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Research Report

Employee Perceptions of South African Office spaces

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Contents

Plagiarism and Declaration	4
Chapter 1.....	5
Introduction	5
Research problem	6
Research objectives	7
Research questions	7
Delineations	7
Assumptions.....	8
Limitations	8
Chapter 2.....	9
Literature Review.....	9
2.1 Introduction	9
2.2 Types of office spaces	9
2.2.1 Private/ Cellular office spaces.....	10
2.2.2 Open plan/Group offices	11
2.3 Personal/Interpersonal aspects in the workplace	12
2.3.1 Privacy.....	13
2.3.2 Collaboration.....	13
2.4 Physical and environmental aspects in office spaces (move to before 2.4)	15
2.4.1 Acoustics	15
2.4.2 Ergonomics.....	15
2.4.3 Internal Environmental Quality.....	17
2.5 Intergenerational differences in work spaces	19
2.6 Cultural differences in work spaces	20
2.7 Workspace and Productivity	22
2.7.1 Personal/interpersonal aspects and Productivity.....	23
2.7.2 Physical and environmental aspects and productivity	25
2.8 Synthesis and conclusion	26
Chapter 3.....	29
3.1 Research Methods used in this Problem Area	29
3.2 Research Philosophy and Approach.....	33
3.3 Research Design	34
3.4 Research Procedure Followed	35

3.5 Research Participants.....	35
3.6 Research instrument.....	36
3.7 Methodology.....	36
3.8 Statistical Analysis of Results	37
3.9 Ethics	38
3.9.1 Consent and informed consent.....	38
3.9.2 Privacy.....	38
3.9.3 Confidentiality.....	39
3.9.4 Ethical principles in the analysis and reporting of data	39
Chapter 4.....	40
4.1 Analysis and Results	40
4.1.1 Respondent Characteristic.....	40
4.1.2 Types of Office Space	43
4.1.3 Supplementary facilities.....	44
4.1.4 Personal and Interpersonal Aspects of Office Spaces.....	45
4.1.5 Physical aspects of Office Space	47
4.1.6 Environmental, Personal and Design Aspects of Office Space	48
4.1.7 Group Cohesion	51
4.1.8 Intention to stay.....	55
4.1.9 Worker productivity.....	56
4.2 Discussion and Conclusion	58
Reference List.....	60
Annexure 1	64
Letter of Consent to Company.....	64
Annexure 2	66
Letter of Consent to Participant	66
Annexure 3	68
Participant Information Sheet	68
Annexure 4.....	71
Questionnaire	71
Annexure 5	83
Ethic Clearance Certificate	83

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Chapter 1

Introduction

Research findings have illustrated that in the past the main type of office layout used was private office spaces (Rasila & Rothe, 2012). However, due to the wide variety of financial opportunities such as the reduced building expenses, rental costs and net usable area per employee that open plan office layout has to offer, the main trend is to move from private to open plan office design layout (Shafaghat et al., 2015 & Roelofsen, 2002). Today, the most common type of office spaces used are open plan offices with some aspects of private designs incorporated into its layout (de Been & Beijer, 2014).

There are negative and positive experiences associated with both private and open plan office spaces within South Africa and internationally (Kim & de Dear, 2006). The nature of these experiences can be characterised as physical, environmental and personal/interpersonal (Roelofsen, 2002 and Glass, 2007). For the purpose of this research, physical and environmental aspects include acoustics, thermal ventilation, lighting, internal environmental quality and ergonomic aspects while personal/interpersonal aspects include privacy and collaboration opportunities and the lack of it.

Collaborating workstations in an incorrect manner through poor office layout and design have introduced a variety of problems. Examples of the negative effects include increased noise levels, poor heating and cooling systems, hindrances in the internal environmental quality (Passero & Zannin 2012, Kim & de Dear, 2006 and Keränen & Hongisto, 2013), ineffective application of ergonomics (Brooks, 1998, Rowan & Wright 1995), intergenerational and intercultural/interethnic differences that may occur in users' experiences (Rasila & Rothe, 2012, Glass, 2007 and Bernstein & Salipante, 2015).

These negative conditions experienced in office environments may contribute to a lack of job satisfaction and a decline in workers' productivity (Haynes, 2008; Roelofsen, 2002; Kim & de Dear, 2006 and Rowan & Wright, 1995).

Research problem

Previous studies have found that noise levels, human comfort, heating, lighting and the internal environmental conditions affect the work space and productivity in both a negative and positive manner (Kim & de Dear, 2013; Rowan & Wright, 1995 and Roelofsen, 2002).

The negativities apparent at the environmental and personal/interpersonal level include disturbances caused by unwanted noise, a feeling of loss of privacy, mismatching the work requirements to the individual's demands, dissatisfaction with lighting and temperature in workspaces (Kim & de Dear, 2013; Rowan & Wright, 1995 and Roelofsen, 2002). However, earlier research found that correct management of each physical and environmental aspect found in the workspace, worker satisfaction can be achieved (Fernandez, 1995).

Studies have also found that personal/interpersonal aspects such as intergenerational differences in office spaces exist and have implications on the worker and productivity (Glass, 2007). However, these authors are limited in the above aspects as they have only focused primarily on generational and not cultural/ethnic work preferences with respect to preferred design and layout (Haynes, 2011; Lee 2010 and de Been & Beijer, 2014), internal physical environmental quality (Brook, 1998; Passero & Zannin 2012, Kim & de Dear, 2006 and Keränen & Hongisto, 2013) and personal/interpersonal interaction with diverse generations (Glass, 2007 and Rasila & Rothe 2012).

To the best of my knowledge, researchers have not fully explored the effects of cultural/ethnic differences in office spaces. This illustrates the inadequacy of international findings on an interpersonal level of research conducted in office spaces in the South African context. Full cultural and ethnic mix in offices spaces in South Africa is relatively recent, after decades of segregation, making a study from this angle relevant and beneficial to space planners, corporate real estate managers and human resource managers. In addition, the interpersonal environment in office spaces has an effect on productivity and therefore cultural and ethnical differences may affect worker satisfaction and productivity, increasing the relevancy of conducting this research.

Research objectives

This study aimed to:

1. Investigate worker satisfaction with physical, personal/interpersonal as well as internal environmental quality aspects of South African work environments.
2. Evaluate the manner in which physical, environmental and interpersonal aspects affect productivity in South African offices.
3. Investigate if differences exist on the above dimensions in South African offices between the different generations and cultural self -classifications identified in the Employment Equity Act.
4. Evaluate if these generational and cultural differences affect productivity in South African offices.

Research questions

In order to address the above objectives, the following questions were addressed:

1. How satisfied are South African office workers with personal/interpersonal aspects of the work environment?
2. How satisfied are South African office workers with the physical, design and environmental aspects of the work space?
3. Are there generational and cultural differences in the experiences of the workplace in South Africa?
4. How is worker productivity and performance affected by the generational and cultural integration in South African office spaces?

Delineations

The focus of this study was the office real estate sector in the South African context.

Assumptions

It is assumed that

1. the work environment in office spaces affects workers' productivity.
2. cultural differences may occur in South African office spaces due to cultural integration in workplaces being only approximately 22 years old.

Limitations

1. A single case study was used to conduct this research and it is therefore limited to the sample size; this may have resulted in an untrue reflection in the generalization of the population.
2. A survey was used to interview the respondents, this may have altered the reliability and validity of the data as respondents may not have provided accurate and honest answers.
3. The vast percentage variance between the age group categories of the respondents in the case study conducted may have limited the results.

Chapter 2

Literature Review

2.1 Introduction

The main objective of this literature review is to explore prior research in the topic and highlight the research gaps that exist in the body of knowledge. The literature review also seeks to evaluate the methodologies that were used to research topics in this field of study. This will aid in exploring the research design and philosophy for the research methodology and techniques to adopt. It also seeks to identify any new angle from which previous studies can be replicated and extended.

The literature review is structured as follows: firstly, it gives an overview on the different types of office spaces available. Thereafter it discusses the physical, design, environmental as well as personal/interpersonal conditions experienced by workers. Finally, the effect that these aspects have on worker productivity is analysed and discussed. The scope of the literature will explore research conducted internationally and will not be limited to the South African context only.

2.2 Types of office spaces

Office spaces in general can be categorised into four diverse typologies. Duffy (1997) and Haynes (2008) found that hives, which accommodates individual processed work and cells, accommodating concentrated work can be more broadly classified as private/cellular office spaces. Other typologies including dens catering for group processed work and clubs which allow for transactional knowledge can be classified as open plan/group office spaces (Duffy, 1997; Haynes, 2008; Brennan, Chugh & Kline, 2002; Shafaghat et al., 2015 and Allen et al., 2004).

Research findings have found that it is the arrangement and layout of the office space that determines or classifies the office type (Lee, 2010). The distinction between different office types are mainly based on architectural features such as the lay-out, design and functional features within workspaces as well as typological frameworks (de Been & Beijer, 2014 and Duffy, 1997). The existence of different office typologies is due to the advancement of

technology, adjustments to suit corporate changes and the quest to meet organisational goals and objectives in the work environment (de Been & Beijer, 2014). It is important to select the correct type of office in order to cater for the sharing of knowledge within the workplace, reduce facility costs, maximize on productivity and achieve a more flexible building to accommodate for future organizational changes (de Been & Beijer, 2014).

The type of office space is largely dependent on working trends. Haynes (2008) highlighted the following working trends: individual process workers, who are mostly required to be at their desk and do not have much interaction with their work colleagues; group process workers, are mainly required to be at their desk but have a high level of interaction with colleagues; concentrated study workers, who have a high degree of flexibility in where they work and do not have much interaction with colleagues and lastly; transactional knowledge workers, who have a high degree of flexibility in where they work as well as a high degree of interaction with their colleagues.

A well designed workspace environment of any typological framework must incorporate the following key elements into its design and settings. These include clear spaces catering for optimum flexibility of layout, defined entry and exit stations, accessibility to relevant spaces and views, sound internal environmental qualities in terms of lighting, acoustics, ventilation, ergonomics and office designs that are sustainable and energy efficient. (CABE: Creating Excellent Buildings, 2004).

2.2.1 Private/ Cellular office spaces

Research findings by Chigot (2003) has defined private/cellular offices as solitary or autonomous work areas while Allen et al (2004) have defined private/cellular office spaces as a large enclosed floor space that is partitioned by numerous permanent walls to form office working cells or rooms.

This office typology is generally configured along a corridor whereby the size and shape of each office is dependent on the managerial or professional position of the worker occupying the office, demonstrating the hierarchy of roles within the organisation (Allen et al., 2004 and Chigot, 2003).

de Been & Beijer (2014) discovered office spaces known as individual and shared room office spaces. These types of offices constitutes an aspect of privacy as it is a combination of cell office spaces and small shared rooms which is mostly used by one to three workers.

The main benefit of private/cellular office spaces is the sense of privacy and confidentiality that it has to offer while the main disadvantage of this type of office configuration is the increased net usable area per employee increasing building and rental costs (Becker, 2001 and Shafaghat et al., 2015).

2.2.2 Open plan/Group offices

Open plan/group offices have been defined by authors such as Brill et al., (2001) and Allen et al., (2004) as workspaces with desk boundaries that do not extend up to the ceiling. Brennan, Chugh & Kline (2002) established that open plan offices in many studies have been characterised by the number and heights of partitions together with the density and openness of space.

Research findings have demonstrated that open plan/group offices can be categorised into a wide variety of types ranging from landscape offices, which include partitioned workstations, to bull pen offices which has no partitions catering for teamwork with small groups of desks or long rows of desks in an open area (Lee, 2010; Shafaghat et al., 2015 and Allen et al., 2004).

Open plan/group offices can also be considered as enclosed shared, which accommodates between two to twelve individuals. Furthermore, it can be characterised as high or low panel cubicle settings. In high panel cubicle settings, workers cannot see their co-workers while seated and in low panel cubicle settings, workers are able to see their co-workers while seated (Lee, 2010; Shafaghat et al., 2015 and Allen et al., 2004). Open plan offices also include executive suites whereby office spaces within the professional environment building are subleased (Shafaghat et al., 2015).

de Been & Beijer (2014) described combi office environments as having an open and transparent nature as they are based on open and semi open spaces. In combi offices, workers have an assigned workstation in an open or half-open office area. Flex offices have been recognized as another type of open plan office, which has the same design and floor plan as the combi office. In flex offices, workers do not have an assigned workstation as

workers are expected to clear their desk every time they leave the workstation so that other colleagues can then make use of it (de Been & Beijer, 2014; Shafaghat et al., 2015 and Allen et al., 2004).

The open plan working environment can be designed and used for a wide range of office mechanisms. It can be designed as caves which allows for partitioned areas for common use within the general office (Stocks, 1998). Common areas can also be designed to facilitate open plan meeting rooms which encourage spontaneous meetings and gatherings. Other designs that can be incorporated into open plan office designs include hot desking; whereby desks and workstations are used by multiple workers and organisations use each other's office spaces (Stocks, 1998).

Kim & de Dear (2013) and Becker (2001) discovered that the transition from private to open plan office spaces was driven by the economic advantages of open plan offices which includes the increase in net usable area, higher occupant density and reduction in cost per employee. This can be confirmed by (Shafaghat et al., 2015 and Becker, 2001) who found that a larger number of workers are accommodated in a smaller space in open plan offices. The reduced space required allows for a reduction in rental and building costs as well as technical services, maintenance and energy consumption costs (Shafaghat et al, 2015). Furthermore, open plan office spaces allows for fast, inexpensive reconfiguration of office layout and settings due to its flexible design nature (Shafaghat et al, 2015).

Meel and Vos (2001) found that as time progresses, organisational cultures become more informal, flexible and less hierarchical. New open plan office buildings tend to incorporate luxurious facilities such as gyms, lounge areas, hairdressing salons, day care facilities, restaurants/canteens, coffee bars, pool tables etc. into the design to facilitate an informal, relaxed layout.

2.3 Personal/Interpersonal aspects in the workplace

Research findings have demonstrated that different office typologies create a variety of positive and negative experiences on a personal and interpersonal level in the work environment (Rasila & Rothe, 2012; Glass, 2007 and Bernstein & Salipante, 2015). The commonest effects involve a trade-off between privacy and collaboration.

2.3.1 Privacy

Palen and Dourish (2003) found privacy to be a form of withdrawal, where people prefer various levels of privacy in diverse situations and these preferences are thus factored into the design of private office spaces. Ding (2008) found that there are three main personal/interpersonal factors that contribute to privacy in a cellular/private office environment. Firstly, control over access which is the ability to limit the undesired impact of the presence and distractions of others. Secondly, control over visual distractions and interruptions: this refers to limiting unintended and accidental effects of the presence of others or of the activities of others and lastly, speech privacy, which refers to the ability to hold confidential conversations, safeguarding sensitive and confidential information.

Chigot (2003) has established cellular office spaces as a model provide an environment for conducting independent work. He further found that cellular/private office spaces are in favour of the concept that skills and tasks are best developed in its own space and environment.

The main positive aspects associated with private/cellular office configurations on a personal/interpersonal level is the increased level of privacy, reduction of disturbances and distractions, ability to successfully complete confidential work and an allowance for an increased sense of ownership within the workplace (Allen et al., 2004). It also allows for workers to have meetings and confidential discussions in each other's offices (Chigot, 2003). However, the main disadvantages of private/cellular office spaces are the restricted communication, interaction and involvement achieved in the workplace (Chigot, 2003). Other negativities include the perceived sense of lack of being valued by staff not allocated to private offices and a reduction in the opportunity for tacit learning and monitoring (O'Neill, 2008).

2.3.2 Collaboration

de Been & Beijer (2014) describe combi office environments as allowing for additional open and enclosed areas to accommodate collaboration, individual concentrated work, telephone calls and for a variety of interactional, transactional and conference activities.

The benefits associated with collaborative configurations on a personal/interpersonal level include higher social relations, communication, interaction and exchange of knowledge between workers (Shafaghat et al., 2015; Hedge, 1982 and Allen et al., 2004). Hickey (2010) found that other benefits of open plan office spaces is that it eliminates physical barriers between managers and general staff which enhance the speed and quality of tasks to be performed. Open plan office formations also facilitate tacit learning from diverse experienced employees and also allows for the ease in the transfer of information between teams and co-workers (Becker, 2001).

The main drawbacks associated with open plan office spaces on a personal/interpersonal level is the loss of privacy, reductions in productivity and satisfaction (Oommen, 2008). It also reduces employees' ability to control unwanted disturbances and interruptions. Collaborative configurations reduce the amount of quiet spaces required for individuals to render services that relate to confidential and sensitive information (Allen et al., 2004 and Becker, 2001). Other negativities include the perceived loss of status of employees particularly during the transition from private to open plan office space settings (O'Neil, 2008).

de Been & Beijer (2014) observed that the less satisfied people are with privacy, the less able they are to perform their required tasks. Kim and de Dear (2013) found that enclosed private offices outperform open plan office spaces particularly with regard to personal/interpersonal aspects. They found that the benefit of the ease of interactions that open plan offices offer is less than the negativities of higher noise levels and reduced privacy. Furthermore, findings by Ding (2008) explained that open plan offices do not enable efficient communication between workers as it does not cater for confidential, private or business communication.

On the contrary, de Been & Beijer (2014) argued that despite private offices offering an increased level of satisfaction due to the reduction in noise and increased level of privacy, research findings have demonstrated that the isolation of private offices can hinder the ability to communicate and reduces the ability for workers to interact with one another whereas open plan spaces alleviate this problem (de Been & Beijer, 2014).

2.4 Physical and environmental aspects in office spaces (move to before 2.4)

Findings have proven that there are a wide variety of aspects apparent in the work environment on a physical level (Roelofsen, 2008; de Been & Beijer, 2014 and Brooks, 1998). The main issues relating to acoustics, ergonomics, thermal ventilation and lighting are discussed and evaluated. It is examined for both the cellular/private and open plan/group office layouts.

2.4.1 Acoustics

Acoustics in office spaces can be defined as the ability of the building material used for construction to transmit sound (Sundstrom et al., 1994). The main source of acoustics apparent in open plan offices is noise that originates from the continuous sound of machines and ventilation systems (Rasila & Rothe, 2012). However, Passer & Zanni (2012) argued that noise, particularly originating from human speech is one of the main sources of irritation and annoyance in open plan office spaces. Other sources of noise include computers, printers and the overall movement of co-workers (Sundstrom et al., 1994). Research findings have demonstrated that open plan offices do not separate workers from unwanted sound resulting in the overall feeling of loss of privacy and loss of personal control over their workplace (Kim & de Dear, 2013). This results in serious problems for a worker whose task requires silence and is placed in open plan spaces (Keränen & Hongisto, 2013). The distractions from irrelevant speech are problems that exist in the work environment and it is through improved room acoustic designs that these problems can be removed (Keränen & Hongisto, 2013).

On the contrary, findings by Van der Voordt (2004) discovered that workers in open plan office spaces experience an increase in stimuli in terms of visual and acoustic elements as opposed to private office spaces. Kim & de Dear (2013) found that open plan office spaces facilitate communication and interaction between workers irrespective of the increased noise levels, which is important to improve individual work performance and the organisation's productivity.

2.4.2 Ergonomics

Wilson (1995) as cited in Brooks (1998) has defined ergonomics in an office context as the practice of learning about worker characteristics and using that understanding to improve

workers interaction with the elements that they use in an office environment. Attaran & Wargo (1999) have defined ergonomics in the work environment as the integration of the worker with their tools and tasks. These authors further elaborated that ergonomics is aimed at matching the workers physical characteristics with their responsibilities within the work environment (Attaran & Wargo, 1999).

Karwowski (2005) found that ergonomics can be categorised into three main dimensions, these include physical ergonomics: which focuses on human anatomy and anthropometrics that is linked to physical activity. Cognitive ergonomics relates to psychological processes such as mentally processing data and absorbing individual perception about elements in the office work place and lastly, organisational ergonomics, focuses on the interaction between individuals and technology as well as interaction between workers and other participants found in the organisation.

Examples of ergonomic aspects found in both open plan and private office spaces will be discussed on the following elements: desks, chairs, doors, tools and technology. Desks that are designed with an articulating keyboard holder allows for both horizontal and vertical adjustability, accommodating for higher levels of ergonomics (Attaran & Wargo, 1999). In order to achieve improved ergonomics, office chairs should factor in vertical adjustability, allow for the back rest to be raised, lowered, reclined, locked and allow for the seat pan to be tilted or remain flat. The arm rest of the chair should also allow for vertical adjustability catering for different physical characteristics of the workers (Attaran & Wargo, 1999 and Martin & Helander, 2003). Automated doors that are found in private/cellular office spaces are found to be ergonomically friendly as it is more hygienic, saves times and prevents injuries as opposed to manual doors (Attaran & Wargo, 1999).

Research findings have shown that there are four main elements regarding ergonomic requirements in open plan and private office space design. These include office equipment, environmental conditions, software and the work organisation (Margaritis & Marmaras, 2006). Findings also suggest that in order for organisations to have a competitive advantage in the marketplace, in terms of quality and excellence, it must apply the principles of ergonomics in an effective and correct manner (Fernandez, 1995).

There are many tools and equipment that are found in both open plan and private office spaces, and incorporating ergonomics into these elements are of importance to allow for the job or task to be completed with ease. Examples of ergonomic tools and equipment include telephones, keyboard wrist pads, ergonomic pens and staple removers (Attaran & Wargo, 1999). Incorporating advanced technological equipment such as computers and digital phones also contributes to good ergonomic practice in open plan and private office spaces.

Fernandez (1995) found that the following key principles must be factored into both open plan and private office space designs: the surface heights used by the worker should match the anthropological framework of the worker, unnatural postures should be avoided, the work station should allow for change in posture and position. Chairs should cater for the maintenance of sitting postures and finally the workers should be trained to use all office equipment correctly.

Rowan & Wright (1995) illustrated that the main goal of ergonomics in open plan/group and private/cellular office spaces is to enable workers to be more efficient by matching the requirements and demand of the job to the ability and limitation of the workers instead of forcing the workers to fit the job itself. This goal of ergonomics has been confirmed by Fernandez (1995) who discovered that the main aim of ergonomics is to fit the task to the individual and not the individual to the task in any given office typology.

Margaritis & Marmaras (2006) explain that ergonomics requires appropriate design of the various components of the work environment. It can therefore be used as a tool to solve work related problems encountered by office workers. Rowan & Wright (1995) found that ergonomic management is an integral part of corporate strategy and culture and must be incorporated into the office design.

2.4.3 Internal Environmental Quality

There are many variables which influence the internal environmental quality in open/group office spaces as well as in private/cellular offices spaces. These include the auditory, visual and thermal environment, air quality and the level of control. These factors are apparent in office spaces and have an effect on the productivity and performance of workers within the organisation (Roelofsen, 2002).

A variety of studies have been conducted to establish the effect of the environmental quality on employees in the workplace, with the internal environment seen as the main tool in achieving higher organisational performance (Lee, 2009). The main elements affecting the internal environment in open plan/group office spaces include lighting, which must be applied to promote the following: sustainability of tasks, avoidance of glare and cost efficiency. The lighting must be to the satisfaction of the workers, supporting their task to be completed (Brook, 1998).

Roelofsen (2002) found that lighting plays a fundamental role in the internal environmental quality of open plan and private office spaces; however it is limited to the degree at which the job demands lighting. This author further elaborated on the ease at which the eye can adapt to different lighting conditions and this therefore has a minimal effect on worker productivity. Roelofsen (2002) discovered that unlike the adaptable nature of lighting by office workers, ventilation does not have the same effect on workers. This author also found that workers tend to complain more of the internal temperature of open plan/group office spaces as opposed to complaints about sound and lighting. This is due to the limited control workers have over the temperature particularly in large open plan office spaces as opposed to private/cellular office configurations. Findings by Wong, Mui, Hui and Chan (2009) found that the indoor climate must match the workers needs in an office space in order for them to successfully physically connect with the office and environment and work efficiently in both open plan and private office spaces.

Research findings by Attaran & Wargo (1999) found that the incorrect application of lighting can cause headaches and eye irritability. This problem can be reduced or eliminated in open plan office spaces by providing task lights. These lights provide additional light required for conducting intense paper work which aids in reducing glare and eye strain and is controlled by the individual worker, giving the individual worker control over lighting despite being in an open plan office environment.

Chigot (2003) found that the cell model or private office spaces contributes to an environment that caters for personal needs allowing each room for the worker to adapt and adjust to physical aspects such as heating and lighting as opposed to open plan office spaces.

2.5 Intergenerational differences in work spaces

The four main types of demographic groups present in the workplace include veterans: born between 1925 and 1940; baby boomers, born between 1941 and 1960. Generation X, born between 1961 and 1976 and the millennial, born between 1977 and 1992. Lastly, generation Y is defined as individuals born between 1982 -2002 (Glass, 2007 and Rasila & Rothe, 2012). There is currently a mix of all the above mentioned generations in the workplace except for the veterans, illustrating the diversity of generational mix in the office space.

Glass (2007) discovered that individuals raised in different periods and generations differ in work views, expectations and values and thus have their own preferred method of communicating and interacting with each other in an office environment. Each generation has different traits and styles in their behaviour as they were exposed to different conditions in their upbringing (Glass, 2007). They have different work ethics, managing change approaches and different perceptions of organisational hierarchy; however, they are expected to work in a collaborative fashion in the workplace of open plan office configurations (Glass, 2007).

Glass (2007) found that traditionally, older generations are more familiar to private/cellular office spaces and thus have particular preference to that office typology as they are more accustomed to its configurations. This may cause problems amongst older age groups as the main trend is to move from private/cellular office spaces to open plan office spaces (Kim & de Dear, 2013).

Glass (2007) found that a variety of differences are currently present in open plan office spaces due to the intergenerational gap found in the workplace. These include older generations being able to work longer hours at a time and younger generations having the perception of just getting the job done as quick as possible. This may cause conflict as open plan office spaces are in favour of work collaboration, and different generation with different work styles and techniques are forced to work together in open plan office configurations (Glass, 2007).

Research findings by Glass (2007) have demonstrated that older generations struggle to adapt to new technology in the office while this is not a problem for younger generations. Means of communication modes tend to pose conflict between different generations as

open plan office spaces encourage face to face communication which is preferred by older age groups while younger age groups prefer using advanced technological means to communicate (Glass, 2007). The issues highlighted above may pose conflict in both open and private work spaces due the diverse preferences of different generations having to work together and at times as a team (Rasila & Rothe, 2012)

Open/group plan office spaces encourage interaction between workers as it accommodates for the transition of knowledge, this may be problematic when older generations struggle to work and intermix with younger generations and are forced to do so in open plan office configurations as opposed to private/cellular office spaces (Glass, 2007 and Rasila & Rothe, 2012). Other differences and negativities include when workers from older generations are managed by younger leaders particularly in open plan office spaces where team work is encouraged (Glass, 2007).

Open/group plan office spaces can be beneficial for both younger and older generations as each generation can adopt skills and expertise from the opposite generation, allowing for growth and development in the sharing of knowledge in this office typology (Chigot, 2003). Private/cellular office space configurations do not enhance such exchange of knowledge between different generations in the work environment and can be viewed as a major drawback (Allen et al., 2004).

Research findings have illustrated that younger generations prefer an open plan office environment as opposed to a private one. They had recognised the problems associated with open plan designs but do not view them in a negative manner only. They accept the negative effects of open plan layout in light of a positive good (Rasila & Rothe, 2012).

2.6 Cultural differences in work spaces

Literature has defined anthropometrics as the measurement of human beings, such as the diversity apparent in gender, ethnic, cultural, social class and race (Fernandez, 1995). Findings have shown that ethnicity relates to cultural customs, values and behaviours, self-identification and feelings about belonging to a certain group whilst race is generally based on physical characteristics and social constructions of those characteristics (Martin and Nakayama, 2010). Currently, there is an array of anthropometrical mixes present in the

workforce particularly in a South African context. It is thus important to accommodate for cultural mixes in both open plan and private offices designs (Fernandez, 1995).

Bernstein & Salipante (2015) have defined interethnic comfort as the ease and self-confidence in interacting appropriately with diverse others. It is important to achieve diversity in an organisation as diverse individuals interact competently and meaningfully with each other instead of interacting only superficially or avoiding each other altogether. This sort of interaction can be more successfully achieved in open/group office configurations as it allows for an increased level of social interaction as opposed to private/cellular office spaces, which does not promote such interaction in the work environment.

It has been found that one of the most vital elements associated with individual proficiency in an office environment is the comfort or discomfort that an individual experiences when interacting with diverse others which is more easily attainable in open plan office spaces (Bernstein & Salipante, 2015).

The avoidance of cultural and interethnic interactions in the presence of diverse others can be understood by the well renowned idiom written by Robert Half *"birds of a feather flock together."* This statement fails to explain the reasoning behind positive interethnic interactions being common in some groups and not in others (Bernstein and Salipante, 2015). However, it shows that in many instances, individuals of the same ethnic and cultural background tend to find comfort and a sense of belonging in those who are alike to them (Bernstein & Salipante, 2015). It is therefore of great importance to collate and group different ethnicities and cultures correctly in open plan office spaces in order to maintain comfort and a sense of belonging in the work environment.

Intercultural and interethnic discomfort in a variety of forms has been recognised in studies to have negative effects for both the minority and majority of individuals. These negativities include impeding positive relationships through stereotype threats, interethnic anxiety and the strengthening of negative attitudes (Bernstein & Salipante, 2015). The negative effect of these stereotypes amongst diverse ethnicities and cultures may cause discrepancies in open plan office configurations. This can be confirmed by Human (1996) who found that in many intercultural and interethnic situations, there are many stereotypical and prejudice ideas

about attitudes and behaviours of certain groups. It has also been observed that workers of specific cultural groups may project themselves as superior while workers of other cultural groups may project themselves as inferior in intercultural and interethnic encounters, causing discomfort when required to work in a collaborative fashion in open plan office spaces. These circumstances come about when ethnicity, race, culture, power or status forms a psychological driving factor. In order to eliminate these implications, an environment that creates a sense of belonging, interaction structuring and a welcoming climate must be introduced in modern open plan office spaces (Bernstein & Salipante, 2015).

Managing diverse personal/interpersonal aspects in office spaces is of paramount importance and requires flexibility and communication skills which up holds and retains the value of diverse others. Improving the management of diversity will create a positive work environment and optimal conditions whereby worker productivity and performance will be maximised in many settings including that of office spaces (Human, 1996).

2.7 Workspace and Productivity

Rolloos (1997) has defined productivity as that which people can produce with little effort, while Sutermeister (1976) has defined productivity as the output per employee per hour. Productivity has also been described as the increased functional and organisational performance of workers in terms of quality. There is a great association between productivity and performance as Sink (1985) discovered that organisational performance can be measured on the following dimensions: effectiveness, efficiency, quality, profitability, productivity, quality and innovation. This serves as a guideline for the bases of measuring productivity. The result of improved productivity can be due to the increase in the quantity and quality of the production during the period that employees are actively working (Roelofsen, 2002).

Measuring productivity is very subjective in its nature and despite the above perceived definitions of productivity, Haynes (2007) found that there is no universally accepted measure for productivity and thus a self-assessed measure for productivity is acceptable. Furthermore, Haynes (2008) suggested that since occupiers experience the office environment with all the senses, it would thus be appropriate to develop a means to measure the manner in which the office environment affects those senses.

Haynes (2008) has identified ten workplace qualities that ensure worker productivity. These include the ability to conduct distraction free solo work, support for impromptu interactions, support for meetings without distractions, work space comfort, ease of accessibility to co-workers, good places for breaks, access to required technology, quality lighting and access to daylight as well as temperature control and air quality.

2.7.1 Personal/interpersonal aspects and Productivity

de been & Beijier (2014) found that workers in private/cellular office spaces are able to achieve higher levels of productivity due the increased privacy and improved concentration that this office configuration has to offer as opposed to open/group plan office spaces. Furthermore, findings also show that open/group plan office spaces do not allow for workers to personalize their workspaces, resulting in a negative effect on productivity (de been & Beijier, 2014). On the contrary, the increased social interaction and communication that open/group plan office spaces have to offer contribute to increased productivity as opposed to private/cellular office spaces (Roelofsen, 2002).

Research findings by Roelofsen (2002) emphasised that the most essential requirement in open/group plan office spaces is a working environment that permits workers to maximise their productivity. This can be achieved by creating comfortable work conditions by accommodating for diverse cultural, ethnic and multi-generational groups present in many open/group office spaces found today (Bernstein & Salipante, 2015). It is imperative to invest in the quality of the work environment as this is the most effective way of combating loss of performance and promoting worker productivity particularly in open plan office spaces (Roelofsen, 2002).

Glass (2007) and Bernstein & Salipante (2015) found that the largest diversity of generational, cultural and ethnic groups are currently present in the office workplace. Due to the transition from private/cellular office spaces to open/group office spaces, these diverse generational, cultural and ethnic groups are expected to work in a collaborative manner. Research findings suggest that differences may arise when encouraging intercultural, interethnic as well as intergenerational integration in open plan office spaces (Human, 1996 and Chigot, 2003). This is of a great concern in a South African context as older age groups and diverse cultures have been working in a collaborative fashion for only

approximately the past 22 years. There is therefore a likelihood of differences that could occur across cultures, ethnicities and generations, hindering productivity. It is thus important to understand the causes of generational, cultural and ethnic differences that may occur in South African office spaces. This will aid in improving the design, physical environmental quality as well as personal/interpersonal aspects in open/group office spaces. These improvements may therefore prevent productivity loss in open/group office spaces (Fernandez, 1995; Bernstein & Salipante, 2015 and Glass, 2007).

Furthermore, it is also important to achieve the correct multi-generational, cultural and ethnic combination within the open plan/group office spaces to achieve productivity and efficiency. This can be accomplished through the identification of the challenges faced by all personal/interpersonal factors and managing them correctly to achieve worker productivity in a comfortable environment (Glass, 2007).

Mawson (2002) discovered that productivity loss is due to the mismatch between the office environment and the work that is undertaken in that environment. On a personal/interpersonal level, this could possibly indicate that multi-generations are not coordinated and mixed correctly when expected to work and complete a task in a collaborative fashion in open/group plan office spaces, resulting in the loss of productivity (Mawson, 2002). This can be confirmed by Haynes (2008) as he illustrated that high-performance in open/group plan workplaces are achieved when the office environment is in line with the occupier's work styles and the occupier's perception of their office environment.

In addition, Duffy (2000) as cited in Haynes (2007) found that high performance and productivity in an open/group plan office workplace is achieved by aligning the workplace strategy with the business strategy. A workplace strategy that is aimed at creating a diverse intercultural and interethnic environment should be aligned correctly to the business strategy in order to achieve high levels of productivity particularly in open/group plan office spaces (Bernstein & Salipante, 2015). Research findings have illustrated that productivity will be achieved in this type of setting where workers feel at ease and are confident in the work environment (Bernstein & Salipante, 2015).

2.7.2 Physical and environmental aspects and productivity

Acoustics have been found to have a direct effect on worker productivity as Rasila & Rothe (2012) found that individuals perform worse in noisy environments. The ability to work without being distracted has been found to contribute to effective collaboration and productivity (Heerwagen et al., 2004). This can be confirmed by Kim & de Dear (2013), who discovered that noise and lack of privacy serve as the key elements of dissatisfaction in open plan offices and therefore has a negative effect on productivity. Noise has been found by Roelofsen (2008) to reduce the ability to perform as the distraction from noise causes tiredness, irritability and depression. Noise has also been found to disturb verbal communication, making speech and hearing less distinct. This makes it difficult for workers to concentrate and causes a decline in work productivity (Roelofsen, 2008).

On the contrary, research findings by de Been & Beijier (2014) found that a greater sense of productivity is achieved in open/group plan office spaces as worker are more satisfied with the architectural and layout design as opposed to that of private/cellular office spaces. These authors found that it is because workers have the option to choose their workstations in open/group plan office spaces they are more productive than being assigned to a single workstation in private/cellular office spaces (de Been & Beijier, 2014).

Ding (2008) discovered that the greater the amount of control workers have over office environment factors such as lighting adjustment, temperature regulation and noise, in open/group plan and private/cellular offices, the greater the amount of work satisfaction and higher the levels of productivity achieved. Furthermore, he explained that in order to optimise productivity in terms of individual performance, group performance and job satisfaction, an individual must be able to work in a setting that is free of distraction. Croome & Baizhan, 2002 as cited in Pitt & Smith 2011 found that indoor climate is linked to productivity as improving indoor thermal conditions in office spaces could improve productivity by 4 to 10 per cent .

Rowan & Wright (1995) discovered that ergonomics in the workplace has a direct effect on profitability, effectiveness and productivity. Once the main goal of ergonomics is achieved by finding a good fit between the worker and their job, it will result in worker comfort, safety, efficiency and increases productivity (Rowan & Wright, 1995).The main consequence

of good ergonomics is quality improvement, performance improvements, cost reductions and a more productivity enhanced processors (Rowan & Wright, 1995).

Furthermore, findings by Fernandez (1995) demonstrated that the application of ergonomic principles to the office design results in increased productivity, job satisfaction, increase in work quality, lower worker turnover, lower lost time at work, improved morale of workers and a decrease in the rate of absenteeism. The main priority of organisations is to achieve improved worker performance at low costs; however, the employees biggest concern is to experience a pleasurable work environment (Passer & Zanni, 2012). It is therefore of paramount importance to find the correct balance in achieving lower costs without deteriorating the work environment.

2.8 Synthesis and conclusion

International studies have demonstrated that the main typologies of offices spaces available range from hives and cells as more broadly known as private/cellular office spaces to dens and clubs, which can be classified as open/group plan office spaces (Duffy, 1997 and Haynes, 2008). Today, the main trend is the use of open plan office spaces due to the many economic benefits that it has to offer. These benefits include the increase in net usable area, increased occupant density and reduction in energy consumption cost per employee (Kim & de Dear, 2013; Becker, 2012 and Shafaghat et al., 2015).

The different office typologies that exist offer a variety of implications on a personal/interpersonal level for both private and collaborative office configurations (Rasila & Rothe, 2012; Glass, 2007 and Bernstein & Saliphante, 2015). Allen et al (2004) found that private/cellular office spaces cater for increased privacy, reduced disturbances and supports for confidential work to be completed as opposed to open/group plan office spaces. However, research findings have also found that private/cellular office spaces restrict communication and interaction between workers in the workplace which may hinder efficient productivity (Chigot, 2003; Shafaghat et al., 2015; Hedge, 1992 and Allen et al., 2004).

Open/group plan office spaces encourage higher social relations, communication and exchange of knowledge facilitating faster, efficient productivity gains as opposed to

private/cellular office spaces (Shafaghat et al., 2015; Hedge, 1992; Allen et al., 2004; Becker, 2001 and Hickey, 2010). The main negativity associated with open plan office spaces is the loss of privacy, inability of controlling unwanted distractions, noise, thermal conditions, lighting and executing services that is allied to sensitive and confidential data (Oommen, 2008; Allen et al., 2004; Roelofsen, 2002 Rasila & Rothe, 2012 and Becker 2001).

Key authors have found that physical aspects such as acoustics, ergonomics, ventilation, lighting and the internal environment influence both private and collaborative office configurations (Roelofsen, 2008; de Been & Beijer, 2014 and Brooks, 1998). Findings have shown that open/group plan office spaces do not separate unwanted noise and disturbances from the worker (Kim & de Dear, 2013). This creates a sense of loss of privacy impeding the ability to maximise on productivity (Rasila & Rothe, 2012 and Heerwagen et al., 2004).

It is of great importance for the work environment to cater for the ergonomic characteristics of the worker. Elements such as desks, chairs door, tools and equipment should match the physical characteristics of the worker to ensure productivity in both private/cellular and open/group plan office spaces. Other physical factors that influence worker satisfaction in private and collaborative office spaces include lighting, ventilation and temperature (Roelofsen, 2002; Lee, 2009; Brook, 1998 and Attaran & Wargo, 1999). These physical factors must be applied correctly ensuring worker satisfaction and productivity (Roelofsen, 2002 and Lee, 2009).

Research findings have shown that diverse generations have different preferences in work styles and methods which may result in differences when encouraged to work in a collaborative fashion in open/group plan office space (Glass, 2007; Kim & de Dear, 2013 and Rasila & Rothe, 2012). It is thus imperative to find the correct multi-generational combination in order to achieve competency and productivity (Glass, 2007). Amalgamating different cultures and ethnicities in the work environment may also result in differences despite the benefits and advantages of creating diversity in work spaces (Bernstein and Salipante, 2015). This is of great importance in a South African context due to the difficulties that may arise in adapting to the ethnic and cultural mix in office spaces due it only being approximately two decades for post-Apartheid. Office workers may not be accustomed to

cultural and ethnic integration in South Africa due to the Apartheid era, increasing the probability of differences and difficulties that may occur in open plan/group plan office spaces.

To the best of my knowledge international studies have not factored in and explored interethnic and intercultural differences that may exist in private/cellular and open/group office spaces particularly in a South African context. Research findings have not fully described the experiences with regard to this personal/interpersonal aspect taking into account the approximate 21 years of democracy in South Africa. This proves as the gap in the body of knowledge, whereby conducting research in this domain will be effective and beneficial.

This study is aimed at testing the following hypotheses:

- Generational and cultural differences exist in the manner that office workers experience the personal and interpersonal aspects of the office.
- Generational and cultural differences exist in the environmental, personal and design aspects of the office space.
- Generational and cultural differences exist in group cohesion as well as intention to stay with the firm.

The above mentioned hypotheses will be tested by means of a Kruskal - Wallis test. Furthermore, a Post Hoc test will be conducted to further analyse and explore the data obtained from the Kruskal - Wallis test.

Chapter 3

3.1 Research Methods used in this Problem Area

Methodologies that have been adopted by key authors in this field of study range from quantitative, qualitative to mix methods. These methods applied were investigated and the strengths and weaknesses of each method were analysed. This aided in highlighting the advantages and disadvantages of the methods utilised, providing an indication on the efficiency of the method that I have applied to execute my research study.

de Been & Beijer (2014) conducted their study in Netherlands, using three different office typologies, namely, individual and shared room, combi and flex offices. The research was conducted on 87 different work environments within Netherlands. The main advantage of using different typologies is that the results are gained from participants expose to the main variety of office configurations. This allows for improved accuracy in findings relating to the satisfaction and experience of different office settings.

These authors have a sample size of 11 799, indicating that approximately half of the sample participated in the study as 24 733 questionnaires were sent out. The benefit of using such a large sample size is that it provides a greater representative of the population and reduces the amount of outliers (Gujarati, 2003). The large sample size used by these authors also increases the validity and accuracy of results and reduces the standard margin of error (Gujarati, 2003).

In order to measure the satisfaction of workers in both open plan and private office spaces, an online questionnaire was developed and used by de Been & Beijer (2014). The main advantage associated with structured interviews is that it enables the researcher to identify general patterns making it easier for these authors to test their three hypotheses (Saunders, Lewis and Thornhill, 2012).

The use of electronic questionnaires caters for participants that are geographically dispersed particularly in the study by de Been & Beijer (2014) where 87 different work environments were used. Utilising the internet is thus beneficial for these authors. Also, another advantage of online questionnaires is that the software used automatically records all information typed by the participant allowing for improved accuracy and a reduction in

time required to capture results. There are however a number of ethical issues associate with online questionnaires and surveys (Saunders, Lewis and Thornhill , 2012). Findings by SmartSurvey's (2015) found that online questionnaires are much faster and inexpensive as opposed to traditional transcriptive methods. It also allows for increased accuracy and ease at which data can be analysed.

de Been & Beijer (2014) used a questionnaire that constituted of 41 questions relating to the facilities, internal environmental quality and support of productivity in office environments. The questionnaires were based on a ten point scale which is commonly used in Netherlands. A regressive analysis was then used to analyse the results.

Haynes (2008) evaluated the existing literature that makes a link between the office layout and the effect on workers' productivity. The main advantage of this methodology is that an in depth analysis was provided on past literature findings. It provides relevant and important information on the aspects and components to cover in the field of study. This author has conducted the literature review by developing two main themes in the literature based on office layout and its linkage to work patterns as well an argument between open plan office spaces versus cellular office spaces.

This author makes use of secondary data only, which allows for existing knowledge to be further analysed and interpreted. However, the author has lack of control over the quality, reliability and validity of the data being analysed serving as the main disadvantage. Benefits in using secondary data include the following: reduction in resource requirements, unconstructive in its nature, provides comprehensive and contextual data and lastly it allows for durability of data.

Rasila & Rothe (2012) carried out their research as a case study in Finland, on two different office typologies namely open plan and private office spaces. The use of different typologies allows for data to be collected on experiences of two office configurations as adopted by de Been & Beijer (2014). The interviews were carried out at three different locations on full time and part time workers. A variety of generations were interviewed increasing the diversity in satisfaction experienced in open plan and private office spaces.

The interviews conducted by Rasila & Rothe (2012) were based on a variety of themes. The themes included the following: noise, privacy, density, distraction, social settings, inefficiency, increased workload and ambient conditions. The interviews were conducted in an informal manner, whereby the duration of each interview was 45 to 60 minutes long. This is a much longer, structured approach compared to de Been & Beijer (2014).

Rasila & Rothe (2012) have a sample size of 20 which is relatively small as opposed to de Been & Beijer (2014). The main disadvantage of a small sample sizes is that the sample cannot be used to make a generalisation of the population and thus does not represent a true reflection of the population (Gujarati, 2003). Small sample sizes results in high confidence interval levels and standard deviations making findings less accurate and reliable. Smaller sample sizes could also lead to bias.

Despite the weaknesses due to the sample size used, Rasila & Rothe (2012) provides an overview on the experiences of generation Y in both open plan and private office spaces. Unlike de Been & Beijer (2014), Rasila & Rothe (2012) analyse the results of the interviews by means of a literature review. This method of interpretation allows for a discussion on the results as opposed to report like analysis from findings that have been through regression analysis by de Been & Beijer (2014). An in depth detailed discussion is given on the results of each thematic question posed to the interviewee.

Kim & de Dear (2013) carried out their research in Australia, on two different office typologies namely open plan and private office spaces. The use of different typologies allows for data to be collected on experiences of two office configurations as adopted by de Been & Beijer (2014) and Rasila & Rothe (2014). Kim & de Dear (2013) made use of an occupant survey database whereby questionnaires and surveys were carried out through this software.

As mentioned previously, the use of electronic questionnaires caters for participants that are geographically dispersed. The main benefit of using online questionnaires and surveys is that the software used automatically records all information typed by the participant allowing for improved accuracy and a reduction in time required to capture results (Saunders, Lewis and Thornhill , 2012).

Kim & de Dear (2013) have a sample size of 42 764 participants which is an exceptional amount and can be compared to de Been & Beijer (2014) who had a sample size of 11 799 participants. As mentioned previously, the main advantage of using such a large sample size is that it provides a greater representative of the population and reduces the amount of outliers (Gujarati, 2003). The large sample size used by these authors also increases the validity, reliability and accuracy of results and reduces the standard margin of error (Gujarati, 2003).

The results found by Kim & de Dear (2013) was based on occupant satisfaction with regard to different internal environmental quality aspects. This was done using rating questions with a seven scale system. Saunders, Lewis and Thornhill (2012) found that rating questions are intended to collect information on workers opinion. This type of questionnaire is also known as “Likert –style rating” which are presented in a straight line to the respondent. The main advantages associated with these types of questionnaires are that it is easily understood by the respondents. Given the wide variety of computer software available, results of these types of questionnaires are easily quantifiable (LaMarca, 2011). However, Saunders, Lewis and Thornhill (2012) found the main disadvantage of these types of questionnaires is that data is collected for seven or nine response categories but combined when analysed in the findings. Furthermore, these authors found that the bigger the scale, the increased likelihood for measurement error.

The main physical aspects covered in the questionnaires by Kim & de Dear (2013) includes the following: thermal comfort, air quality, lighting, acoustics, office layout and furnishings, cleanliness and maintenance. These are basically all of the physical aspects that influence worker satisfaction of open/group plan as well as private/cellular office spaces. Personal/interpersonal characteristics such as age, gender and work category were also included in the survey. These types of questions are important to pose as it allows for demographic data to be gained, refining the findings. The data was than analysed using the satisfaction levels from responses that are generated through regression analysis using means, percentiles and standard deviations. Finally an in depth discussion was provided on the findings.

Ding (2008) conducted her study in the Midwest of USA on two different office typologies namely open plan and private office spaces. The use of different typologies allows for data to be collected on experiences of two office configurations as adopted by de Been & Beijer (2014), Rasila & Rothe (2014) and Kim & de Dear (2013).

Ding (2008) has a sample size of 42 participants which can be compared to the sample size of Rasila & Rothe (2012) of 20 participants. The small sample size serves as the main limitation of the research conducted by Ding (2008). As mentioned previously, the main disadvantage of a small sample size is that the sample cannot be used to make a generalisation of the population and thus does not represent a true reflection of the population (Gujarati, 2003). Small sample sizes results in high confidence interval levels and standard deviations making findings less accurate and reliable. The sample used by Ding (2008) mainly constitutes of managers and employees which covers the basic occupiers of an office space.

Ding (2008) made use of structured interviews, as seen with de Been & Beijer (2014), the benefit related to structured interviews is that it enables the researcher to identify general patterns making it easier for these author to test her hypotheses (Saunders, Lewis and Thornhill, 2012). Ding (2008) has a total of five questions that are used for the interview.

Ding (2008) analyses her results by recoding the frequency of the responses of each question. The results were illustrated graphically and a detailed discussion was provided on the findings. Ding (2008) also categorised her findings and used Chi Square calculations to make interpretations on the hypothesis.

3.2 Research Philosophy and Approach

The quantitative approach that was adopted to complete this research study reflected a positivism philosophy, whereby data was collected about an observable reality. A search for regularities and casual relationships in the data was made in order to create a law like generalisation as those made by natural scientists (Saunders, Lewis and Thornhill, 2012). An important component of the positivist philosophy which was applied to the research undertaken is that the research was conducted in a value free manner. Due to the adoption of this approach, a highly structured methodology was used in order to facilitate replication.

Objectivism ontology was also used, representing the position that social entities exist in reality externally to and independent of social actors. A deduction approach was employed that developed the theory, which was then subjected to tests through a series of propositions. The key author's in this field of study that have applied this approach through testing hypothesis is de Been & Beijer (2014) and Ding (2008).

Quantitative research examines relationships between variables which are measured numerically and analysed using a range of statistical techniques. This methodology uses correlations, statistical logic, measurements and probability sampling techniques to ensure generalizability (Saunders, Lewis and Thornhill, 2012). It was most the appropriate methodology to adopt as it has been successfully employed by key authors in this field such as Kim & de Dear (2013); Roelofsen (2002); Rowan & Wright (1995) and Haynes (2008). These authors have conducted surveys, interviews and questionnaires based on similar questions to my research objectives.

3.3 Research Design

Utilising a quantitative design to conduct this proposed research study was beneficial as it provided an objective stance of the participants exposed to the various physical/environmental and personal/interpersonal aspects in office spaces. The main purpose of using quantitative data is to identify patterns, trends, frequencies, characteristics, attitudes and actions of participants (Neuman, 2000). The research design was non-experimental as it did not make use of control groups, nor did it engage in random assignments for participants. Non-experimental research designs do not allow for casual interference and was therefore not applied to this research study analysis (Neuman, 2000).

The main advantage of applying a quantitative method was the ease at which the data had been collected, measured, analysed and demonstrated. It allowed for a broader study with an increased number of subjects improving objectivity and accuracy of results (Saunders, Lewis and Thornhill, 2012). It also avoided personal bias of the researcher by keeping a distance from its subjects. Furthermore, it assumed that the sample is a representation of the population. However, the main weakness of this method was that the results may have been limited to its sample size.

In order to conduct this research study, a survey research strategy was conducted through the use of structured interviews and questionnaires. The type of questionnaire employed was self-completed questionnaires, which was completed by the respondent electronically using an online software platform called Qualtrics which is governed by the University of Witwatersrand.

A case study, which constituted a comprehensive examination of a case, emphasizing developmental factors in relation to the context, (Stangor, 2011) was applied to conduct this research. A case study generally investigates occurrences within its real life context (Stangor, 2011). Thus, this research study was conducted to examine the worker's experiences in office spaces on a physical/environmental level as well as on a personal/interpersonal level.

3.4 Research Procedure Followed

The following procedure was followed in order to conduct this research study: firstly, a presentation of the research proposal was presented to the head of the Construction Economics and Management School and other reputable personal from the School. Secondly, ethical clearance from the University of Witwatersrand was obtained to conduct the research study. Thirdly, permission was obtained from an "office-using" company with different office configurations to use its firm and employees as a case study. Fourthly, the participants were emailed consent forms, giving them a brief overview of the purpose of the study, and inviting them to partake in the research study. Thereafter the participants completed the questionnaire on a voluntary basis, guaranteeing anonymity. Finally, all results were analyzed, evaluated and interpreted in a confidential manner by the researcher and incorporated into the research study in a report style.

3.5 Research Participants

The participants involved in this research study were from workers based in office environments. The name of the firm remains anonymous for the purpose of this study. The researcher provided via email an explanation of the purpose and objectives of the study, this allowed for the directors of the firm to gain a complete understanding of the research study before granting consent to use its firm as a case study. The sample constituted employees of the firm including directors, associates, managers, juniors, typists, cost

controllers, secretaries, support staff, etc. The participants were aged from 21 years old and above. The sample size totaled to 65 participants of which 40 respondents were successfully achieved. The participants completed the questionnaire that was sent to them electronically using the Qualtrics database. Personal information of the participants involved remained anonymous and all results were interpreted maintaining the confidentiality and anonymity of the firm and its employees.

3.6 Research instrument

The first section of the questionnaire covered all biographical information of the participant through category questions. The second section of the questionnaire covered all physical and environmental aspects experienced in the workplace and its effect on productivity. The third section of the questionnaire covered the personal and interpersonal aspects that are experienced in the workplace and its effect on productivity. The final section of the questionnaire was a self- measure of productivity. The second and third section of the questionnaire made use of “rating questions” which was employed to collect opinion data, using the “Likert-style rating system.

3.7 Methodology

A quantitative approach was adopted to facilitate this research study. The main purpose of this research was to investigate the physical, environmental and personal/interpersonal aspects present in South African office spaces and its ultimate effect on worker productivity. The level of satisfaction on physical and environmental aspects such as acoustics, ergonomics, lighting and thermal ventilation in office spaces were investigated.

This was done by using ranking questions that were intended to collect information on workers experience and opinion in the office. This type of questionnaire is also known as “Likert –style rating” which were presented in a straight line to the respondent. Ranks were used on a scale of 1 to 5, where 1 represented extremely poor, 2- poor, 3- average, 4- good and 5- excellent. The main advantages associated with these types of questionnaires are that it is easily understood by the respondents (Saunders, Lewis and Thornhill, 2012).

Similarly, the personal/interpersonal aspects in terms of intergenerational and intercultural/interethnic experiences of workers were also analysed in this manner. However, the ranking scales were represented as follows: 1 represented strongly disagree, 2

– agree, 3- neutral, 4- disagree and 5- strongly disagree. In order to measure productivity, workers were asked to rank themselves on a scale of 0 to 100 per cent, where 100 per cent was full capacity.

3.8 Statistical Analysis of Results

In order to analyse and interpret the results, a statistical programme known as SPSS was used to run a Kruskal – Wallis test. This is a non-parametric statistical test that analyses the variance between three or more independently sampled groups on a single, non-normally distributed continuous variable (McKight & Najab, 2010). This type of test does not assume that the data is normal; however it does assume that the different groups have the same distribution. In addition, it also assumes that groups with varying standard deviations have various distributions (McDonald, 2014).

The main reason for using a Kruskal-Wallis test in this research study is due to the original data constituting of a nominal variable and a ranked variable (McDonald, 2014). The non – parametric test were performed on ranked data, where the smallest value gets a rank of 1, the next smallest value gets a rank of 2 and so forth. The sum of the ranks were calculated for the individual groups and thereafter the test statistic H was calculated. The test statistic H represented the differences of the ranks amongst the groups, with an adjustment for the number of ties (McDonald, 2014). The H value is approximately chi-square distributed, whereby the possibility of getting a particular value for H by chance, if the null hypothesis was true, the P value corresponding to the chi-square was equal to H (McDonald, 2014). If the P value was greater than 0.05, this indicated that there was no significant difference and the null hypothesis was accepted. However, if the P value was less than 0.05, this indicated that it is statistically significant and the null hypothesis was rejected. A post Hoc test was then ran to confirm where the differences appeared on all P value variables with significant differences.

3.9 Ethics

The following ethical issues were associated to the survey and were addressed in the following manner:

This study has taken into account and incorporated ethics into its contents in order to generate an effective and meaningful research. The methodological approach adopted for the research study was a quantitative approach and was conducted in an ethically sound manner. The following key concerns were taken into account to ensure that correct ethics were adhered to:

3.9.1 Consent and informed consent

Consent involves the option whereby the participant decides whether or not to participate in the study. As the researcher, I ensured that the participants had a complete and clear understanding of the purpose and methods that were used in the study, together with the associated risks and what was demanded of the participant's (Best & Kahn, 2006 and Jones & Kottler, 2006). It was also important for the participant to be aware that they have the right to withdraw from the study at any time. There were two types of consents that was adopted, firstly, direct consent where consent was gained directly from the participant involved in the study. The second was substitute consent or third party consent, whereby consent was given by someone else other than the person involved in the study (Nagy, 2005 and Roberts et. al 2005).

Informed consent is associated with three elements, namely: capacity, information and voluntariness. It was important for these elements to be present for the actual consent to be effective (Drew & Hardman, 2007). It was also vital to inform the participant answering the questionnaire that consent is not permanent and may be withdrawn at any given time and can be applied where necessary.

3.9.2 Privacy

It was important, as the researcher, to certify that the privacy of participants was ensured when conducting the research. This included respect for the participants, avoidance of

harm, the voluntary nature of participants, ensuring confidentiality and maintaining anonymity (Saunders, Lewis and Thornhill, 2012).

3.9.3 Confidentiality

The research was aimed at answering structured questions and was not focused on those who provided the data. It was therefore important that all individuals and organisations remained anonymous and the data that they provided was processed for it to be non-attributable. When confidentiality and anonymity were assured, the data's reliability was thus enhanced.

3.9.4 Ethical principles in the analysis and reporting of data

In conducting this research, all assurance on privacy, anonymity and confidentiality was upheld and ensured when analysing and reporting data. The primary data was not altered and the results were not falsified. All of the findings were reported fully and accurately, irrespective if they conflicted with expected outcomes. The data was protected while the research was in progress by storing the data on an online platform that was password protected. The research data will be destroyed after one year after the completion of the research study. Furthermore, the data will be safeguarded and preserved from unauthorised access by using a secured online platform until it is properly destroyed and disposed.

Chapter 4

4.1 Analysis and Results

The study is a single case study of an office using private consultancy firm, located in Johannesburg, South Africa. The questionnaire was sent to employees based in the following departments: management, consultancy, financial, human resource, cost controlling, planning and administration support. This allowed for the capturing of responses from employees of various segments within the firm.

65 questionnaires were sent out in December 2015 as a pilot study and 40 were returned after a reminder was sent within one week. This resulted in a response rate of 61.54 per cent and 1 per cent of the respondents dropped out of the survey. Due to the high success in the response rate, the pilot study was decided to be incorporated into the research as a case study.

4.1.1 Respondent Characteristic

Table 1.1, 1.2 and 1.3 below shows descriptive and biographical information of the respondents. These tables provide information on the different age groups, self-classification as per the Employment Equity Act and the language distribution according to the eleven official South African home languages.

Table 1.1 and figure 1.1 below describes the distribution of the various age groups. It illustrates that majority of the respondents are between 21-33 years old (61%), followed by employees aged between 34 -49 years old (24%). The smallest respondent category is between 50-67 years old (15%). This is evident from the bar graph graphically demonstrated below in figure 1.1.

Table 1.1: Age distribution of respondents

Age group	Number	Percentage
21-33	25	61
34-49	10	24
50-67	6	15
68+	0	0
Total	41	100

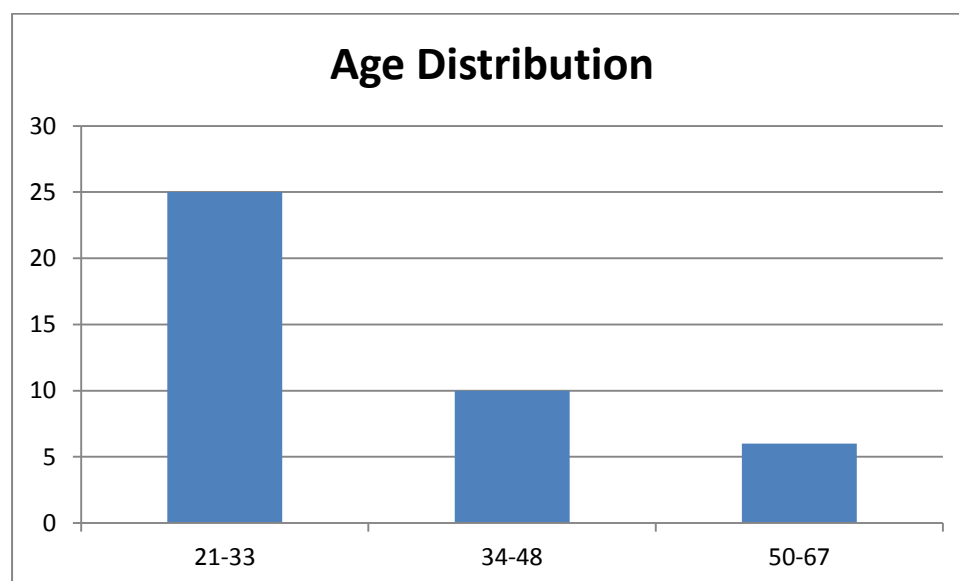
Figure 1.1: Age distribution of respondents

Table 1.2 and figure 1.2 below shows the respondents' self-classification as per the Employment Equity Act. It shows that majority of the respondents have self-classified themselves as white (54%) under the Employment Equity Act, followed by employees self-classifying themselves as African (24%) and Indian (20%). The smallest respondent category has self-classified themselves as coloured (2%) under the Employment Equity Act. This is evident from the bar graph graphically demonstrated below in figure 1.2.

Table 1.2: Self classification as per Employment Equity Act

Respondent self-classification	Number	Percentage
White	22	54
African	10	24
Indian	8	20
Coloured	1	2

Figure 1.2: Self classification as per Employment Equity Act

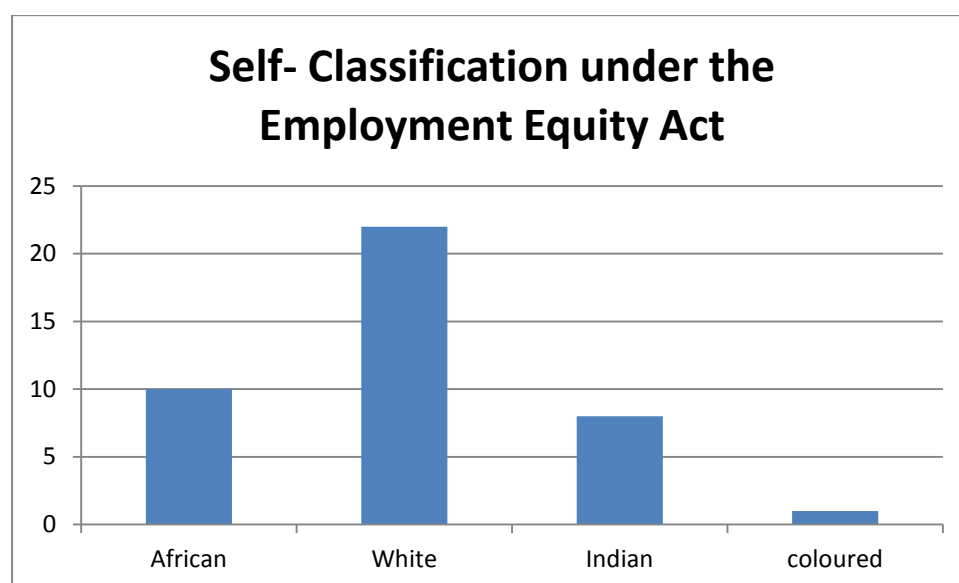
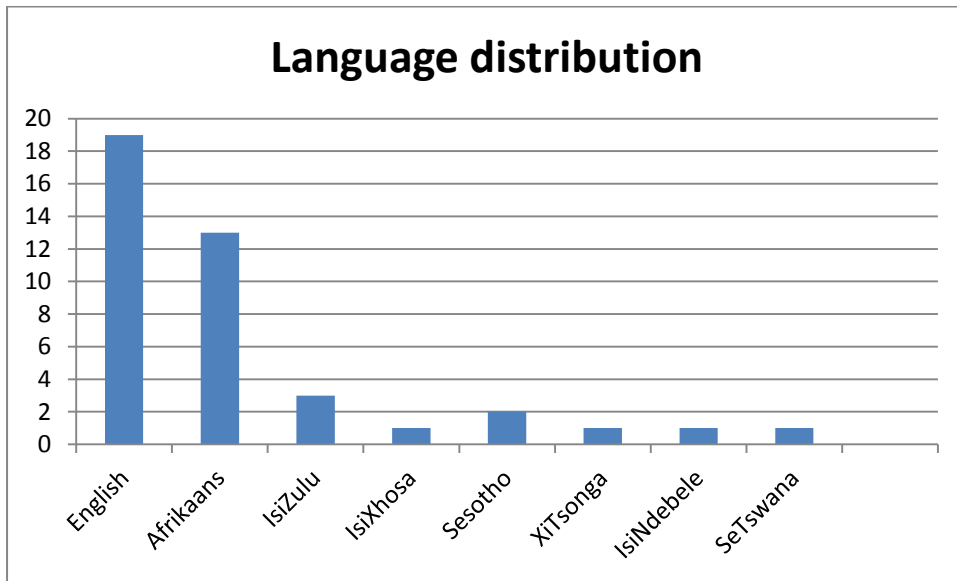


Table 1.3 and figure 1.3 below illustrates the language distribution according to the 11 official South African languages. It shows that majority of the respondents use English (46.3%) as their official South African home language, followed by Afrikaans (31.7%), isiZulu (7.3%) and Sesotho (4.9%). The smallest respondent category has been evenly distributed between isiXhosa , isiTsonga and sesTswana (2.4%). This can be confirmed from the bar graph graphically demonstrated below in figure 1.3.

Table 1.3: Home language distribution of the 11 official South African home languages.

Language	Number	Percentage
English	19	46.3
Afrikaans	13	31.7
IsiZulu	3	7.3
Sesotho	2	4.9
IsiXhosa	1	2.4
XiTsonga	1	2.4
IsiNdebele	1	2.4
SeTswana	1	2.4
Total	41	100

Figure 1.3: Home language distribution of the 11 official South African languages.



4.1.2 Types of Office Space

Figure 1.4 below graphically shows the distribution of office space typologies. In terms of the office type that the respondents use, the open plan office is the dominant form. This is followed by team offices. The minority of respondents use private and partitioned office spaces.

Figure 1.4: Office space typologies.

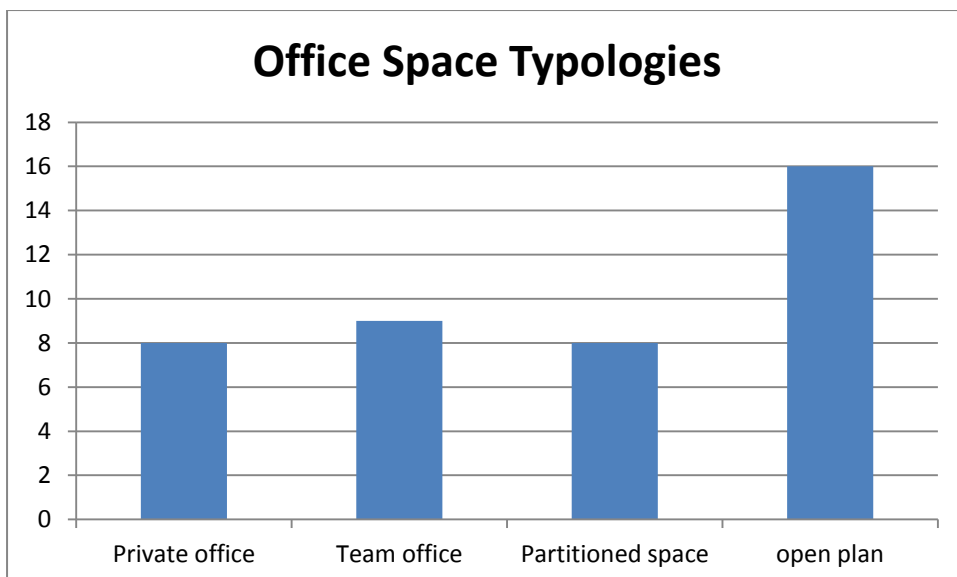


Table 1.5 below shows that in terms of the segment that the respondents belong in the business, middle office is the dominant form, followed by front offices/sales/business development. Minority of the respondents are placed in the back office/ admin support segment of the business.

Table 1.5: Office type arrangement by job type

	Private office	Team office	Partitioned space	Hot desk	Open plan	Total
Middle Office	1	6	5	0	11	23
Front office/sales/Business Development	4	0	3	0	3	10
Back Office/Admin Support	2	2	0	0	1	5
Total	7	8	8	0	15	38

4.1.3 Supplementary facilities

This case study makes use of a single company where findings on supplementary facilities are depicted below. The most common facility available is the covered parking (87%), followed by the entertainment room/bar (68%) and lastly showers (18%). Based on the responses, the company does not have a gym, hairdressing salon/barbershop or day care facilities. The inconsistency in the findings below shows that the respondents are all not fully aware of the facilities offered by the company.

Table 1.6: Supplementary facilities

Supplementary facilities	Per cent
Covered Parking	87%
Entertainment room/bar	68%
Shower(s)	18%
Restaurant/Canteen	3%
Gym	0%
Hairdressing Salon/Barbershop	0%
Day Care Facilities	0%

4.1.4 Personal and Interpersonal Aspects of Office Spaces

Seeing that the majority type of office space used is open plan office spaces, it is of paramount importance to investigate the personal and interpersonal experiences of employees in this office typology. Table 2 below demonstrates that open plan office spaces encourages certain interactive aspects of work life, as the higher average ratings appear in having informal social interaction, collaborating on focussed work, learning from others and holding larger group meetings . These result support literature findings by Shafaghat et al; (2015); Hedge (1982) and Allen et al. (2004) who found that collaborative configurations on a personal/interpersonal level allows for social relations, communication, interaction and exchange of knowledge between workers. However, table 2 below also shows that this office typology does allow respondents to hold private and business confidential conversations but not as adequately desired, as this is where the fairly lower average rating appears. These results support literature findings by Allen et al. (2004) and Becker (2001) who found that collaborative configurations reduce the amount of quiet spaces required for individuals to render services that relate to confidential and sensitive information. This shows that open plan office spaces may promote collaboration but at the cost of privacy.

Table 2: Personal and Interpersonal Aspects of Office spaces

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
Access in-office network connectivity	0	2	7	22	8	3.92
Have informal social interaction	2	3	4	22	8	3.79
Collaborate on focused work	1	3	8	21	5	3.68
Learn from others	3	0	10	21	5	3.64
Hold larger group meetings/audiences	4	4	7	19	5	3.44
Hold informal unplanned meetings	6	1	9	20	3	3.33
Think creatively	3	5	14	10	7	3.33
Host visitors, clients or customers	5	5	7	18	4	3.28
Relax/take a break	3	9	8	12	6	3.24
Hold confidential business discussions	8	5	4	16	6	3.18
Hold private conversations	8	7	6	13	5	3.00

The main areas of concerns are if there are generational and cultural differences in the ranking of the above mentioned factors. The Kruskal – Wallis test as depicted in table 2.1 below clearly illustrates that there are no significant differences between diverse

generational group experiences in the personal/interpersonal aspects in office spaces. This means that each age group experiences all personal/interpersonal aspects in office spaces in the same manner. These results are contrary to literature findings by Glass (2007) who found that older generations are more familiar to private/cellular office spaces as opposed to open plan offices and should thus have more negative feelings toward the personal/interpersonal aspects of open plan office spaces.

Table 2.1: Association between Generational differences and Personal/ Interpersonal Aspects of Office Spaces

	Chi-square(2)	P-value
Hold informal unplanned meetings	0.32486	0.8501
Learn from others	0.5589	0.7562
Have informal social interaction	1.184	0.5532
Host visitors, clients or customers	1.1896	0.5517
Hold private conversations	1.6742	0.433
Relax/take a break	1.9457	0.378
Hold confidential business discussions	2.144	0.3423
Hold larger group meetings/audiences	3.6345	0.1625
Collaborate on focused work	3.742	0.154
Think creatively	4.3642	0.1128
Access in-office network connectivity	5.5196	0.0633

Table 2.2 below also shows that there are no major differences apparent between diverse cultural group's experiences in the personal/interpersonal aspects in office spaces. However, a significant difference does exist where certain cultures prefer to relax and take a break more often than diverse others. This has been confirmed by the Post Hoc test conducted on P values less than 0.05 as illustrated in table 2.3 below.

Table 2.2: Association between cultural differences and Personal/Interpersonal Aspects of Office spaces

	Chi-square(3)	P-value
Have informal social interaction	0.87424	0.8316
Collaborate on focused work	1.8755	0.5986
Hold confidential business discussions	2.165	0.5389
Think creatively	3.5042	0.3202
Host visitors, clients or customers	4.6703	0.1976
Learn from others	4.7168	0.1937
Hold informal unplanned meetings	4.8434	0.1836
Hold larger group meetings/audiences	5.1355	0.1621
Access in-office network connectivity	5.3604	0.1472
Hold private conversations	5.6744	0.1286
Relax/take a break	10.024	0.01836

Table 2.3: Post Hoc Test on P values less than 0.05 for diverse cultures as self- classified in the Employers Equity Act

Self- classification as per the Employers Equity Act	Obs. dif	Critical dif	Difference
African – Coloured	23.222222	31.70791	False
African – Indian	11.284722	14.61662	False
African – White	12.650794	11.98446	True
Coloured – Indian	11.937500	31.90547	False
Coloured – White	10.571429	30.78864	False
Indian – White	01.366071	12.49779	False

4.1.5 Physical aspects of Office Space

The physical aspects of the office environment that affect the respondents experience in the office space were also investigated. Table 3 below indicates that the temperature being too warm is of most concern, as it has the highest average rating. This can be confirmed by Roelofsen (2002) who found that workers tend to complain more of the internal

temperature of open plan/group office. Distracting ambient noises as well as the air being too dry are of the higher average rating indicating concern.

The lighting/glaring and ventilation is of the lower average ratings, showing that it is of a lesser concern. These results can be confirmed by literature findings of Roelofsen (2002) who found that due the ease at which the eye can adapt to different lighting conditions, it has a minimal effect on workers satisfaction. There does however, seem to be an intermediate satisfaction with regard to all other physical aspects found in the office space.

Table 3: Physical Aspects of Office Spaces

	Never	Less than Once a Month	Once a Month	2-3 Times a Month	Once a Week	2-3 Times a Week	Daily	Mean
Temperature too warm	10	3	6	7	4	3	7	3.73
Temperature too cold	15	9	4	3	1	5	3	2.83
Too little air movement	18	8	2	2	1	6	3	2.75
Air too dry	18	9	1	3	0	6	3	2.70
Distracting ambient noises	17	10	4	0	2	2	5	2.65
Electrostatic shocks	21	4	3	4	1	3	4	2.63
Unpleasant odour in the air	14	11	4	6	1	4	0	2.53
Stale air	20	8	3	1	1	5	2	2.45
Insufficient ventilation	18	10	3	2	3	2	2	2.40
Lighting too bright/glaring	22	9	0	2	2	1	4	2.30
Dusty air	21	10	1	1	2	2	2	2.15
Air too humid	28	7	1	2	0	1	0	1.51
Too draughty	31	6	0	2	1	0	0	1.40

4.1.6 Environmental, Personal and Design Aspects of Office Space

The respondents' personal experience on the physical environment was further explored in the research study. The results in this sector showed a significant trade-off between privacy and interactivity. Table 4 below clearly demonstrates this difference as interactivity has the

highest average positive rating while privacy has the lowest average rating. Noise levels are also of a concern as it is of the lower average ratings. These results can be confirmed by literature findings of Kim & de Dear (2013) and Roelofsen (2008) who discovered that noise and lack of privacy serve as the key elements of dissatisfaction in open plan offices. Furthermore, research findings by Hickey (2010) and Becker (2001) found that open plan office spaces supports interactivity.

There does however seem to be an intermediate satisfaction or indifference toward all other physical aspects of the work environment. Lighting and cleanliness fall within the higher average ratings.

Table 4: Environmental, Personal and Design Aspects of Office Space

	Extremely poor	Poor	Average	Good	Excellent	Mean
Ease of interaction with co-workers	0	0	9	22	9	4
Maintenance of the building	0	0	12	16	12	4
Amount of light	0	0	11	20	9	3.95
Cleanliness of the space	0	1	11	19	9	3.90
Overall quality of your personal workspace	0	1	11	21	7	3.85
Comfort of personal office furniture(chair, desk, computer and equipment)	0	1	14	17	8	3.80
Visual comfort of the lighting (glare reflections and contrast)	0	2	16	16	6	3.65
Air quality of the workspace	0	5	14	17	4	3.50
Temperature of the workspace	1	5	11	20	3	3.48
Noise level	2	3	16	13	6	3.45
Colour and texture of flooring, furniture and surface finishes	1	2	20	14	3	3.40
Adjustability of your furniture	1	8	18	9	4	3.18
Privacy in your workspace	9	10	15	4	2	2.50

It is important to investigate if there are generational and cultural differences in the ranking of the above mentioned aspects in the work environment. Table 4.1 and Table 4.2 below

clearly illustrate that there are no significant differences between diverse generational and cultural group experiences in these aspects of office spaces. This shows that irrespective of the generational and cultural differences, all of the respondents experience the same trade-off between interactivity and privacy under open plan office configurations as this is the leading office typology in this case study.

Table 4.1 Association between Generational differences and Environmental, Personal and Design Aspects of Office spaces

	Chi-square(2)	P-value
Colour and texture of flooring, furniture and surface finishes	0.177	0.9153
Amount of light	0.39816	0.8195
Temperature of the workspace	0.60488	0.739
Visual comfort of the lighting (glare reflections and contrast)	0.62426	0.7319
Air quality of the workspace	1.4607	0.4817
Adjustability of your furniture	1.8467	0.3972
Cleanliness of the space	1.8663	0.3933
Maintenance of the building	2.2098	0.3312
Privacy in your workspace	2.4995	0.2866
Ease of interaction with co-workers	2.9635	0.2272
Noise level	4.37	0.1125
Comfort of personal office furniture(chair, desk, computer and equipment)	5.2725	0.07163

Table 4.2: Association between Cultural differences and Environmental, Personal and Design Aspects of Office spaces.

	Chi-square	P-value
Cleanliness of the space	1.1028	0.7764
Maintenance of the building	1.1596	0.7627
Overall quality of your personal workspace	1.6329	0.652
Temperature of the workspace	1.6344	0.6516

Colour and texture of flooring, furniture and surface finishes	1.6637	0.645
Visual comfort of the lighting (glare reflections and contrast)	1.7321	0.6298
Adjustability of your furniture	1.7359	0.629
Amount of light	2.6476	0.4492
Noise level	2.962	0.3975
Privacy in your workspace	3.3548	0.3401
Air quality of the workspace	3.3922	0.335
Comfort of personal office furniture(chair, desk, computer and equipment)	4.4472	0.2171
Ease of interaction with co-workers	6.0864	0.1075

4.1.7 Group Cohesion

Research findings have defined group cohesion as “the resultant of all forces acting on members to remain in the group” (Festinger, 1950 as cited in Baridu, 2013). Table 5 below illustrates items that serve as a measure for group cohesion. The respondents appear to have demonstrated a higher average rating response to the positive statements on group cohesion whilst the negative statements on group cohesion attained lower average ratings as depicted in table 5 below. These results reveal that majority of the respondents have a positive attitude and feeling toward group cohesion. Furthermore, respondents appear to deviate from the negative sentiments toward group cohesion.

Table 5: Group Cohesion

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
I like my unit	2	2	10	19	6	3.64
I feel a part of the unit	1	3	10	23	3	3.60
It makes a difference to me how this unit performs	2	1	14	16	6	3.59
I want to remain a part of the unit	2	2	12	19	5	3.58
Compared to other units I know of, I feel y unit is a better place to work that most	0	4	15	16	5	3.55
My workspace in the unit enables me complete my work effectively	2	2	12	21	3	3.53

I feel involved in what is happening in the unit	0	3	16	19	2	3.50
In spite of individual differences, a feeling of unity exists in my unit	2	4	11	19	4	3.48
My workspace allocated to me in the unit portrays a professional image	4	2	12	18	4	3.40
My workspace in the unit facilitates teamwork with colleagues	3	2	15	18	2	3.35
I feel it would make a difference to the unit if I were not around	4	7	15	9	5	3.10
If I were told I didn't have to meet with the members today, I would feel bad	4	6	15	13	2	3.08
I would not feel badly if I had to miss a meeting of the unit's staff	4	10	12	10	4	3.00
I feel distant from the unit	6	12	15	5	2	2.63
If I could leave the unit now I would	11	8	13	3	5	2.58
I dread coming to work	8	14	11	2	5	2.55
I do not feel a part of unit's activities	8	10	16	4	2	2.55
I feel my absence would not matter to the unit's performance	8	13	11	5	3	2.55
I don't care what happens in this unit	11	10	13	4	2	2.40
I wish it were possible for the unit to close now	12	14	11	0	3	2.20

This study investigates if there are generational and cultural differences in the ranking of statements relating to group cohesion. Table 5.1 below shows that a significant difference does exist between the different age groups. The Post Hoc test as shown in table 5.2 below confirms that younger age groups feel more valued in the office environment as they feel it would make a difference to the unit if they were not around. This could be due to research findings by Glass (2007) who found that older age groups find difficulty in adapting to advanced technology, methods of communication and innovative working styles. This could result in older age groups feeling less valued as opposed younger age groups, who are able to grow and develop much faster.

Table 5.1: Association between Generational Differences and Group Cohesion.

	Chi-square	P-value
I like my unit	0.0061985	0.9969
In spite of individual differences, a feeling of unity exists in my unit	0.031111	0.9846
It makes a difference to me how this unit performs	0.27935	0.8696

My workspace allocated to me in the unit portrays a professional image	0.35479	0.8374
My workspace in the unit enables me complete my work effectively	0.69064	0.708
If I were told I didn't have to meet with the members today, I would feel bad	0.95497	0.6203
I feel involved in what is happening in the unit	1.0134	0.6025
My workspace in the unit facilitates teamwork with colleagues	1.2444	0.5368
I dread coming to work	1.4056	0.4952
I want to remain a part of the unit	1.6651	0.4349
I feel my absence would not matter to the unit's performance	1.7343	0.4201
I wish it were possible for the unit to close now	1.9564	0.376
I feel distant from the unit	1.9985	0.3682
I feel a part of the unit	2.1443	0.3423
I would not feel badly if I had to miss a meeting of the unit's staff	2.7045	0.2587
I do not feel a part of unit's activities	2.842	0.2415
If I could leave the unit now I would	3.2677	0.1952
Compared to other units I know of, I feel y unit is a better place to work that most	3.3719	0.1853
I don't care what happens in this unit	4.2072	0.122
I feel it would make a difference to the unit if I were not around	10.024	0.006657

Table 5.2 Post Hoc Test on P values less than 0.05 for diverse generations

Age group	Obs. dif	Critical dif	Difference
21 -33 and 34 –48	13.420000	10.73027	True
21-33 and 50- 67	1.003333	13.03712	False
34-48 and 50-67	12.4166667	14.80917	False

Table 5.3 below shows that there are significant cultural differences in group cohesion as certain cultural groups do not feel a sense of belonging in the unit compared to diverse others. This may result in certain cultural groups leaving the unit or the company itself. This behaviour can be confirmed by literature findings of Bernstein & Salipante (2015) who

found that if the work environment fails to create an atmosphere that is welcoming and has a sense of belonging for workers of diverse cultures, worker satisfaction will be hindered.

Table 5.3: Association between Cultural Differences and Group Cohesion.

	Chi-square	P-value
I feel involved in what is happening in the unit	1.3022	0.7286
In spite of individual differences, a feeling of unity exists in my unit	1.4161	0.7018
My workspace in the unit facilitates teamwork with colleagues	1.5894	0.6618
I wish it were possible for the unit to close now	1.7152	0.6336
I feel a part of the unit	1.7447	0.627
My workspace allocated to me in the unit portrays a professional image	1.8149	0.6117
I would not feel badly if I had to miss a meeting of the unit's staff	1.9213	0.5889
I dread coming to work	2.1804	0.5358
It makes a difference to me how this unit performs	2.2768	0.517
I do not feel a part of unit's activities	2.5589	0.4647
I like my unit	2.6976	0.4406
My workspace in the unit enables me complete my work effectively	3.2965	0.3481
If I could leave the unit now I would	3.8595	0.277
I feel it would make a difference to the unit if I were not around	3.9419	0.2678
I don't care what happens in this unit	4.0042	0.261
I want to remain a part of the unit	4.7614	0.1901
I feel my absence would not matter to the unit's performance	4.8315	0.1846
Compared to other units I know of, I feel y unit is a better place to work that most	5.1217	0.1631
If I were told I didn't have to	5.4875	0.1394

meet with the members today, I would feel bad		
I feel distant from the unit	9.5692	0.02261

4.1.8 Intention to stay

Table 6 below shows that there mainly appears to be a neutral trend with regard to respondents thinking about quitting their job and being optimistic about finding another job. This may lead to an increase in staff turnover. Respondents seem somewhat positive about recommending their job to a friend/relative. In totally, group cohesion seems to co-exist with a neutral to fairly positive intention to stay in the firm.

Table 6: Intension to stay

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
I would recommend this job to a friend/relative	5	6	11	12	5	3.15
I am optimistic about finding another job	5	7	17	8	2	2.87
I am thinking of quitting my current job	8	8	17	4	2	2.59
I have applied for a new job in the past 6 months	11	11	8	7	2	2.44

Findings have shown that there seem to be generational and cultural differences in the ranking of the intention to stay in the job. Table 6.1 below shows that differences do exist between diverse generations and their intension to stay. The Post Hoc Test as shown in table 6.2 below confirms that majority of the older age groups are thinking of quitting their current jobs. This has been explained by Glass (2007) who found that older age groups who may have previously had their own private offices may still be struggling to adapt to the open office space configuration with the personal and physical consequences attached to it.

Table 6.1: Association between generational differences and intention to stay

	Chi-square	P-value
I would recommend this job to a friend/relative	0.74044	0.6906
I have applied for a new job in the past 6 months	1.1937	0.5506
I am optimistic about finding another job	1.5837	0.453

I am thinking of quitting my current job	10.551	0.005116
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Table 6.2 Post Hoc Test on P values less than 0.05 for diverse generations

Age group	Obs. diff	Critical diff	Difference
21 -33 and 34 –48	11.833333	10.53381	True
21-33 and 50- 67	4.1666667	12.77413	False
34-48 and 50-67	16.000000	14.45227	F True

Table 6.3 below shows that there are cultural differences present in employees' intention to stay. Certain cultural groups may recommend their job to a friend/relative compared to diverse other cultural groups. This indicates the difference in job satisfaction experienced by the different cultural groups.

Table 6.3 Cultural Differences in Intention to stay

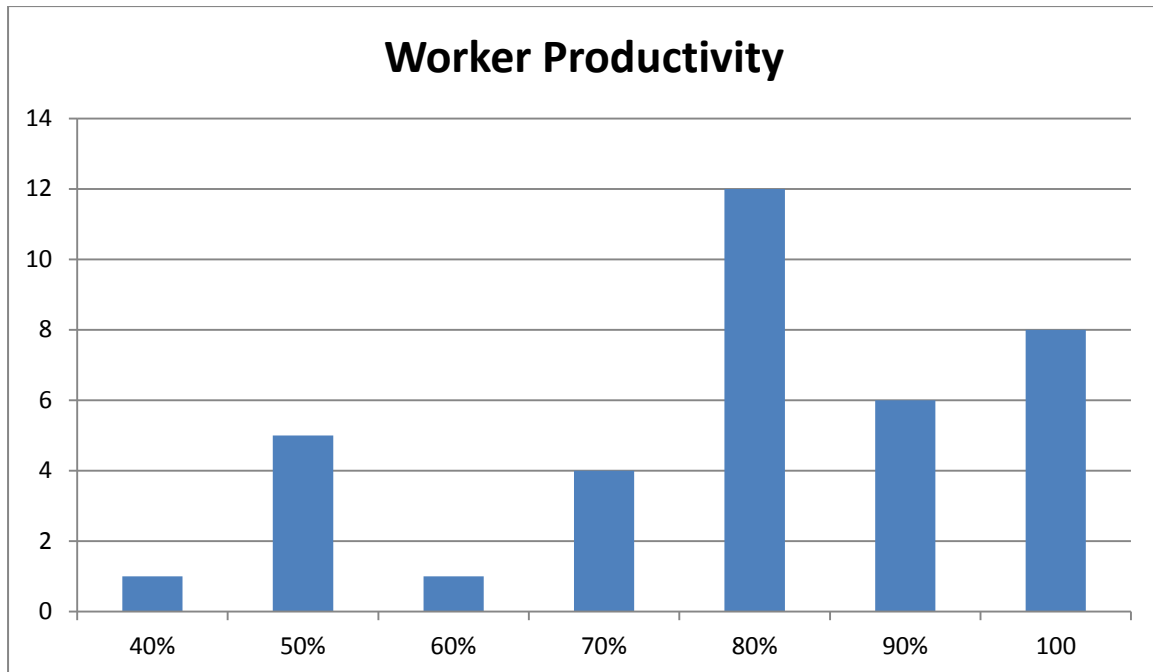
	Chi-square(3)	P-value
I have applied for a new job in the past 6 months	2.3412	0.5047
I am thinking of quitting my current job	2.8643	0.413
I am optimistic about finding another job	3.0186	0.3888
I would recommend this job to a friend/relative	9.2026	0.02672

4.1.9 Worker productivity

Research findings by Haynes (2008) showed that there is no universal measure of productivity and measuring productivity is very subjective. In order to measure productivity in this case study, on a scale of 0-100 per cent (where 100% is full capacity), the workers were asked to rate themselves on how well they have been working over the past month in relation to their full capacity. Figure 7 below illustrates that majority of the workers rated themselves as 80 per cent productive at work during the past month followed by 100 per cent to 90 per cent. This indicates that in general, workers find themselves to be very productive given the personal/interpersonal, environmental, physical and design aspects which they are exposed to in the open plan office spaces that they are working in. The results from the case study indicated that the main factors which impacted

(increased/decreased) the workers' productivity was workload and deadlines. Other factors that impacted their productivity were noise, lack of privacy and lack in energy.

Figure 7: Worker Productivity Rating



4.2 Discussion and Conclusion

This study uses a case study of a consultancy firm in Johannesburg, South Africa, to investigate intergenerational and intercultural differences in employees' experience of the office environment. This study showed that the leading office typology is open plan office spaces as opposed to all other office configuration within the firm. The case study also highlights the trade-offs between the collaborative advantages of working in open plan offices such as the interactivity and exchange of knowledge as well as the disadvantages associated with open plan office spaces such as the loss of privacy and noise.

This case study revealed that no significant differences exist between the different generations' and cultures' ability to conduct activities which are influenced by personal and interpersonal aspects of the office space. This proves that the hypothesis which stated that generational and cultural differences exist in the manner that office workers experience the personal and interpersonal aspects of the office can be rejected.

In addition, generational and cultural differences do not exist on aspects related to environmental, personal and design elements in the open plan office space. This could be due to the homogeneous nature of the sample, as 61% of the employees age group fall between 21 – 33 years of age while only 15% of the employees are aged between 50 -67 years old. Similarly, 54% of the respondents' have classified themselves as white and only 24% as African under the Employment Equity Act. This shows that more than 50% of the employees are of the same age and cultural group in this case study, resulting in no significant generational and cultural differences in the results on the above mentioned aspects. These results verify that the hypothesis which stated that generational and cultural differences exist in the environmental, personal and design aspects of the office space can be rejected.

Despite group cohesion being apparent in the workgroups, there are significant generational and cultural differences that exist. This is evident where younger age groups feel more valued in the unit as opposed to older age groups. Furthermore, certain cultural groups do not feel the same sense of belonging in the unit compared to diverse others.

There also seems to be significant generational and cultural differences apparent with regard to employees' intention to stay. In terms of generational differences, majority of the

older age groups are thinking of quitting their jobs. In terms of cultural differences, certain cultural groups may recommend their jobs to a friend/relative compared to diverse others. It is important to note that dissatisfaction in the work environment could lead to reduced group cohesion resulting in reduced intention to stay and employee turnover. This illustrates that the hypothesis which stated that generational and cultural differences exist in group cohesion as well as intention to stay with the firm can be accepted.

Majority of the employees rated themselves as being 80% and higher productive at work given all personal/interpersonal, environmental and design aspects associated to their work environment. This shows that in general, employees are satisfied with their work environment as Haynes (2008), found that the work environment influences worker productivity.

The key findings of this research show that despite their being diverse age and cultural groups apparent in the current work environment, there is no significant difference in the manner that each generation and cultural group experience the environmental, personal/interpersonal and design aspects of the work environment. However, differences do exist with regard to group cohesion and intention to stay for both generational and cultural segments. It would therefore be interesting to establish if a theoretical link exist between the work space, group cohesion, intention to stay and productivity in South African “office using” firms.

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Annexure 1

Letter of Consent to Company



School of Construction Economics and Management
1 Jan Smuts Avenue
Wits 2050
Johannesburg

EMPLOYEES PERCEPTION OF SOUTH AFRICAN OFFICE SPACES

February 2016

Dear Sir/Madam

You are invited to participate in a research project that will analyse how employees experience different aspects of South African office spaces. The results should provide your firm's Human Resource department (HR) with important information about the extent to which the current use of office space supports the achievement of business objectives. Space planners and developers of office spaces should also find the findings useful in their development efforts.

This research will adhere to the framework and policies of the School of Construction Economics & Management as well as the University of the Witwatersrand Research Ethics Committee. Your response will be treated with anonymity. In addition, the data obtained will not be used for either commercial purposes or made available to third parties. By participating in this survey, you express your consent for me to use the data for research as stated. You have the right to discontinue participation in this research at any time without reason. The results from the study will be made available to your employer as a report on request.

Yours Sincerely,

Muneeba Koor (Master's Student)
University of Witwatersrand
Mobile: 076 067 8692
Email: 360574@students.wits.ac.za

Supervisor: Prof Samuel Azasu
Mobile: 071 223 3620
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Annexure 2

Letter of Consent to Participant



School of Construction Economics and Management
1 Jan Smuts Avenue
Wits 2050
Johannesburg

EMPLOYEE PERCEPTIONS OF SOUTH AFRICAN OFFICE SPACES

February 2016

Dear Participant

You are invited to participate in a research project that will analyse how employees experience different aspects of South African office spaces. The results should provide your employer's Human Resource department (HR) with important information about the extent to which the current use of office space supports the achievement of business objectives. Space planners and developers of office spaces should also find the findings useful in their development efforts.

This research will adhere to the framework and policies of the School of Construction Economics & Management as well as the University of the Witwatersrand Research Ethics Committee. Your response will be treated with anonymity. In addition, the data obtained will not be used for either commercial purposes or made available to third parties. By participating in this survey, you express your consent for me to use the data for research as stated. You have the right to discontinue participation in this research at any time without reason. The results from the study will be made available to your employer as a report on request.

Yours Sincerely,
Muneeba Koor (Master's Student)
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Mobile: 076 067 8692
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Annexure 3

Participant Information Sheet



School of Construction Economics and Management
1 Jan Smuts Avenue
Wits 2050
Johannesburg

EMPLOYEE PERCEPTIONS OF SOUTH AFRICAN OFFICE SPACES

February 2016

Dear Participant

I am master's student at the University of Witwatersrand registered for MSc (Buildings) in the field of Property and Development Management.

I am conducting research on the personal/interpersonal, environmental and physical aspects that influence the employees experience in office spaces. This study is for research purposes only and is aimed at learning how diverse generations and cultures are influenced by the above mentioned aspects in the office environment.

You are invited to participate in this research project that will analyse how employees experience different aspects of South African office spaces. The results should provide your employer's Human Resource (HR) department with important information about the extent to which the current use of office space supports the achievement of business objectives. Space planners and developers of office spaces should also find the findings useful in their development efforts.

By participating in this research study, you will be required to complete an online questionnaire which comprises of 26 questions. The questionnaire consists of questions with

multiple answers and you will be required to select the answer which you deem most suitable. The questions will also require you to rank the way you feel and experience personal/interpersonal and physical aspects in the office. This questionnaire will not take more than 15 minutes of your time. Your identity will be protected as you will not be requested to issue any personal information when completing the questionnaire; this guarantees anonymity.

The captured data from your response will be stored in a secure online platform that is password protected. Organizations that may inspect and/or copy my research records for quality assurance and data analysis include groups such as the Research Ethics Committee.

In addition, the data obtained will not be used for either commercial purposes or made available to third parties. You have the right to discontinue participation in this research at any time without reason. The results from the study will be made available to you and your employer as a report on request. This research will adhere to the framework and policies of the School of Construction Economics & Management as well as the University of the Witwatersrand Research Ethics Committee.

Yours Sincerely,

*Muneeba Koor (Master's Student)
Mobile: 076 067 8692
Email:360574@students.wits.ac.za*

*Supervisor: Prof Samuel Azasu
Mobile: 071 223 3620
Email:Samuel.Azasu@wits.ac.za*

Annexure 4

Questionnaire

The following are related to the background or biographical information of the participants. Please answer the following questions by placing a tick or cross in the relevant block.

1. Are you a South African Citizen?

Yes ☐

No ☐

2. Under the Employment Equity Act, how would you classify yourself?

African ☐

White ☐

Indian ☐

Coloured ☐

☐

3. Of the 11 official languages in South Africa, which is your home language?

English ☐

Afrikaans ☐

isiZulu ☐

isiXhoza ☐

Sesotho ☐

xiTsonga ☐

isiNdebele ☐

siSwati ☐

thsiVeda ☐

seTswana ☐

sePedi ☐

4. What city/province is your office located?

- | | |
|-----|--------------------------|
| JHB | ☐ |
| CPT | ☐ |
| PTA | ☐ |
| KZN | ☐ |

5. What is your age group?

- | | |
|-------|--------------------------|
| 21-33 | ☐ |
| 34-48 | ☐ |
| 50-67 | ☐ |
| 68+ | ☐ |

6. What is your position in the organisation?

- | | |
|-------------------|--------------------------|
| Senior Management | ☐ |
| Middle Management | ☐ |
| Non-Management | ☐ |

7. In which segment of the business do you belong?

- | | |
|--|--------------------------|
| Front Office/ Sales/Business Development | ☐ |
| Middle Office | ☐ |
| Back Office/Admin Support | ☐ |

8. What is the highest qualification you are currently holding?

- | | |
|-------------|--------------------------|
| Matric | ☐ |
| Diploma | ☐ |
| B-Tech | ☐ |
| BSc/BCom/BA | ☐ |

- Honours Degree ☐
- Post Graduate Diploma ☐
- MSc ☐
- PhD ☐

9. What is the nature of your firm?

- Insurance Company ☐
- Pension Fund ☐
- Professional/Services/Consultant ☐
- Bank ☐
- Other ☐

10. How long have you been employed in the company?

- Less than 5 years ☐
- 6 - 10 years ☐
- 11 - 15years ☐
- More than 15 years ☐

11. On which floor of the building is your office located?

- Near the lift ☐
- Near the entrance ☐
- In the middle of my office ☐
- Near the window ☐

12. Which direction does your workspace face?

- North ☐
- South ☐

East ☐

West ☐

13. How many hours per day are you at your desk/workstation/office?

Less than 4 hours ☐

4-6 hours ☐

6-8 hours ☐

+8 hours ☐

14. What type of office space do you work in?

Private office ☐

Team Office ☐

Partitioned space ☐

Hot Desk ☐

Open plan ☐

15. In addition to this, which of the following facilities do you have?

Private meeting rooms ☐

Phone Rooms ☐

Video conferencing Rooms ☐

Breakaway rooms ☐

16. Which supplementary facilities do you have?

Gym ☐

Hairdressing salon/Barber shop ☐

Restaurant/Canteen ☐

Covered Parking	☐
Day-care facilities	☐
Entertainment room/bar	☐
Showers	☐

17. To what extent do you agree with the following statement?

	<i>Not at all like me</i>	<i>Not much like me</i>	<i>Somewhat like me</i>	<i>Quite a lot like me</i>	<i>Just like me</i>
I need to be visible in the workplace	☐	☐	☐	☐	☐
I need space for quite concentration	☐	☐	☐	☐	☐
I need opportunities to network in the office.	☐	☐	☐	☐	☐
I need high quality individual workspace.	☐	☐	☐	☐	☐

18. The following are related to your assessment of environmental, personal/interpersonal and design factors that may affect your workspace experience. Rank them on a scale of 1 to 5, where 1 – Extremely Poor; 2 - Poor; 3 - Average; 4 - Good and 5 - Excellent.

	<i>Extremely Poor</i>	<i>Poor</i>	<i>Average</i>	<i>Good</i>	<i>Excellent</i>
Privacy in your workspace	☐	☐	☐	☐	☐
Ease of interaction with co-workers	☐	☐	☐	☐	☐
Comfort of personal office furniture(chair, desk, computer and equipment)	☐	☐	☐	☐	☐

Adjustability of your furniture	☐	☐	☐	☐	☐
Colour and texture of flooring, furniture and surface finishes.	☐	☐	☐	☐	☐
Temperature of your workspace	☐	☐	☐	☐	☐
Air quality of the workspace	☐	☐	☐	☐	☐
Amount of light	☐	☐	☐	☐	☐
Visual comfort of the lighting(glare, reflections and contrast)	☐	☐	☐	☐	☐
Noise level	☐	☐	☐	☐	☐
Cleanliness of the space	☐	☐	☐	☐	☐
Maintenance of the building	☐	☐	☐	☐	☐
Overall quality of personal workspace	☐	☐	☐	☐	☐

19. The following are related to your opinion of environmental, personal/interpersonal and design factors that may affect your experiences in your workspace. Rank them on a scale of 1 to 5, where 1 – Strongly Agree; 2 – Agree; 3 – Neutral; 4 – Disagree and 5 – Strongly Disagree.

My workspace creates an environment which allows me to:

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
Learn from others	☐	☐	☐	☐	☐
Hold business confidential discussions	☐	☐	☐	☐	☐
Hold private conversations	☐	☐	☐	☐	☐

Hold informal unplanned meetings	☐	☐	☐	☐	☐
Host visitors, clients or customers	☐	☐	☐	☐	☐
Collaborate on focused work	☐	☐	☐	☐	☐
Think creatively	☐	☐	☐	☐	☐
Have informal social interaction	☐	☐	☐	☐	☐
Relax/take a break	☐	☐	☐	☐	☐
Access in-office network connectivity	☐	☐	☐	☐	☐
Hold larger group meetings or audiences	☐	☐	☐	☐	☐

20. The following are related to your opinion with regards to your intention to stay in your job. Rank them on a scale of 1 to 5, where 1 – Strongly Agree; 2 - Agree; 3 - Neutral; 4 - Disagree and 5 - Strongly Disagree.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
I am thinking of quitting my current job	☐	☐	☐	☐	☐
I have applied for a new job in the past 6 months	☐	☐	☐	☐	☐
I would recommend this job to a friend/relative	☐	☐	☐	☐	☐
I am optimistic about finding another job.	☐	☐	☐	☐	☐

21. Taking everything into consideration, how do you feel about your job as a whole?Very unhappy ☐Unhappy ☐Neither Happy no Unhappy ☐Happy ☐Very Happy ☐**22. In the last month how often have you experienced the following physical symptoms while at work?**

	<i>Never</i>	<i>Less than once a month</i>	<i>Once a month</i>	<i>2-3 times a month</i>	<i>Daily</i>
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	☐	☐	☐	☐	

23. In the last month how often have you experienced the following conditions while in your office?

	<i>Never</i>	<i>Less than once a month</i>	<i>Once a month</i>	<i>2-3 times a month</i>	<i>Daily</i>
Temperature too warm	☐	☐	☐	☐	
Temperature too cold	☒	☐	☐	☐	
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	☐	☐	☐	☐	

24. Answer these questions in relation to how you feel about your unit. Rank them on a scale of 1 to 5, where 1 – Strongly Agree; 2 – Agree; 3 – Neutral; 4 – Disagree and 5 – Strongly Disagree.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
I want to remain part of the unit.	☐	☐	☐	☐	☐
I like my unit.	☒	☐	☐	☐	☐
I don't care what happens in this unit.	☐	☐	☐	☐	☐
I feel involved in what is happening in the unit	☐	☐	☐	☐	☐
If I could leave the unit now I would	☐	☐	☐	☐	☐
I dread coming to work	☐	☐	☐	☐	☐
I wish it were possible for the unit to close now.	☐	☐	☐	☐	☐
I feel a part of the unit	☐	☐	☐	☐	☐
In spite of individual differences, a feeling of unity exists in my unit.	☐	☐	☐	☐	☐
Compared to other units I know of, I feel my unit is a better	☐	☐	☐	☐	☐

place to work than most.					
I do not feel a part of the units activities	☐	☐	☐	☐	☐
I feel it would make a difference to the unit if I were not around.	☐	☐	☐	☐	☐
If I were told I didn't have to meet with the units members today, I would feel bad.	☐	☐	☐	☐	☐
I feel distant from the unit	☐	☐	☐	☐	☐
It makes a difference to me how this unit performs	☐	☐	☐	☐	☐
I feel my absence would not matter to the unit's performance	☐	☐	☐	☐	☐
I would not feel badly if I had to miss a meeting of the unit's staff	☐	☐	☐	☐	☐
My workspace in the unit enables me to complete my work effectively	☐	☐	☐	☐	☐
My workspace in the unit facilitates teamwork with colleagues	☐	☐	☐	☐	☐
The workspace allocated to me in the unit portrays a professional image.	☐	☐	☐	☐	☐

25. On a scale from 0-100 per cent (where 100% is full capacity), rate how well you have been working over the last month in relation to your full capacity.

26. What is the single most important factor that impacted (increased/decreased) your productivity during this time?

Annexure 5

Ethic Clearance Certificate