3: Comparison of well-being, productivity, absenteeism, presenteeism physical work conditions

In order to examine if there was an overall effect of the ‘green’ building on well-being, productivity, absenteeism, presenteeism, and physical work conditions- the researcher compared Time 1 data with that of Time 3 data. It was shown that there were non-significant results to show a difference in well-being, absenteeism, and presenteeism. However, significant results were obtained for perceived productivity. From the average mean scores, it can be established that there was a substantial increase in productivity from Time 1 (79.44) to Time 3 (83.45). This is not an unforeseen result; as it has been stated in prior research that improving the design of a building and improving the indoor air quality can lead to a substantial increase in perceived productivity, as workers are more comfortable and can concentrate better (Leaman & Bordass, 1999; Heerwagen, 2000).

Comparisons of the physical working conditions from Time 1 to Time 3 produced motivating findings. The results obtained were mixed in nature, with some findings being significant, whereas, most were non-significant. Once again, these results were aligned with prior research done by Paul and Taylor (2008), which emphasised that results varied among different factors of physical working conditions. Results that were significant depicted the following results from Time 2 to Time 3: Air was less dry (2.82<3.18); air was less humid (3.33<3.58), air was less stale (2.95<3.23), and air was less dusty (3.04<3.44). These were all positive, however, it was depicted again that odours were worse from Time 1 to Time 3 (2.93>2.58). Like it was stated above, this could be due to malfunctions within the system (Paul, et al, 2008). When examining the mean scores for physical work conditions, it must be stated that mostly all of the factors seem to improve from the beginning to the end, or there was a very minimal decrease change. This is aligned with research that states that the primary purpose of ‘green’ buildings is to create improved indoor air quality, and better physical working conditions (Singh, Syal, Grady & Korkmaz, 2010). On a very positive note, it can be

established that even though physical work conditions seemed to decrease from Time 2 to Time 3, the overall impact was shown to be positive. In future there can be expectations of more significant results.

5.1.4. Repeated-measures ANOVA analysis (Time 1, Time 2 and Time 3)

The purpose of the repeated-measures ANOVAs were to confirm the results obtained from the matched samples t-tests. The results obtained from these analyses showed that there were non-significant differences between the three time frames for most of the variables, namely job satisfaction, psychological well-being, physical well-being, productivity, and absenteeism. This was relatively similar to that of the matched samples t-tests. However, the matched samples t-tests did show some significant results for job satisfaction from Time 1 to Time 2; physical well-being from Time 2 to Time 3, as well as, productivity from Time 1 to Time 3. These discrepancies could have been due to the reduction in sample sizes from the t-tests to the ANOVAs. It has been stated in prior research that an increase in sample size can increase the chances of significant results (Leung, 2001). Due to the fact that the sample size reduced to 44 people within the repeated measures ANOVAs, this could have definitely impacted on the results obtained. However, generally, there was consensus that most results were non-significant.

When referring to the physical work conditions, results portrayed that there was an overall significant positive difference from Time 1 to Time 3 ($p=0.048<0.05$). This is not surprising, as from the t-tests, it was recognised that numerous factors were significantly better, whereas, other factors showed an improvement, which was not yet significant.

From the above results, it can be established that most of the results obtained were non-significant. This is consistent with prior research that stated that ‘green’ buildings don’t necessarily lead to significant differences in outcomes (Thatcher & Milner, 2012; Paul and Taylor, 2008; Ries and Bilec, 2006).

5.1. Qualitative Results

The qualitative aspect of the current study aimed to uncover the underlying feelings, experiences, likes and dislikes which 'green' buildings hold for employees and the ways in which individuals cope with the changes that they are exposed to on a daily basis. This section was further used as a means of understanding the non-significant and significant results that were obtained from the quantitative data. The results of the qualitative investigation into 'green' buildings revealed that 'green' buildings were viewed as legitimate and justifiable, and that societal acceptance of the 'green' phenomenon' played a strong role in maintaining this legitimacy. This is consistent with research done by Butler (2011), which states that organisations are adopting corporate social responsibility initiatives in order to keep up with societal demands.

Furthermore, many participants emphasised that to truly see the effects of going green, there needs to be a collaborative effort among all parties within the community. It was also stated that the moral reasoning behind implementing green was vital. Prior research has established that 'green' building practices are predominantly implemented to reduce negative environmental impacts and improve sustainability, but are also claimed to contribute to additional benefits for the organisation, such as reduced operating costs, increased staff productivity, and reduction of liabilities associated with poor indoor air quality problems (Bauer, et al, 2010). Participants emphasised that the moral reasoning should be in line with improved benefits for society, and the employees, rather than just being profit orientated. This could have contributed to the non-significant results obtained within the quantitative section. Participants would have revealed positive perceptions if they believed that their organisation was implementing 'green' for the betterment of all the stakeholders within the organisation. However, participants that perceived the 'green' building to be a profit- making initiative would have had opposing perceptions. Thus, the results could have been influenced by the variations in perceptions regarding the actual value given to the 'green' initiative.

Although, there seemed to be a level of consensus when establishing the legitimacy of implementing 'green' buildings, the results also portrayed that there were many issues that needed to be dealt with in order to reap full benefits of this initiative. One major challenge was that of education. It was emphasised within the results that there was a lack of knowledge surrounding the whole concept of 'green'. This showed that many of the

employees did not understand the relevance of the new 'green' building systems (i.e. recycling stations) that were implemented and the reasoning behind this implementation. Thus, this was linked to negative organisational and individual outcomes, as the 'green' building was not utilised and perceived in the correct manner. These employees could not identify the difference between their old conventional building and the new green building; hence they didn't feel like anything had changed. This could have caused contradictory results within the quantitative data, as the data was determined by using scales that were focused on the perceptions of the individuals, thus they wouldn't have perceived a difference in well-being, job satisfaction, productivity or any of the other variables if they perceived the buildings to be the same. It can be acknowledged from this that many of the occupants perceptions of the 'green' building were the same as the conventional building. Hence, there should be no change in results from Time 1 to that of Time 2. This was evident in most of the results obtained in the quantitative section.

Furthermore, without knowledge of the 'green' dynamics, employees were left in the dark about the benefits, which could have also influenced results. This is not incongruent to prior literature obtained by Strife (2010), stating that the whole world is moving towards environmental movements. However, knowledge and education of sustainability is lagging behind. Furthermore, this research acknowledged that positive information strategies contribute to the encouragement of positive behaviour change (Strife, 2010). Even though this was the case, the members who were educated saw the 'green' building as a forum to obtain new knowledge, teach this knowledge to others, and use this knowledge to be sustainable within their own home environments. Yudelson (2007) stated that the most powerful agent of change is a person's personal experience, which leads to increased benefits as they 'buy into' this phenomenon.

The current study also revealed that participants showed a high degree of resistance towards the whole move to a 'green' building. These findings emphasise the degree to which individuals attribute negative consequences to any form of change. This finding is aligned with previous research that has emphasised that employees are resistant to change, and that management need to understand how to deal with not only the change, but with the feelings of the employees opposed to this change (Laframboise, et al, 2003).

The change was associated with emotional fears, security fears, and anxiety. Firstly, on an

emotional level, individuals were scared of change and were also worried about how this would impact on their job tasks. Secondly, with respect to security aspects, employees linked other outcomes with the move, such as restructuring and retrenchments. One of the main problems felt by employees within the notion of restructuring was that if they held a senior position within the organisation prior to the move, they were now situated in an open office with all the employees, as seating was broken down into function- thus making them feel like they were demoted.

This can directly link to the results obtained within the quantitative analysis. For example, employees that feel a sense of anxiety with the whole move to the 'green' building will transfer these insecurities into their perceptions. Hence, anxiety around change will influence occupants' perceptions negatively, which would be noticeable when examining quantitative results. Furthermore, the quantitative results portrayed a significant decrease in job satisfaction from Time 1 to Time 2. Employees who felt a sense of demotivation and were worried about being retrenched would be unhappy, thus contributing to dissatisfaction. As Locke (1969) stated job dissatisfaction is "the unpleasurable emotional state resulting from the appraisal of one's job as frustrating or blocking the attainment of one's job values or as entailing disvalues" Thus, employees could have seen this building as blocking their path to the future. This was hypothesised, as Time 2 data was taken 6 months after the move, hence the change was relatively new.

Laframboise and colleagues (2003) stated that these changes can impact employees negatively, especially when "those losing an entitlement, many employees spend their entire career trying to obtain, may find these type of changes very difficult to deal with" (p. 311). Finally, participants also felt that the change was not only within the building but also the processes. Additionally, they felt anxious, as they believed that they were continuously being monitored and corrected. It can be hypothesised that the resistance to change could have definitely impacted on the non-significant results obtained in the quantitative data. Employees who feel anxious and feel like they have been 'demotivated', could demonstrate this with negative perceptions of the whole 'green' concept. This could impact on their job satisfaction, and lead to them feeling anxious all the time, thus increasing the perceptions of poor well-being.

Within the present study, it was also acknowledged that there were contrary viewpoints

established about the perceptions of the actual design of the office. One of the reasons for the contrary findings were based on individual differences such as an individuals' preference for privacy or contact with others or their passion for 'greenness'. There were many features that were uncovered within this section with regard to the open plan office, recycling stations, ventilation systems, and water facilities. Some of these results were positive, whereas, others emphasised that the design of the building looks good on paper, but the practicalities within this 'green' phenomenon were not up to standard. This is consistent with research conducted by Lee and Guerin (2009), whereby it was concluded that there was too much emphasis on the engineering aspects of 'green' buildings, such as water conservation and energy use. This conclusion portrayed that more importance should be on the human occupants (Lee, et al, 2009; Hedge & Dorsey, 2013).

Some of the negative aspects that were highlighted with respect to the actual open space offices were that it increased the level of noise, and that employees felt that they lacked privacy. This is consistent with research conducted by Oldham and Brass (1979), which compared a conventional building with an open-office building. Results showed that employees' concentration decreased due to increased noise and distractions. However, they concluded that differences in individuals and employees may change the way they perceive the open-space (Oldham & Brass, 1979). These individual differences could have contributed to the non-significant results that were obtained when examining the physical environment. For example, people who thrive in noisy environments would have not found the 'green' building to be noisy, whereas, others would have.

The ventilation system was credited for its fresh air, however individuals believed that they either felt too hot or too cold, consequently resulting in decreased concentration levels as well as sickness for a few employees. Various literature has emphasised that if the indoor air quality is not up to standard, it can result in decreased well-being, increased absenteeism, as well as decreased productivity (Vischer, 2008; Singh, et al, 2010; Cole, 2010). There were also problems in the water systems that led to terrible smells, and flooding. Although, some participants stated that the recycling stations were great contributors to sustainability, the overall reaction seemed to emphasise that these stations were an inconvenience to employees and disturbed them while they were trying to be productive, even though this might have contributed to improved health. This is consistent with previous research that has emphasised that individuals will participate and perceive 'green' behaviours according to their pre-

existing beliefs of the activities, as well as, the perception of the level of inconvenience associated with this behaviour (Anderton & Jack, 2011).

'Green' effects were often identified as non-existent, due to the fact that employees believed that they could not consciously perceive the impacts that the building had on them. Certain participants did credit the building, by saying that they know that it is meant to increase their physical well-being as there is natural air coming into the building all the time, and others believed in the building's positive effects because they had been told about them. This is not inconsistent with evidence obtained by Hedge (2010), whereby, it was stated that the effects of the physical environment can't be interpreted by means of observation. Furthermore, often people are not aware of the impacts that this environment has on their health and performance levels (Hedge, 2010). However, there seemed to be consensus among employees that they did not have clarity on the actual positive impacts that were 'supposed' to be existent from the building. Participants did identify certain features within the building that they believed could possibly impact them, such as recycling, and non-toxic materials.

Nevertheless, they battled to identify the positive impacts that were more covert such as their perception of their psychological wellbeing or work functioning. This could have impacted on the non-significant results obtained. It must be noted that it is very difficult to notice changes within psychological functioning, as they are more subtle and difficult to see. From this, it is not surprising that results were non-significant, due to the fact that people will not be able to report definite changes in such an abstract phenomenon.

The current study also uncovered the theme of 'teething problems', which could not have been discovered in the quantitative results. This is a very important theme, as it could have influenced results within Time 2 data collection, and also resulted in more negative outcomes. This can be supported by research done by Paul and Taylor (2008), which stated that their research found no significant difference between 'green' buildings and conventional buildings; however, this could be due to malfunctions that existed within the lighting and ventilation systems. It was stated by many of the participants that the original move into the building was characterised by many problematic issues. From this, it can be hypothesised that results could have been non-significant as teething problems could have hampered any noticeable change that was evident within the building. For example, the smells that were present due to a problem within the water facilities could have altered the overall perceptions

negatively when participants rated aspects within physical working environment. This was actually evident within the quantitative data, as ratings of bad odours were higher in Time 2 and Time 3, thus showing the effect of the teething problem associated with the smell from the water tanks.

Due to the fact that Nedbank Menlyn Maine is one of the few 'green' buildings within South Africa, they were the first to deal with the actual 'practicalities' inherent within this design. These teething problems impacted negatively on the facility manager, as well as, the employees. It was established that employees' had high expectations around the move into the 'green' building, and these were disappointed when they faced various problems, such as flooding, faults within the water tanks, and malfunctions in the air conditioning systems. These malfunctions were all linked to negative outcomes, such as decreased concentration, sickness, and decreased happiness. Additionally, there was an emphasis on the stress that facilities managers were exposed to with respect to sorting out these teething problems. Thus, it is not surprising that these factors could have altered the quantitative results. Instead of employees perceiving the 'green' building as efficient and beneficial, they would have rated the physical conditions lower and felt that they were less productive due to the lack of concentration; they would have felt more sick due to the temperature change, and had overall negative perceptions of their job in general.

On the positive side, employees did acknowledge the importance of passion for the 'green' culture as a driver of success. Richardson and Lynes (2007) stated that for 'green' initiatives to be successful, there needs to be a passion established within the organisation, and among leadership that are driving it. From this theme, it was depicted that individuals often felt less inclined to be involved in the 'green' phenomenon if they didn't believe in its benefits. It was also acknowledged that certain employees felt that being a part of the sustainable environment initiative contributed to their working success. However, it was noted that it is hard to become a part of the green initiative if you weren't inclined to this before. On the negative side, from the responses obtained, the general findings seemed to recognise that the 'green' culture was evident within the higher levels of the hierarchical structure, with little emphasis on the values inherent within the lower levels of the organisation. Employees were thrown into the deep end, and they had to adapt to this new change and 'culture'.

Finally, a few of the individuals within the organisation believed that the 'green' initiative

afforded them the opportunity to live a healthier life. Some of the participants noted that facilities like the bike racks allowed them to get exercise, and feel healthier. This finding is aligned with research that states that there is a definite link between environmental determinants and human well-being and health (Jaakkola, 1998). This can also be linked to literature by Yudelson (2007), which suggested that by implementing bicycle commuting, organisations are promoting green and creating an environment which is healthier, friendlier and more sustainable. People can ride bikes instead of polluting the environment with car emissions, and it is also a healthier way of getting around (Yudelson, 2007). However, even though this facility is intended to reduce car emissions, most of the employees still drive to work. Furthermore, generally people believed that because they were inconvenienced and had to get up and put rubbish in centralised bins, they were getting more exercise. These seemed to be the general findings, however, others believed that the building was just a building; hence it didn't have an impact on them at all. They believed that they worked the same, and their health was the same as it was prior to the move to Menlyn Maine.

From the above findings, it can be acknowledged that again there were contradictory findings. However, the qualitative results create a better understanding of why the quantitative results were predominately non-significant. Some people believed in going 'green' and believed that benefits existed. Whereas, other participants saw negative aspects of the 'green' phenomenon, thus only seeing the bad within erecting 'green' buildings. These contradictory results can be due to the complexities that surround the whole phenomenon of 'green'. Erecting 'green' buildings is not only about the actual building but what strategies need to be implemented in order to create an efficient 'green' environment and what specific outcomes need to be achieved; how the building will impact the staff that have to work in this environment, as well as, the leadership and culture that exists to direct green initiatives (Laframboise, et al, 2002). It is imperative that the problems evident within 'green' buildings are dealt with in order to enhance the experience of green. It was stated by Leaman and Bordass (2001) that the key to reducing the complexities of the 'green' building phenomenon is to create an environment that is focused on 'simplicity, intelligibility, managed feedback, respect for people's comments and rapid response' (p. 130).

It can be stated that legitimacy, education, change and resistance, office design, unconscious impacts, passion, and health effects can definitely impact on job satisfaction, productivity,

well-being, as well as, absenteeism and presenteeism. From the above qualitative results, it is important to note that there are various problems that need to be dealt with before we can see positive effects of the 'green' buildings.

Limitations and suggestions for future research

It is important to note certain limitations which existed within this study. Sample sizes were relatively small, and overall results may thus have been influenced by extreme scores. Larger sample sizes would have been likely to be more influential; however this was very difficult as the matching process reduced the size of the sample. When examining the qualitative sample, it would have been viable to obtain more than nine participants for a deeper understanding; however, this was very difficult due to the lack of interest of participants when asked to be interviewed. It would have also been beneficial to obtain a qualitative sample of employees from a variety of lower level and upper level positions, as this would have given a more generalised analysis of the population.

A few limitations existed within the quantitative design of this study. Some of them refer to that of extraneous variables. It can be hypothesised that results could have been non-significant due to the concept of social desirability. This was not ruled out or accounted for by the researcher. Furthermore, it must also be noted that the sample questionnaires were sent out three times, thus the carry-over effect could have been problematic. It would have also been beneficial for the researcher to compare this samples scores with that of a control group. Another limitation of the quantitative section could have been within the measures that were used, it could have been more feasible if job satisfaction and productivity were measured using other instruments, not single item scales. In addition, most of the instruments that were used in this study were self-report scales and were based on employees' perceptions. This is problematic as perceptions can be altered by many different variables, and can change depending on an individual's mood at that specific time.

Due to the lack of significant evidence found on the relationship between 'green' buildings and organisational outcomes, further research might investigate whether this phenomenon is merely an illusion or if it actually exists by going deeper into this dynamic area. This can be achieved by using a bigger sample, as well as, examining this through a wider range of

organisations that have erected ‘green’ buildings. Furthermore, more interviews can be conducted to examine more themes that may exist within the ‘green’ field. Based on the results obtained, organisations need to ensure that they have the right structures and training in place to create an environment that is susceptible to the erection of green buildings, furthermore, educating staff on the issues that may occur and the benefits that they will reap in the long run.

With regard to directions for future research, it is vital that researchers explore the dynamics within the South African context as the area remains under-researched. As the South African context is unique and quite different from many Western organisations specifically in terms of developments in the green building phenomenon, suitable research would prove highly valuable for future studies within the South African context.

Given the disparate results of the current study, a replication with a larger sample might also establish a less ambiguous relationship between ‘green’ buildings’ and organisational outcomes. Furthermore, it will be viable for future research to examine this concept through a wider range of organisations that have erected ‘green’ buildings. It must be noted that the Banking Industry might be under various other pressures that could change the results obtained. Thus, it will also be viable to conduct interviews with occupants in various Industries to see the similarities and differences that arise in themes regarding the ‘likes’, ‘dislikes’ and problems experienced by occupants.

It is also important that future research within the quantitative dimension use more objective measures when examining ‘green’ buildings. Most of the measures used in the current analysis were self-report measures and were prone to biases. For example, researchers could try use actual productivity and absenteeism reports in order to document these as fixed numbers rather than mere perceptions that are likely to vary at different times.

Conclusion

This study investigated the relationship between ‘green’ buildings and organisational outcomes, namely psychological well-being, physical well-being, job satisfaction, productivity, absenteeism, and presenteeism. Furthermore, a deeper analysis into this phenomenon was investigated by means of documenting employees’ experiences, feelings,

likes and dislikes associated with the ‘green’ building. This study built and expanded on the work of previous studies in the field. The significance of this study stems from it being one of the few studies to incorporate a qualitative aspect into the analysis of ‘green’ buildings, particularly within the South African context. This allowed for a more clear description of the results that were found by providing important information as to why the quantitative results were surprising, as well as documenting vital information that can be used to understand the dynamics within the realm of green.

The quantitative analysis revealed no significant results to show that ‘green’ buildings impacted positively on well-being, productivity, job satisfaction, absenteeism, or presenteeism. Thus, this study didn’t provide the empirical evidence needed to conclude that green indoor environments can and do offer more beneficial environments for their occupants. Although this is the case, some of the variables did show an improvement in mean scores from one time to another, such as productivity and certain physical conditions.

With regard to the qualitative findings of the study, it was noted that certain aspects can lead to these non-significant findings, namely legitimacy of the concept of ‘green’ buildings, education, change and resistance, office design likes and dislikes, impacts on an unconscious level, teething problems, passion for the ‘green’ culture, and health effects. The qualitative analysis was used as a means to investigate the non-significant results obtained in the quantitative section. This is very valuable to understand the results, and also create a basis for emerging research in this realm. The qualitative analysis opened up a whole new understanding for both researchers and practitioners by acknowledging that quantitative results are not enough when examining this dynamic sphere. This will also allow organisations to implement the ‘green’ building initiative in the most effective way by accounting components such as culture, resistance, and design, to name a few.

Despite its limitations, the present study substantiates the existing research that emphasises that there is inconsistent significant evidence to support the fact that ‘green’ buildings improve organisational outcomes. However, from the findings, it can be acknowledged that ‘green’ buildings are definitely moving towards improved environmental working conditions, and are contributing to certain improvements, such as productivity. From the qualitative findings, it must be noted that organisations need to account for various aspects when diving into the realm of ‘green’ construction.

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Ethical Considerations

Appendix A: Permission consent form

Appendix B: Participant Information sheet for questionnaires

Appendix C: Participant information sheet for interview

Appendix D: Consent form for interview

Appendix E: Permission for recording

Appendix A: Permission consent form

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

Dear Charl,

My name is Sharni Hart and I am currently doing my Masters in Organisational Psychology. I am conducting research for the purpose of obtaining my Masters degree at the University of the Witwatersrand. I am focussing on the areas concerned with the impact of green buildings, job satisfaction, productivity and employee well-being.

The reason why I am sending you this letter is to kindly ask your permission to have access to your database of employees. I ask you this because my sample is a group of employees within an organisation that has established a Greenstar rating, and your facilities cater to this group. I would like to randomly select people from your database and send them an invitation via email to participate in my research, so that the sample will be more representative of the wider population. This will allow me to draw more accurate conclusions.

I would like to stress that this whole process will be done with integrity and with the aim to keep people's identity anonymous. I will use a coding system while dealing with emails so that I will not know which email goes to which person. This allows me to send to great numbers of people, but when the individual receives the email, all other addresses are hidden from his/her view. This will assure that other participants will not be able to access other's email addresses.

Furthermore, I would also like to perform in depth interviews on the organisational premises; this would be much appreciated if it does not cause any inconvenience to you and your employees.

The interview dynamics:

- The aim is to conduct interviews with approximately 10-15 employees/employers.
- Each interview will be between 45 minutes and an hour.
- The interviews will be conducted on the premises of Menlyn Maine Falcon building.
- The information obtained from the interviews will only be seen by the interviewer and the relevant supervisor.

Specific objectives/purposes of the interview process:

- Report on the underlying feelings and experiences associated with the green building phenomena.
- Highlight aspects that were not covered within the quantitative research that has been reported prior to this research.
- Discuss issues that will help Nedbank improve their green building image.
- Highlight aspects that are imperative within the success of the building, furthermore acknowledging practical problems that need to be addressed to improve employee experiences.

I am under supervision of professionals at the School of Human and Community Development at the University of the Witwatersrand (011-717-4503). If you would like to check my credibility please feel free to call them. In addition, I have to receive permission of the ethics board to conduct this research and am thus liable if I breach anonymity agreements which I have stated above.

If you would like more details of what my research entails, or any results of my research please contact me on sharni.hart@gmail.com.

I understand if you do not grant me permission to use your database and premises, and I will make alternative plans.

Thank-you for your time.

Kind Regards,

Sharni Hart (Reasearcher) Prof. Andrew Thatcher (Supervisor)

Appendix B: Participant Information sheet

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

Hi,

My name is Sharni Hart and I am currently doing my Masters in Organisational Psychology. I am conducting research for the purposes of obtaining my Masters degree at the University of the Witwatersrand. I am focussing on the areas of 'green' buildings, employee well-being and organisational well-being.

My hopes are that if a relationship is found, further research can be done into finding ways to achieve the most effective implementation of 'green' buildings and therefore improve areas of efficiency.

I would like to invite you to participate in this study. If you do choose to participate, you will have the knowledge that you have contributed to some valuable research that may help to improve our society and organisational commitment and effectiveness.

If you choose to participate you will be asked to take some time to fill out a questionnaire pertaining to your 'green' building and other relevant questionnaires. You will also be asked some demographic information, such as your race, sex and age. These measures are not tests, in other words you cannot be wrong or right. This process will take no more than 15-20 minutes of your time.

It must be stressed that your participation is voluntary, and if you wish to withdraw at any time up until you submit your questionnaire, you are free to do so.

While you will be asked for some personal information, please be reaffirmed that your identity will not be shown anywhere on the questionnaire, and no persons but for the researchers will be able to access these documents. The researcher will guarantee anonymity- the researcher will not be able to identify employees by employee numbers, and this will be used simply as a means for coding. The researchers only have access to the employee numbers but no other personal information such as names- thus keeping the participants' identities anonymous from the researcher. Furthermore, employee numbers will not be reported in any documents, and will be deleted once the matching process is completed.

Note that responses will not be used for any purposes, other than the intended research. In no way will anyone other than myself or my supervisor see the data. All data will be stored in a password- protected file by the researcher.

The research study will be conducted under the supervision of Professor Andrew Thatcher who is Registered Industrial Psychologist at the University of the Witwatersrand. Please contact me should you have any further questions.

Finally, for anyone who is interested in the outcome of this research, you will be given a one-page summary of the results on request. You may contact the researcher through the School of Human Community Development, 011-717-4503, or by email on sharni.hart@gmail.com.

Thank you so much for your time

Kind Regards

Sharni Hart (Researcher) Prof. Andrew Thatcher (Supervisor)

Appendix C: Participant information sheet for interview

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

Hi,

My name is Sharni Hart and I am conducting research for the purposes of obtaining a Masters Degree in Organisational Psychology at the University of the Witwatersrand. The research will focus on perceptions of 'green' buildings, with respect to employees' feelings and experiences associated with this phenomenon. I would like to invite you to participate in this study.

Participation in this research will involve an interview with the researcher in which you will be asked a series of questions. It is estimated that this should take 30-45 minutes to complete. With your permission this interaction will be tape-recorded in order to ensure accuracy. Furthermore, the tapes will be destroyed, and only electronic transcripts will be kept in a safe place. These transcripts will only be accessible to the researcher and her supervisor. This interview will be scheduled at a time that is convenient for you and will take place at your place of work in a private location.

Participation in this research is completely voluntary and you will in no way be advantaged or disadvantaged for choosing to take part or not. There are no benefits to taking part in the study and participation is not foreseen to be harmful in any way.

Your responses will be kept confidential, pseudonyms will be used and no information that could identify you will be included in the research report. The tapes and transcripts will be safely stored and only accessed and processed by myself and my supervisor. Feedback will

be given to the organisation in the form of summary and can be supplied to participants at their request. Participants may withdraw from the study at any time.

If you have any questions about the study please contact me on sharnihart@gmail.com.
Thank you for considering participating in this research.

Yours sincerely,

Sharni Hart (Researcher) Prof. Andrew Thatcher (Supervisor)

Appendix D: Consent form for interview.

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

I _____ consent to being interviewed by _____ for her study on 'green' buildings .

I understand that:

- Participating in this interview is voluntary.
- That I may chose not to answer questions I would prefer not to.
- I may withdraw from the study at any time.
- No information that may identify me will be included in the research report, and my responses will remain confidential. Thus, I will only be identifiable by the researcher, and no other personnel.
- Direct quotations from the tape recording may be used as long as my identity is kept confidential.

Signed: _____

Date: _____

Appendix E: Permission for recording

Psychology
School of Human & Community Development
University of the Witwatersrand
Private Bag 3, WITS, 2050
Tel: (011) 717 4500 Fax: (011) 717 4559

I _____ consent to my interview with _____ for her study on 'green' buildings

I understand that:

- The tapes and transcripts will not be seen or heard by any person besides the researcher and her supervisor, and will only be processed by the researcher. This will be assured as electronic transcripts will be kept in a password-protected place, which will only be accessible to the mentioned parties.
- All tape recordings will be destroyed after they have been transcribed.
- No identifying information will be used in the transcripts or the research report.
- I give permission for the researcher to use direct quotations from the tape recording provided my identity is kept confidential.

Signed: _____

Date: _____

Questionnaires and Interview Schedule

Appendix F: Biographic Questionnaire

Appendix G: Perceptions of physical work conditions

Appendix H: Psychological Well-being Questionnaire

Appendix I: Physical Well-being Questionnaire

Appendix J: Perceived productivity, Absenteeism, Presenteeism, and Overall Job Satisfaction Questions

Appendix K: Green Building Interview Schedule

Appendix L: Self-reflexive report

Appendix F: Demographic Information

(Please answer the following questions that proceed)

Employee Number:

Gender:

Race:

Year born:

When did you first start working for Nedbank (State year and month)?

Year	Month

Organisational level:

Have you changed office buildings in the last month?

If Yes, when did you move?

What office building were you in before?

What office building are you in now?

Department/unit

If you have a permanent disability please indicate which :

Sight	
Hearing	
Motor	
Other	

Chronic underlying illness:(tick all that apply):

Cardiovascular e.g. Heart disease ☐

Hypertension e.g. High blood pressure ☐

Asthma ☐

Cancer ☐

Diabetes ☐

Endocrinal e.g. kidney ☐

Epilepsy ☐

Psychiatric e.g. depression, anxiety ☐

Other ☐

If "Other" please specify: _____

How many hours a day on average do you spend in the current building?

How many hours per day on average do you spend working at you desk/work station?

How many days per week on average do you spend in the current building?

Appendix G: Perceptions of physical work conditions

(Assessed using a scale from Hedge et al.)

In the last month how often have you experienced the following conditions while in your office (Tick the relevant box for each item):

	Never	1-3 times/month	1-3 times/week	Every day
Temperature too warm				
Temperature too cold				
Lighting too dim				
Lighting too bright/glaring				
Insufficient ventilation				
Too drafty				
Too little air movement				
Air too dry				
Air too humid				
Distracting ambient noises				
Unpleasant odour in the air				
Stale air				
Dusty air				
Electrostatic shocks				

Appendix H: Psychological Well-being Questionnaire

(Assessed using the Warwick-Edinburgh Mental Well-Being)

Please answer the following questions in relation to how you have been feeling generally in the last month (Tick the relevant box for each item):

	None of the time	Rarely	Some of the time	Often	All of the time
I've been feeling optimistic about the future.					
I've been feeling useful.					
I've been feeling relaxed.					
I've been interested in other people.					
I've had energy to spare.					
I've been dealing with problems well.					
I've been thinking clearly.					
I've been feeling good about myself.					
I've been feeling close to other people.					
I've been feeling confident.					
I've been able to make up my own mind about things.					
I've been feeling loved.					
I've been interested in new things.					
I've been feeling cheerful.					

Appendix I: Physical Well-being Questionnaire

(Assessed using the Sick Building Syndrome (SBS) questions)

In the last month, how often have you experienced the following physical symptoms while at work (Tick the relevant box for each item):

	Never	1-3 times/month	1-3 times/week	Every day
Excessive mental fatigue				
Headache in your forehead				
Dry eyes				
Irritated or sore eyes				
Tired/strained eyes				
Nervousness or irritability				
Tiredness or lethargy				
Stuffy or congested nose				
Sore or irritated throat				
Runny nose				
Hoarseness				
Dry skin				
Dizziness				
Wheezing or chest tightness				
Nausea				

Appendix J: Perceived productivity, Absenteeism, Presenteeism, and Overall Job Satisfaction Questions:

1) On a scale of 0-100 percent (where 100% is full capacity), rate how well you have been working over the last month in relation to your full capacity:
2) During the last 12 months, how many days sick leave have you taken?
3) During the last 12 months, how many days did your work despite being ill because you felt you had to?
4) Please tick the appropriate box:

	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied
Taking everything into consideration how do you feel about your job as a whole.					

Appendix K: Green Building Interview Schedule

1. What do you think about sustainable development and green buildings in general? Do you think that they are legitimate and logical?
2. What do you believe are the main differences between the green building that you are exposed to every day and that of a conventional building that you have previously been exposed to?
3. Describe your biggest challenge/s associated with the transition/move to the new Green building and how you overcame it or intend to meet this challenge professionally?
4. Describe specific aspects that are associated with your Green building that enhance your everyday working experiences?
5. Do you believe that working in the Green building has changed the way you feel about your job in general? What reasoning underpins this change or lack of change?
6. Do you feel that the Green Building has impacted on your health (psychological and physical)? What aspects contribute to this feeling?
7. Do you believe that by implementing the Green Building, your organisation has supplied you with better 'resources' that help you work more efficiently? If so, what are these resources that come to mind?
8. From your experiences, if you had to advise another organization that was moving towards a Green Building approach. What would you highlight as the strengths and weaknesses associated with this move?

Appendix L: Self-reflexivity Report

It must be noted that this research did employ a mixed methods approach when collecting data. The quantitative data collection used already existing questionnaires that have been established as highly valid, however, the qualitative approach used interviews to collect and analysis data which was obtained from the participants. Even though I have not been directly exposed to working in a green building- I, as the researcher, am aware that my own subjective thoughts, feelings and expectations may have had an impact on the analysis process. In order to try and rule out my subjective feelings, I decided to use quotations in order to make a point, so that my personal bias would not be evident within the data analysis.

It must be noted that my career choice may have impacted on the way I perceived the whole concept of going 'green'. As a practicing Industrial Psychologist, I believe in the benefits that 'green' can have on not only the environment but also the employees. I also realised that participants were busy with their daily working activities, so I tried to keep the interviews as short as possible, and establish a rapport with participants by keeping interviews as informal as possible.

Finally, when performing the data analysis process, I tried to remain as objective as possible while analysing the interviews, in order to allow factual meanings to be conveyed from the participants, without any subjective influences on the results. By doing this, I believe I was constantly aware of my role as the researcher, and allowed for the themes to emerge in the most fair and just manner. Thus, allowing for new perspectives in this realm to emerge