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THE SLOW ADOPTION OF TELECOMMUTING IN SOUTH AFRICA

by

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DECLARATION

I, Nwakego Joy Okoli, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signed **Date**

ABSTRACT

Climate change imposes indisputable burdens on economic development by significantly causing damage to the environment. In the transportation sector, carbon dioxide emissions from vehicles are seen as top environmental pollutants around the world and in South Africa. Despite increasing environmental issues, many people, including business leaders, generally think of environmental issues as disconnected from their everyday business lives and behavioural patterns.

The Republic of South Africa as a member of the United Nations Framework Convention on Climate Change (UNFCCC) encourages any practices and processes that will control, reduce or prevent anthropogenic emissions of greenhouse gases. The adoption of telecommuting for travel reduction can impact positively on environmental sustainability by reducing the amount of commuter driving and thus reducing carbon emissions.

Telecommuting is an arrangement where an employee works from home or out of office using telecommunication links (internet, email and/or telephone) to reduce commuting to and from the office, enhance productivity in the organisation, and reduce office space requirements. However, despite the well documented benefits of telecommuting, the uptake of telecommuting in South Africa is slow.

This study falls under the Green Information Technology research field. The aim of the study is to identify the reasons behind the slow adoption of telecommuting in South African organisations. The study followed embedded multiple-case studies. Qualitative data were collected from nine companies using semi-structured interviews with 19 participants comprising of Information Technology (IT) and Human Resource (HR) managers, telecommuters and non-telecommuters. The companies were selected to be as diverse as possible in the operating sector and both purposive and snowball strategies were used.

The collected data were analysed using content analysis. The findings, which are presented thematically, constructed the story of telecommuting in South Africa, bringing together the reasons why telecommuting is slow. From an organisational point of view, traditional management and leadership styles such as having workers onsite, observing what they do, and not trusting workers to manage themselves, are preventing the changes necessary to promote telecommuting in organisations. It is therefore recommended, among others, that strategic planning be made to include telecommuting into business strategies.

This study has theoretical and practical contributions. An analytical framework positioning telecommuting in South Africa relative to companies' adoption of Green IT is presented. Three new elements have been added to the theoretical framework used, namely job

redesign for telecommuting, the emotional intelligence of telecommuters in terms of their ability to self-manage, and the emotional intelligence of management to manage remote workers. Recommendations for further research were also made.

Keywords: Green IT, telecommuting, adoption, climate change, greenhouse gas emissions, air pollution, business strategy, sustainability.

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DEDICATION

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GLOSSARY

Acronym/Term/Abbreviation	Explanation/Definition
ADSL	Asymmetric Digital Subscriber Line
APTA	American Public Transportation Association
AT&T	American multinational telecommunications company
CEO	Chief Executive Officer
CO_2	Carbon Dioxide
CSIR	Council for Scientific and Industrial Research
DDU	Dimension Data University
Dell	A multinational IT company
Dropbox	A free application that allows the saving of documents on the web which can be accessed from anywhere
Email	Electronic Mail
EQ	Emotional Intelligence
Facebook	Free social service networking website
GHG	Greenhouse Gas
Gmail	Free web-based electronic mail service developed by Google
HP	Hewlett-Packard is a multinational IT company
HR	Human Resources
HVEN	Video Exchange Network
ICT	Information and Communications Technology
IM	Instant Messaging
Intel	A multinational IT company
IP	Internet Protocol
IPCC	Intergovernmental Panel on Climate Change
IS	Information Systems
IT	Information Technology
ITF	International Transport Forum
ISP	Internet Service Provider
MTN	A multinational mobile telecommunication company
NEMA	National Environmental Management Act

Acronym/Term/Abbreviation	Explanation/Definition
OECD	Organisation for Economic Co-operation and Development
OoVoo	Free video chat and messaging application; a cross-platform mobile and computer application which allows someone to see four people at once on screen during video chat sessions
OPM	Office of Personnel Management
SA	South Africa
SkyDrive	A free personal cloud storage service that enables individuals to store, access and synchronise their files across different operating systems; developed by Microsoft Corporation
Skype	Cross-platform application that allows someone to have a spoken conversation over the internet; messages are exchanged and frequently viewed by webcam
Sun	A multinational IT company
TAM	Technology Acceptance Model
TBL	Triple Bottom Line
Telecommuter	An employee that uses ICT resources to work from home or away from the office on a Full-time or part time basis
Tele-overtime	A word invented during an in-depth interview process of this study, meaning employees working with ICT resources from home after their daily normal work hours
Telkom	A wireless and wire-line telecommunication company
TRA	Theory of Reasoned Action
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UPS	Uninterruptible power supply
UTAUT	Unified Theories of Acceptance and Use of Technology
Viber	A mobile application allowing someone to make video phone calls and exchange messages to other users for free
VPN	Virtual Private Network
WeChat	Free mobile text and voice messaging communication application developed by Tencent in China
WhatsApp	Cross-platform mobile free instant messaging application allowing the interchanging of messages without paying for it
Yahoo!	*Yahoo* has several related services but this study refers to Yahoo! Messenger and its electronic mail, a free application developed by Yahoo Incorporated

CHAPTER ONE: INTRODUCTION AND OVERVIEW OF THE STUDY

1.1 Introduction

Information and Communications Technology (ICT) is the use of computers, telephones, tablets and telecommunication devices to send, receive, save and edit information. Since its inception, ICT has afforded big and small companies the power to participate globally, and has changed the manner in which companies communicate with stakeholders, customers and vendors (Madlock, 2012:1). The active global business environment is quickly changing and organisations need to be extra flexible to become responsive to the changes in the market. Studies have recognised that addressing sustainability problems is serious as it helps companies to succeed (Dao, Langella & Carbo, 2011:63). Technology has modified the manner in which work is performed and where work is performed. This implies information technology has had a great impact on society and it affects every area of our being. Recent technologies have improved the way companies allocate and direct work to different locations (Bayrak, 2012:286).

Organisations, society and governments are pursuing environmentally friendly practices as the fear of global warming, tsunamis and earthquakes have created concern for environmental safety. Problems such as greenhouse gas emissions, usage of dangerous resources, consumption of fuel by motor vehicles and energy encourage the drive to "go green" (Chou & Chou, 2012:447-448). In fact, organisations can contribute towards reducing the carbon footprint and lessening dangerous environmental effects through implementing eco-friendly ICT practices often referred to as Green IT (Du Preez, 2010:2). "Green IT is defined as an environmentally sound IT. It is the studying and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems for example monitors, printers, storage devices, communications systems and networking—efficiently and effectively with a reduced or no effect on the environment" (Murugesan, 2008:25-27). Green IT promotes "telecommuting" and remote computer administration in order to reduce transportation emissions (Boudreau, Chen & Huber, 2008:2; Ruth, 2009:77). One approach by which ICT is able to enable environmental sustainability is through telecommuting (Du Preez, 2010:62).

1.2 Telecommuting definition

Nilles in 1973 introduced the term "telecommuting" (a.k.a. telework, virtual office, flexible working, e-working and remote working). This term means an arrangement where an employee works from home or out of office, using telecommunication links

(internet, email, computer and/or telephone) to replace commuting to and from work (and this reduces traveling miles). It may be implemented and used either as a permanent solution or on an *ad hoc* basis, as requirements dictate (Nilles, 1991:413; Handy & Mokhtarian, 1996:227; Mungly & Singh, 2010:4; Chepken, 2012:1). Modern technologies encourage companies and workers to embrace possible telecommuting arrangements. Companies want to become more competitive and workers need flexible time (Kowalski & Swanson, 2005:237).

1.3 Background to the research problem

Developing nations all over the world are experiencing many infrastructural problems such as poor roads and electricity supply (Chepken, 2012:2). Commuting to and from work tends to increase as urban areas are becoming crowded. The reduced use of rail deregulation of freight transportation and increased middle class earners have increased the usage of road transport (Padayachi & Thambiran, 2012:1). This has led to traffic, especially during rush hour in the mornings and evenings. Telecommuting provides the means to move work closer to the homes of employees instead of having them commute to office on a daily basis. This results in an almost instant decrease in motor vehicle traffic, related energy usage, and air pollution (Nilles, 1991:411). Air pollution are caused both by human activities and natural sources; it means the accumulation of substances such as chemicals, particulates or other harmful materials (gaseous, liquid or solid substances) in the atmosphere, which might threaten human health and cause damage to the environment. Air pollution causes ozone depletion and acid rain (BusinessDictionary.com, 2014). Furthermore, traffic related air pollution adds to health problems (Beelen, Hoek, Vienneau, Eeftens, Dimakopoulou, Pedeli & Tsai *et al*., 2013:11).

Telecommuting benefits have been well documented; this includes improved job satisfaction, increased productivity, life balance and work, work independence, improved excellence, communication with customers, reduced commuting/travelling time, and cost (Ye, 2012:20). However, below are some challenges identified in the literature facing telecommuting:

- Security of data, mainly for organisations dealing with sensitive information, for instance the government, bank, medical and legal occupations (Mungly & Singh, 2010:9)
- Security of corporate information and physical devices (Pearce II, 2009:23; Nyaanga, 2012:12)
- Right candidate to telecommute

- Fear of whether a telecommuter can be trusted to constantly work while away from the office since there is no one supervising him or her (HR Focus, 2011:2).

Telecommuting does not really imply that the employee is at home all the time working as they were before. The use of high speed bandwidth Internet networks, virtual private networks (VPNs) and wireless technologies enable employees to work from abroad, snack shops, on the beach, a remote work site and the conventional office (Mungly & Singh, 2010:5). Virtual private networks enable employees to log on to a corporate network securely by creating a protected channel (Pearce II, 2009:20).

What is the problem?

Literature on telecommuting in the South African context is limited (Mungly & Singh, 2010:10; Baard & Thomas, 2010:9; Grobler & De Bruyn, 2011:63). Mungly and Singh (2010) points out that there is ample literature on telecommuting available on the internet—which is the technology that activates telecommuting—yet not much is known about this flexible working arrangement and its application in the developing world (Africa) and the South African context. The largest part of the literature on telecommuting is from the developed world, especially North America and Western Europe (Aboelmaged & El Subbaugh, 2012:4). To this effect, Grobler and De Bruyn (2011:63,76) note: "South African companies should therefore take up the challenge immediately". These authors indicate that only a few employees practice this working arrangement, and add that organisations should think this through and increase this virtual work arrangement as there are benefits for almost everyone (community, company and employees). Also, Baard and Thomas (2010:9) point out that South African organisations so far are yet to take advantage of virtual working and the paybacks associated with it. The authors state that the forecast for telecommuting internationally is high and it is vital that organisations recognise this as it may well be used to advance competitiveness. In brief, it is obvious that telecommuting adoption in the South African context has been relatively slow.

How is the slow adoption of telecommuting a problem?

Telecommuting has societal and environmental benefits. Less commuting to and from work will result in less motor vehicle accidents, deaths and cost of road maintenance. Disabled and elderly people will benefit by working from home with the use of technology as this group finds it hard to commute to work on a daily basis. Moreover, telecommuting will decrease office space requirements as well as the amount of pollution (CO_2) caused by *vehicle kilometre travel* (Fuhr & Pociask

2011:44; Ye, 2012:20). For example, the Council for Scientific and Industrial Research (CSIR) published an article stating that *vehicle kilometres travelled* (VKT) have to be reduced to help reduce air pollution in South Africa. It further maintained that the emission of CO_2 (carbon dioxide) from road transport vehicles in South Africa constitutes the largest on the African continent, and this is a major source of greenhouse gas emissions resulting in air pollution. Furthermore, it was observed that CO_2 from cars increased in 2007-2008 (International Transport Forum, 2010; Padayachi & Thambiran, 2012).

The Kyoto protocol established at the United Nations Framework Convention on Climate Change encourages member countries to decrease greenhouse gas emissions (UNFCCC, 2010, cited in Du Preez, 2010:1). South Africa, as a member of this body, has a responsibility to "promote and cooperate in the development, application and diffusion of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases" (South African Department of Environmental Affairs, 2013:15). Furthermore, King III points out that environmental concern should be among organisational acts, and strategies, with a reduced reliance on fossil fuels (King III, 2009a:3-4). King III is concerned with corporate risk management and reporting (section 2.2.1.1).

Telecommuting may not necessarily be practised on a permanent basis; employees can work away from their typical office two or three days weekly, thus removing approximately 30% of commuters off the road, resulting in a decrease in greenhouse gas (GHG) emissions (Lister & Harnish, 2011:20). As a result, telecommuting could help organisations comply with the Clean Air Act which is usually stipulated by government to help protect the environment (Chou & Chou, 2012:447).

Why is the slowness of telecommuting a problem?

Mungly and Singh (2010:13) point out that telecommuting challenges can be overcome if telecommuting is added to organisational strategic plans. Furthermore, telecommuting should have a foundation of trustworthy relationships between managers and telecommuters, and these relationships must be understood as an important component in the organisational decentralised strategy and structure (Bernardino, Roglio & Corso, 2012:304). Thus, management lack of support is the most quoted problem of telecommuting adoption (Lister & Harnish, 2011:7).

1.4 Research problem statement

The uptake of telecommuting in South Africa has been slow. This has wide ranging implications, from lack of compliance of the Clean Air Act and corporate governance in terms of King III reporting, to missed business opportunities such as reduced travelling costs for staff members and fewer office space requirements. Despite the well documented benefits of telecommuting, it appears that South African businesses are still not building telecommuting into their strategies.

1.5 Research question and sub-questions

1.5.1 Research main question

What are the organisational reasons for the slow adoption of telecommuting in South Africa?

1.5.2 Research sub-questions

1. How does the organisation perceive telecommuting?
2. How can the organisation adopt telecommuting as part of their ICT/business strategy?
3. What potential benefits can accrue to a business implementing telecommuting?
4. How ready are staff members for telecommuting?

1.6 Research aim and objectives

1.6.1 Aim

From the literature analysis, it is understood that South African organisations do not have a strategy for telecommuting. The aim of the study is therefore to explore the reasons behind the slow implementation of telecommuting practice in South African organisations.

1.6.2 Objectives

The objectives below are to help accomplish the aim of the study:

- To identify the organisational perceptions towards telecommuting
- To identify the would-be organisational reasons for the slow adoption
- To identify approaches in which telecommuting can be adopted into business strategy
- To establish the potential benefits of telecommuting to organisations
- To determine the readiness of staff members towards telecommuting
- To establish the environmental benefits of telecommuting

Table 1.1 shows a summary of the research questions and objectives. It is further expanded in Chapter Three (section 3.11.2).

Table 1.1: Research problem, questions, approaches and objectives

Research problem		Despite the well documented benefits of telecommuting, it appears that South African businesses are still not building telecommuting into their strategies.	
Research main question		What are the organisational reasons for the slow adoption of telecommuting in South Africa?	
Research sub-questions (RSQ)		**Research approach(s)**	**Objectives**
RSQ 1	How does the organisation perceive telecommuting?	Interviews	To identify the organisational perceptions towards telecommuting, and identify the would-be organisational reasons for the slow adoption
RSQ 2	How can the organisation adopt telecommuting as part of their ICT/business strategy?	Interviews	Identify approaches in which telecommuting can be adopted into business strategy
RSQ 3	What potential benefits can accrue to a business implementing telecommuting?	Interviews	To establish the potential benefits of telecommuting to organisations
RSQ 4	How ready are staff members for telecommuting?	Interviews	To determine the readiness of staff members towards telecommuting

1.7 Conceptualisation of the research

This section presents the main ideas of the study which are unpacked in the following chapters.

1.7.1 Delineation of the research

A qualitative and exploratory approach was used in this study, with a multiple-case study strategy to determine the organisational reasons for the slow adoption of telecommuting in South Africa. The study only collected data from organisations in Cape Town due to time constraints, available resources and accessibility**.** However, the nation-wide nature of the companies researched allowed for extrapolation of data to encompass all of South Africa.

Telecommuting is considered here as second and third order effects of ICT on the environment, therefore the study is within the Green IT research field.

The stakeholders considered in this study were key company representatives and staff members from the researched companies to obtain a good insight into the different groups, and achieve the objectives of the study.

1.7.2 Theoretical underpinning

In order to understand the reasons for the slow adoption of telecommuting in South African organisations, the study adopted two frameworks:

- At staff readiness level, the problem was approached using ideas from the Technology Acceptance Model (TAM) (Davis, Bagozzi & Warshaw, 1989:985), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Morris, Davis & Davis, 2003:447). This was further supported by insights obtained from the stakeholders (staff members and company representatives)
- At management level, the study adopted a model which from insights in terms of IT infrastructure and capability, readiness, and eco-sustainability theories. This model, from the Green IT research field, is called the G-readiness Model (Molla, Cooper & Siddhi, 2011:84). The G-readiness Model offers a platform for practitioners to assess and benchmark their Green IT initiatives and progress. Additionally, the model was extended with insights obtained from participants

1.7.3 Methodological considerations

The methodologies adopted to guide this research are discussed in depth in Chapter Three of this thesis. Figure 1.1 and this sub-section is an overview of the methodological considerations of the research.

This study followed a holistic qualitative approach and drew from the interpretivist paradigm of the epistemological philosophy within an interdisciplinary research field. The approach was founded on an embedded multiple-case study from nine companies in Cape Town as the units of analysis. The units of observation were identified as IT/HR managers, telecommuters and non-telecommuters. The units of observation formed the stakeholder groups (company representatives and staff members).

Data were collected from literature, document reviews and semi-structured interviews. The data were aggregated, categorised, themed, and interpreted as meanings were suggested by the text using qualitative content analysis. In order to

address and validate the research questions and its objectives, findings were compared with an understanding from relevant literature.

Literature and document review: Educational publications associated with the research title were reviewed to deepen the understanding of related constructs and theories, and to keep record of earlier similar studies. Also, available documentation from researched company brochures and websites were accessed to account for definite company line of business (LOB) and practices of telecommuting (Kothari, 2004:111).

The interviews: Purposively selected semi-structured interviews were carried out with members (IT/HR managers, telecommuters and non-telecommuters) from the researched companies. The interviews focused on participants' feelings, experiences towards telecommuting, and how telecommuting could be adopted into ICT/business strategy (Saunders, Lewis & Thornhill, 2009:320-321; Wahyuni, 2012:74).

The content analysis: qualitative content analysis was the approach used to analyse the collected data. Data were aggregated, categorised, themed, and interpreted as meanings were suggested by the text to address the research questions and its objectives. Findings were then compared with prior relevant literature for a better understanding of the study (Wahyuni, 2012:76).

Figure 1.1 shows the methodologies used in the study.

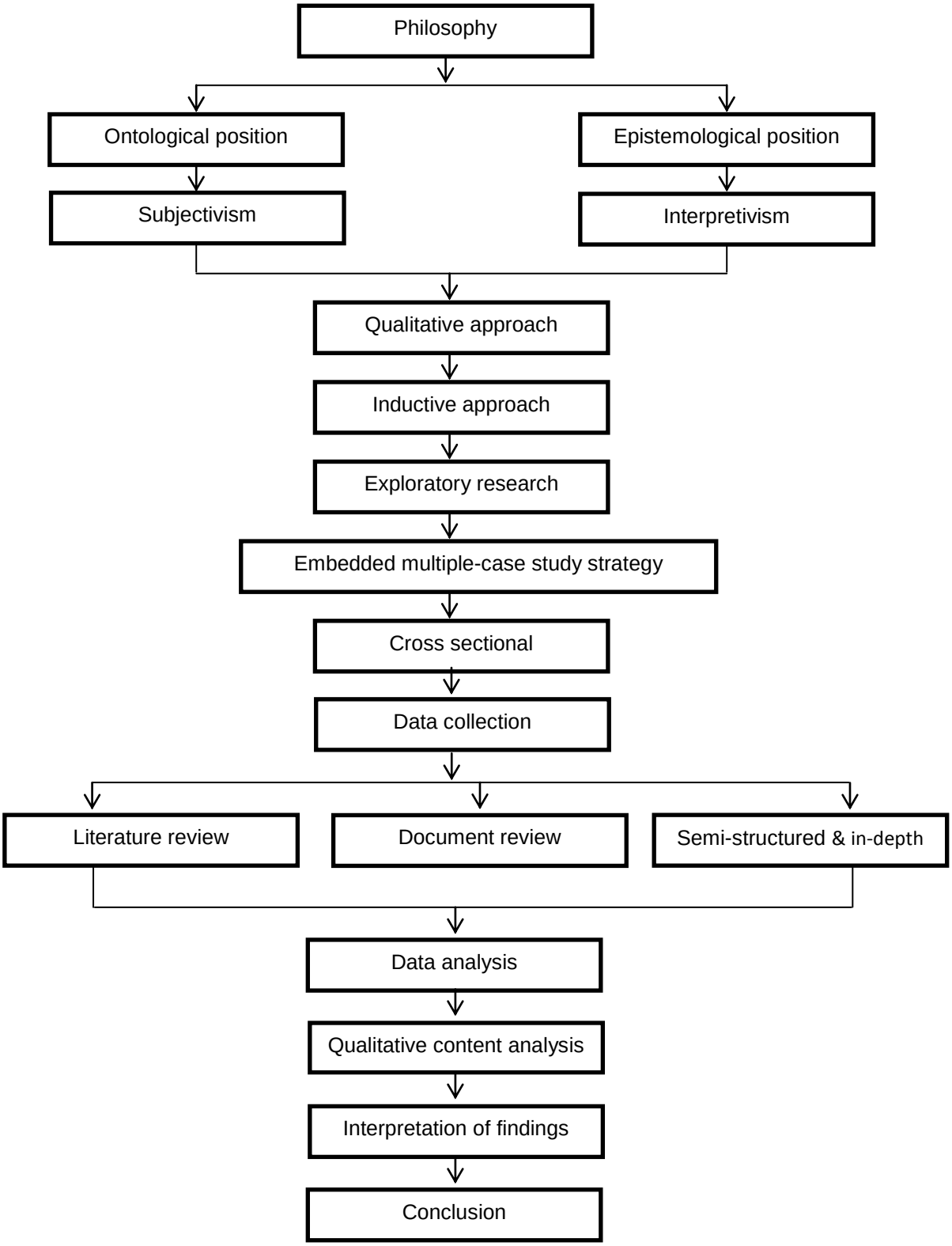


Figure 1.1: Research design and methodology used

1.8 Thesis organisation

This thesis consists of seven chapters followed by references and appendices. Chapters are structured to inform each other (i.e. links together from Chapter One to Chapter Seven) in developing the thesis argument. The details of the thesis arrangement are as follows:

Chapter One introduces and offers a descriptive explanation of the thesis title (i.e. introduction and background). The problem statement, research questions, aims and objectives, delineation of the research, and the theoretical underpinning are indicated. The chapter concludes with a brief introduction of the research design.

Chapter Two provides an in-depth literature review on the status of air pollution in the road transport sector, sustainability, importance of strategic management, how telecommuting is a subset of Green IT, the emergence of telecommuting and IT devices needed for telecommuting. The chapter ends with explanations of three proposed theories on ICT adoption and green readiness in Information Systems (IS) research.

Chapter Three uncovers the research design and methodology of the study, the choice of the ontological and epistemological position, and why these are the appropriate paradigms. The research strategy, techniques employed for data collection, and analysis (qualitative content analysis) are considered. The ethical considerations of the study are all contained in this chapter.

Chapter Four presents a description of the researched companies and participants. It presents a report on the fieldwork and the analytical process.

Chapter Five presents findings that emerged from the multiple-case study on the status of telecommuting in South African organisations. The presentations are based on themes and categories derived during the data analysis phase. In the summary, the key findings are derived.

Chapter Six discusses the emergent themes from the findings. These findings are discussed with regard to literature and the research questions described in section 1.5. The newly emergent constructs and concepts are adapted to form the research conceptual model.

Chapter Seven presents the conclusion of the research by reflecting on the research problem. The main aim of this study is to explore the reasons behind the slow adoption of telecommuting practice in South African organisations. This

chapter provides a summary of the key findings and answers to the main research question and sub-questions in order to address the main aim of the study. It provides sets of recommendations, presents the research contribution and limitations, identifies further research, and reflects on the research journey.

As outlined in section 1.8, the next chapter presents the literature review.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

According to Gravetter and Forzano (2009:48), the purpose of conducting a literature review is to ascertain a gap within the knowledge phenomenon a field of study attempts to answer whilst describing sets of published scholarly reports explaining the present status of knowledge in a particular field. For Biggam (2008:51-52), a "good literature review" contains confirmation of an in-depth critical evaluation. A good literature review presents the work of other people in an interesting, progressive and clear manner to build a logical picture of any study. To this effect, Chapter Two presents an exploration of relevant literature pertaining to the study. The chapter is divided into four parts for context, namely: a) climate change; b) Green IT; c) telecommuting; and d) theory underpinning the study.

2.2 PART A: Climate change

Part A starts with a discussion on climate change and the Clean Air Act (CAA), followed by air pollution in the road transport sector globally. A review is conducted on why road transport is a bad polluter and what has been done around the globe over the last decades to reduce road transport greenhouse gas emissions.

Pertinent issues concerning organisational and green business sustainability, strategic planning and management are addressed.

2.2.1 Defining climate change

> "Climate change can be defined as the increase in average surface temperatures on Earth, mostly because of the burning of fossil fuels. This discharges carbon dioxide and other greenhouse gases into the air (Takepart, n.d.)".

Climate change imposes indisputable burdens on economic development by causing significant damage to the environment, water resources, infrastructure and human health, which are devastating to the world's most vulnerable populations (World Bank & ClimateWorks, 2014). Population health may be significantly compromised for individuals who are not able to reduce their heat exposure. An individual's ability to endure or tolerate heat varies in terms of general health level, capacity to rehydrate, physiological comorbidities, activity, and the capability to cool down the main temperature (Hanna & Spickett, 2011:9). In effect, people's survival, property, enjoyment of natural resources and movement, among others, are indicators used to determine whether human rights have been violated. Those

human right violations, when combined with other global consequences of climate impact, show that UNFCCC members are not meeting their international legal obligations of lessening human rights violation (Crowley, 2011:265).

The quest for energy to develop the environment and meet daily needs (human welfare and health) is on the rise as we all need energy facilities to help us meet our elementary needs such as cooking, travelling, electricity, communication and productive processes. Since about 1850, the usage of coal, oil and gas worldwide has dominated energy supply, which resulted in an increase in carbon dioxide (CO_2) emissions (Intergovernmental Panel on Climate Change, 2011:2-3). The large and dominant role of Carbon dioxide (CO_2) emissions in increasing the average global temperature remains unchanged. An understanding of the impact of greenhouse gases and other pollutants on our climate system is improving (World Bank & ClimateWorks, 2014). These other pollutants are methane (CH_4), halocarbons, black carbon (BC), ozone (O_3) and hydro-fluorocarbons (HFCs), jointly referred to as short-lived climate pollutants (SLCPs) known for their potency as a significant cause of global warming (Erlykin, Wolfendale & Hanna, 2012:499; World Bank & ClimateWorks, 2014).

Global warming is believed to be the major cause of climate change (Shakun, Clark, He, Marcott, Mix, Liu, Otto-Bliesner *et al*., 2012:49; You Magazine, 2014:105). It started when temperature measurements taken in recent decades showed a relatively speedy rate of warming (Fowler, 2012:41). Global warming is the heating of the earth, resulting from pollutants caused by greenhouse gases. These gases form a thick layer in the atmosphere which prevents natural radiation from the earth escaping into the space, and this slowly heats up the earth's atmosphere (Pearce, 1991:938; You Magazine, 2014:105). Even though efforts to decrease these pollutants have been relatively slow, scientific indications suggest that cutting off "short-lived climate pollutants" could have a positive impact on the climate by slowing down global warming (World Bank & Climate Works, 2014). According to World Bank and Climate-Works (2014), greenhouse gases and carbon dioxide emissions need to be considerably decreased to save the globe from surpassing the 2°C borderline of global warming. Without additional commitments and actions towards reducing greenhouse gas emissions, the world will probably heat up to 3°C (World Bank, 2012). Therefore, reduction of fossil fuel combustion in the creation of power and the use of vehicles will improve air quality of rural and urban areas, and help reduce threats to respiratory and cardiovascular ailment (McMichael, Montgomery & Costello, 2012:2-4), as well as reduce extensive sea flooding, extinctions and possible food shortages (Fowler, 2012:41).

The UN Intergovernmental Panel on Climate Change reports that global greenhouse gas emissions have largely grown due to transportation, energy supply, land use and forestry, agriculture, industry and buildings as a result of human actions (Pearce, 1991:938; Younger, Morrow-Almeida, Vindigni & Dannenberg, 2008:517; South African Department of Environmental Affairs, 2013:24). This has led to open awareness from different international bodies—UNFCCC, IPCC and the Kyoto protocol—and governments regarding the need to decrease the rise of air pollution (Lave & Seskin, 2013:1). This action is often referred to as the Clean Air Act.

2.2.1.1 Clean Air Act

The Clean Air Act is a law stipulated by government to help protect the environment (Chou & Chou, 2012:447), thereby creating the right to an environment that is not harmful to health and well-being, as well as promoting valid economic and social development (Government Gazette, 2002:41). This act is usually driven by notable environmental events such as Three Mile Island in 1979 and often accompanied by individuals and businesses to adopt greener practices (Dedrick, 2010:175) such as telecommuting as everybody has a part to play with regard to the management of air quality (South African Department of Environmental Affairs, 2013:24,65). For example, King III reporting is about corporate governance in South Africa, where corporate governance is a system of practices, processes and rules through which an organisation is directed and controlled. The governance structure identifies the circulation of rights and responsibilities between different members of the corporation (for example the stakeholders) (OECD, 2004:24). With the King III principle, companies are mandated to include in their yearly report an explaining on how they obeyed principles put out by King III or earlier versions. King III ensures that an organisation develops a primary environmental strategy/policy stating precisely the standards needed to attain its environmental impacts. Furthermore, the Board ensures that environmental matters become part of business performance and risk management strategies (King III, 2009a:2-3). Therefore, King III takes an “apply or explain” stance (King III, 2009b) in terms of the various aspects of governance. This study is interested in eco-friendly sustainability practices and performances.

Presently, the transport and industrial sectors involved in the creation, sale and consumption of energy are confronted with a deterioration of the environment because of the depletion of fossil fuel resources (Raslavičius, Keršys, Starevičius, Sapragonas & Bazaras, 2014:329).

The section below buttresses on pollution from road transport as the study is targeted at reducing pollution caused by vehicles through telecommuting.

2.2.2 Air pollution from the road transport sector

Transport is a major economic sector supporting social and economic development. It enables efficient allocation of resources and mobility of people. The rapid urbanisation, diversity in leisure and social activities, increase in disposable income, speedy growth in the use of private vehicles, and uneven delivery of resources have increased the demand in transportation worldwide (Raslavičius *et al.*, 2014:329; Saboori, Sapri & Bin Baba, 2014:150). Thus, the reliance on the transport sector is causing long-standing damage to the climate, and continued increase in fossil fuels consumption means peak production of gas looms (Chapman, 2007:354).

With little exclusion, all kinds of transport systems (i.e. road, air, rail and water) emit air pollution due to the combustion of fossil fuel. Most transportation systems today emit the same pollutants, while the relative amount differs depending on the composition of the fuel and information on the combustion conditions. Carbon dioxide (CO_2) and water vapour (H_2O) caused by fuel combustion are major emissions into the atmosphere (Colvile, Hutchinson, Mindell & Warren, 2001:1538-1539). The road transport sector emissions dominate transportation emissions with light-duty motor vehicles being the majority of emissions worldwide. The motor vehicles of some International Transport Forum (ITF) member countries (including Australia, Canada, Germany, UK, India and Japan) and the top 10 CO_2 emitting non-members (including South Africa, China and Brazil) for which estimates are made, certainly have the majority of emissions world-wide (International Transport Forum, 2010). In fact, Piozet (2013:4) as well as Thambiran and Diab (2011:2687) note that VKT per mile is among the leading contributors of greenhouse gas levels. So under business as usual, the CO_2 emission from transportation is expected to continue to grow (International Transport Forum, 2010).

Figure 2.1 shows estimates of the transport sector CO_2 emissions.

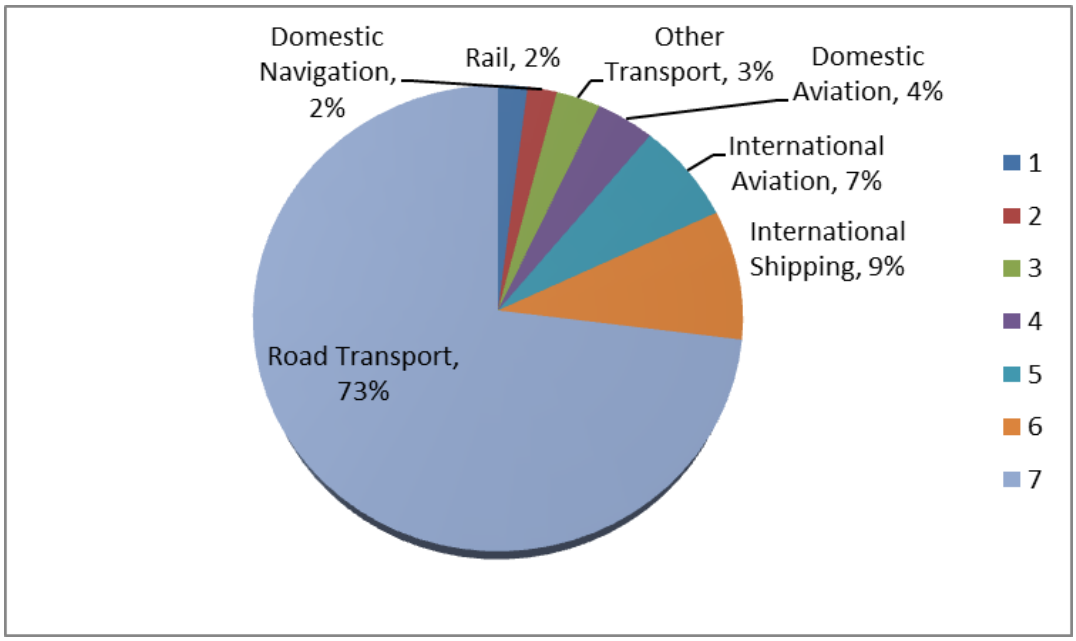


Figure 2.1: World CO_2 emissions
(Adopted from International Transport Forum, 2010)

Figure 2.1 indicates that in 2010, road transport accounted for 73% of CO_2 emissions and South Africa is among the top 10 CO_2 emitting non-members of ITF, while the remaining transport related emissions are from the aviation industry, shipping, railway, domestic navigation and other transport systems of which none is above 10%. This tells us how intensely the road transport sector is heating up the earth. It is also important to note that for every 1 gallon of petrol burned, 24 pounds of carbon dioxide including other global warming gases (e.g. black carbon, ozone, nitrous oxide and methane) are emitted into the atmosphere. Each year an average vehicle releases 6 tons of carbon dioxide into the air, which is about three times the vehicle's weight; this also shows how fast pollution is accumulating (Union of Concerned Scientists, 2016).

2.2.2.1 Why is road transport a bad polluter?

This can be determined in variety of ways. The life-cycle assessment method may be used in identifying the stage—production, disposal or use—in which a particular transport technology is responsible for the major atmospheric emissions. However, most of the emissions happen during the time and place of transport use. For instance:

- 60% to 65% of the life cycle greenhouse gases from petrol engine vehicles are CO_2 exhaust emissions occurring during driving or use
- 10% are non-CO_2 exhaust emissions during use
- 10% is linked to the vehicle production stage, mainly from energy use

- 15% to 20% emissions occur during extraction, refinery and transportation of the petrol (OECD, 1993, cited in Colvile *et al.*, 2001:1539)

The negative effects of road transport extend far beyond a vehicle's life cycle, though. The majority of these vehicles suffer from ignition system failure (or misfire), where the air-petrol mixture has a little petrol to ignite. Some of the vehicles with high emission rates increase with age due to unrepaired failures, continuous lack of maintenance and tamping. Additionally, technologies controlling emissions are among the factors that effectively control automobile emissions, and it is most effective if combined with proper vehicle maintenance (Zhang, Stedman, Guenther & Beaton, 1995:2293; Stedman & Bishop, 1996:494) although the majority of these passenger-driven petrol vehicles are not fitted with technologies that control pollution (Thambiran & Diab, 2011:2686).

2.2.2.2 What is being done about road transport?

The next sections reflect on other transport policy actions carried out around the globe during the last decades to reduce road transport GHG emissions in order to attain sustainable development or clean air by the year 2020.

i) Walking and cycling

These have been indicated in literature as campaigns by different authors encouraging the increase of low emission mode tasks performed by people of all ages (Younger *et al*., 2008:518; Stanley, Hensher & Loader, 2011:1023). Stanley *et al*. (2011:1023) note that no low emission modes exist other than walking and cycling. For example, trips to school are good examples of short trips for walking and cycling; trips shorter than two kilometres is right for walking and cycling while trips longer than two kilometres is right for cycling only if suitable infrastructure is in place. Pucher and Buehler (2010:13) note that the infrastructure needed to encourage walking and cycling include dedicated cycling paths for pedestrians and cyclists, urban design sensitive to the needs of non-motorists, and in-depth traffic education for motorists and non-motorists.

Many studies have however shown that if more people walk and cycle, the number of pedestrian and cyclist injuries, especially for women, the elderly and children, may increase. Concerns about safety significantly added to the shift from cycling to travelling in vehicles (Woodcock, Edwards, Tonne, Armstrong, Ashiru, Banister, Beevers, *et al.*, 2009:1930; Pucher & Buehler, 2010:13; Stanley *et al*., 2011:1023). Walking and cycling have been linked to increased psychological well-being, reduced cardiovascular disease, obesity and stroke, and the provision of valuable

physical activity for people on a daily basis (Younger *et al*. 2008:518; Woodcock *et al*., 2009:1930; Stanley *et al*. 2011:1023).

ii) Promotion of public transport

A public transportation system includes the use of trains and buses. According to the American Public Transportation Association (APTA), using public transportation reduces travel by private vehicle, results in fewer vehicle miles of travel, reduces GHG emissions, and reduces an individual's carbon footprint by eliminating travel that would have been done via private vehicle. APTA saw that public transport has a potential to change people's way of living meaningfully while preserving and enhancing movement (American Public Transportation Association, 2008).

Pucher and Buehler (2010:16) point out that if walking and cycling is combined with public transport, it will provide better benefits for reducing GHG emissions because public transport trips generally start and end with walking to and from railways or bus stops. Public transport services provide cyclists with suitable alternatives when bad weather, mechanical failures or bad landscape is encountered. Additionally, access to public transport enables cyclists to make longer trips they would not otherwise have been able to do with a bicycle only. Increasing the geographical coverage of public transport is among the campaigns created for public transport.

iii) Alternative fuels for carbon lessening

Variations of alternative fuels have been proposed to address the issue faced by petroleum; this includes biofuel, hydrogen, methanol, methane, ethanol and synthetic liquids from coal or gas. Of these, biofuel and hydrogen will be briefly explained as they seem to be more popular.

Biofuel is a fuel created from organic matter or combustible oils produced from plants. Examples of biofuel are black liquor from the paper manufacturing process, alcohol, soybean oil and wood (Intergovernmental Panel on Climate Change, 2007). Lately, the use of biofuel as fuel source has rapidly increased (Lasco & Khanna, 2014:89). According to Raslavičius *et al*. (2014:330), decision makers, scientists, industry leaders and members of the public are pushing for the development of transport biofuels for environmental and economic reasons because biofuel is a lesser carbon alternative—it is less expensive than petrol and an alternative to diversify the sources of energy supply. It is an approach to reduce the growing trade deficits and increase economic opportunity. However, some scholars such as Lasco and Khanna (2014:99) report that the presence of biofuel in the fuel mix will reduce the need for carbon tax and increase the cost of food and land rent, which will in turn

reduce labour supply. Lasco and Khanna (2014:99) support the use of carbon tax rather than biofuel subsidy as GHG emission reduction policy because carbon tax reduces the demand for fuel. In conclusion, sufficient land is needed for farming and marginal land for the production of biofuel in order to lessen the negative impact of increased costs of food and land rent linked to biofuel.

Hydrogen is created from a diversity of available feedstock such as natural gas, waste, coal, solar resources, biomass, wind and nuclear resources (Ogden 1999:229). A fuel cell that operates on hydrogen generates electricity in a non-stop way from the controlled electrochemical reaction of hydrogen or oxygen and fuel. With hydrogen as fuel, water and heat will be emitted (carbon dioxide free) and the heat can be used (Intergovernmental Panel on Climate Change, 2007:81). Studies comparing alternative fuels for future transport have proposed that fuel cell vehicles are encouraging technology to realise the future goals of zero exhaust emissions, good performance, high effectiveness and lower prices in mass production (Ogden, 1999:230). Hydrogen consumption could play a starring role in the transportation sector between the years 2041 and 2050, as its consumption in the transport sector could be more than other alternative fuels (such as fossil/non-fossil) combined. Many countries, for instance Spain, are now working towards achieving a hydrogen-based economy by the year 2050 (Contreras, Guervos & Posso, 2009:17). However, hydrogen is faced with large economic and technological challenges as it is expensive and the development of hydrogen infrastructure needs enabling technologies such as fuel cell vehicles, on-board hydrogen storing systems on the user side, sequestration systems on the hydrogen supply side, and gasifier-based hydrogen creation systems (Ogden, 1999:272; Chapman, 2007:358). So, GHG emissions from road transport vehicles still remains a problem, particularly concerning particulates.

iv) Increase vehicle occupancy rates

Vehicle occupancy rate focuses on the general number of persons conveyed by a vehicle for each journey (origin to destination). The vehicle occupancy rate lever increases the yearly average percentage of seats occupied in vehicles. It was noted that an increase in vehicle occupancy rate will decrease the energy consumption of the road transport sector. Trip sharing and better use of public transport are encouraged. There is a campaign to create lanes that give preference to high occupancy vehicles especially in urban areas that will allow motor cars with two or more passengers along such a lane (South African Department of Environmental Affairs, 2010:1).

It is believed that travelling on the lane that gives preference to high occupancy vehicles will make one's journey much faster than other lanes. This could be a motivating factor to increase occupancy (Stanley *et al*., 2011:1025).

The South Africa Department of Environmental Affairs typically assumes that by the year 2050, cars and SUV's would be 60% occupied; this is forecasted as the upper limit of vehicle occupancy as it is not possible for cars to be fully occupied for every trip travelled; minibus taxis 95% occupied; buses and bus rapid transit (BRT) will run at an average occupancy of 78% of all available seats (South African Department of Environmental Affairs, 2010:1).

v) South Africa's move from petrol to diesel

On 3 September 2014, the South African Department of Energy announced the reduction in costs of petrol and diesel, as petrol dropped by 67 cents per litre and diesel by 25.38 cents per litre. This was largely based on a drop in crude oil price, which led to a decrease in costs of petroleum products in the international markets and the stability of the rand against the dollar (Creamer Media, 2014; Eyewitness News, 2014). Following this news, the South African government suggested a move from petrol to diesel vehicles as part of its fuel efficiency drive. Diesel fuelled vehicles generally emit less CO_2 per kilometre as they typically deliver 25% to 30% better fuel economy than petrol engine vehicles (Thambiran & Diab, 2011:2686). This depends on the model and what the automotive technology achieves. Dovetail (2014) mentions that diesel vehicles have no spark plugs or distributors and therefore do not use ignition tune ups. Due to its fuel economy, diesel vehicles provide far more torque to the drive shaft than petrol vehicles. As a result, the majority of modern diesel passenger vehicles are much faster from a standing start than petrol powered vehicles. However, this analysis is only based on the fuel and emission savings that can be achieved with diesel vehicles as maintenance of the fleet of vehicles are more expensive if the fuel injection system breaks down.

2.2.3 Sustainability

Sustainability is now a significant issue in the sense of reducing direct environmental impact in, *inter alia*, agriculture, production and design as well as social, political and economic activities and in ICT usage (United Nations Conference on Environment and Development cited in Elkington, 1994:90; Dyllick & Hockerts 2002:130; Dedrick 2010:174). An international United Nations review acknowledges sustainable economic development as issues dominating the future. The review notes: "Never before has world opinion been as united on a single goal as it is on achieving sustainable development" (Boudreau *et al.,* 2008:1). The present trend of our

consumption of natural resources is unsustainable, thereby resulting in environmental problems (Boudreau *et al.,* 2008:1).

There exists a need to move to sustainable development. Moreover, sustainable development is now an important norm of smart management as the world is heading towards an ecological catastrophe (Chou & Chou, 2012:447). The most generally recognised definition of sustainability is:

> "…meeting the needs of the present generation without compromising the ability of future generations to meet their needs" (World Commission on Environment and Development, 1987, cited in Deif, 2011:1554).

This reasoning is the main point of sustainable development and much work has been put together to live up to this objective (Bengtsson & Ågerfalk, 2011:97). Though, the definition is relatively difficult and broad for organisations to understand and apply their individual roles (Carter & Rogers, 2008:363; Dao, Langella & Carbo, 2011:64) because most managers view sustainable development as one-dimensional 'nuisance' instead of a multidimensional opportunity. This approach leaves organisations unprepared in dealing with sustainability in a strategic manner (Hart & Milstein, 2003:56). On the other hand, corporate sustainability can be defined as meeting the primary and secondary needs of stakeholders (for instance employees, customers, communities and pressure groups) in organisations without compromising the ability to meet the needs of future stakeholders. Following this objective, businesses ought to develop and uphold their economic, social and environmental aspects (triple bottom line) while keenly contributing to sustainability in the political domain (Dyllick & Hockerts, 2002:131; Hart & Milstein, 2003:56).

Further study on the *triple bottom line* framework gave the following insight.

2.2.3.1 The triple bottom line (TBL)

The triple bottom line framework was coined in 1994 by John Elkington who also formulated the 3Ps (people, planet and profits) in 1995, both of which represent economic, social, and environmental sustainability. This idea was born from Elkington thinking that the social and economic dimensions of Brundtland's 1987 report needed to be addressed in a more unified manner to achieve real environmental progress (Elkington, 2004:1). To achieve an excellent TBL performance, new types of economic, social and environmental partnerships are needed. As a result, Elkington notes that effective long term partnerships are important throughout sustainability transition where some of the partnerships will be between public and private sectors, some among private sectors, and some groups

campaigning for wide-ranging TBL objectives such as trust. Building trust denotes one of the greatest investments we can make in social capital creation because poorly built relationships may undermine trust (Elkington, 1998:37,51) and the pursuit of TBL.

Economic, social and environmental sustainability are explained as follows:

Economic growth defines economic activities and the movement of money, i.e. employment rate, market behaviour, business diversity factors and taxes, which communicate and impact on the social and ecological performance of the society.

Social performance equity involves human rights, *inter alia* education, access to social resources, health and wellbeing, quality of life, and social capital, all of which promise to promote justice in the creation of public policy. It is a key element in guaranteeing a company's authorisation to function, and it supports the company to provide excellent environmental and economic performance.

The environmental aspect of sustainability promotes a healthy environment which unceasingly offers goods and services to human beings and other natural organisms on earth. This may well include air and water quality, energy usage, natural resources, and solid and toxic waste (Norman & MacDonald, 2004:246; Marcus & Fremeth, 2009:19; Slaper & Hall, 2011:5; Chou & Chou, 2012:447).

These components (of TBL) have been adopted by literature as the authors believe organisations can engage in activities that positively affect the environment and society in lasting economic growth, thus, leading to a competitive advantage for the firm (Carter & Rogers, 2008:364-365; Kumar & Sarma, 2013:55). Efforts to regularly decrease pollution and waste lead to better efficiency and discovering innovative techniques and materials. For instance, organisations can focus on reducing the VKT of their employees by implementing telecommuting, whilst a vehicle firm might focus its efforts on fuel efficiency as well as hybrid and fuel cell technologies (Sneirson, 2009:992).

Even though TBL seems great, some authors disagree with supporters of this framework. Milne and Gray (2012:13-14) are of the opinion that TBL and the Global Reporting Initiative are inadequate conditions for businesses contributing to the sustenance of Earth's ecology. The authors maintain that it is unclear whether the implementation of triple bottom line processes has any practical influence on business conduct as firms may strengthen their business as usual, and that may indirectly increase their level of unsustainability.

Norman and MacDonald (2004:243) claim that the uniqueness of TBL comes from its supporters' argument. The authors argue that the general fulfilment of obligations to stakeholders (employees, customers, suppliers, communities and environment) ought to be measured, calculated, audited and reported on in the same manner which the financial performance of public firms are done. Norman and MacDonald (2004:243) further point out that one of the long-term sayings of modern management is: "If you can't measure it, you can't manage it". Pava (2007:107) responds by indicating that the saying only stands if supporters of TBL accept an aggregation claim for financial performance. While there is no single case that aggregates financial performance, nobody should request this of social and environmental reporting either. Clarkson, Li, Richardson and Vasvari (2011:123) note that the phrase, "it pays to be green", appearing forceful as the exact mechanism in which businesses could progress their competitiveness through a proactive environmental strategy, is still debated.

Over the last four decades there has been general work conducted on environmental, social and economic performance. The 1992 Earth Summit held in Rio lead to the extensive acceptance by NGOs, politicians and industry leaders that none of the three problems (of TBL) can be solved without solving the other two (Dyllick & Hockerts, 2002:130). Practically, sustainability is the struggle to reduce the negative environmental, economic and social impact of an activity whether from government, organisations or individuals (United Nations, 2002, cited in Bengtsson & Ågerfalk, 2011:97). While there are ways to measure sustainability, many of these factors considered are hard to express quantitatively as the standard may not be the same from case to case. Regulations and laws have an impact on the benchmark for good sustainability performance (Bengtsson & Ågerfalk, 2011:97). Key environmental regulations are usually present in greenhouse gas emissions, dangerous materials and waste disposal. Certain regulations (such as the King III reporting) may demand that organisations release their environmental information to staff and the public.

2.2.4 Green business

Green business is defined as any organisation that partakes in sustainable development or environmentally friendly activities to ensure that all processes, merchandises and manufacturing engagements reasonably address current environmental issues while profit is maintained (Kumar & Sarma, 2013:55). However, despite increasing environmental issues, many people, including business leaders, normally think of environmental issues as separate from their daily business lives and behavioural patterns (Jenkin, Webster & McShane, 2011:17).

Practically, green businesses need to consider environmental and societal strategies since profit is usually a basic goal for any firm, although, going green implies several things to different businesses, from guarding forests to usage of recycled copy paper, from creating a home-based work programme to reducing traveling times, and swapping luminous bulbs with compact fluorescent lighting (Kain, 2010:16).

Below are a few activities a green business might be engaged in:

- *Energy conservation*: a business that integrates energy conservation into their strategic plan protects themselves from the risk of rising energy costs (Kumar & Sarma, 2013:56). Usually, more than half of this energy is misused through ignorant behaviour, inefficient technologies or poorly designed systems (Jenkin *et al*., 2011:17)
- *Water conservation*: green businesses recognise that fresh water supplies are limited and there is a need to conserve water. Moderate use of water for washing, flushing and watering saves clean water for drinking and support in preventing pollution produced by over pumping of aquifers. Additionally, green businesses manufacture products that consume a reduced amount of water during their lifespan (Kumar & Sarma, 2013:56; Pennybacker, 2014)
- Sustainable businesses may also integrate policies that encourage their workers to save records in electronic format and discourage them from printing emails, scanning, and imaging of records (Kain, 2010:18)

2.2.5 Strategic planning and management

There are many activities a company can engage in to become green. Strategic planning and management helps a company attain greenness.

Strategic planning is a management instrument (Bayat, 2008:183). Of the four management roles—planning, organising, leading and controlling—planning is considered the most important as all processes start with planning (Daft, 2006:238). Strategic planning as defined by Armstrong (1993:24) is a systematic analytical method that studies the whole business in respect to its environment with the purpose of developing an integrated, reliable and coordinated view which the organisation desires to follow. It is applied to help an organisation focus its energy to ensure stakeholders are working towards maintaining, enhancing and achieving the objectives of the organisation. It helps to evaluate and modify the direction of the organisation to respond to a changing environment (Bayat, 2008:183).

In most big organisations such as ExxonMobil and Johnson & Johnsons (J&J), strategic planning involves *contingency planning,* i.e. preparing for unexpected, major and quick changes in the environment which may lead to a significant impact on the organisation, thus requiring an immediate response. For example, managers need to start developing a contingency plan for negative scenarios of major environmental activities such as floods, earthquakes or fire outbreaks that may happen or for crisis management (e.g. terrorism) (Hellriegel, Jackson & Slocum, 2005:179). Moreover, positive events also require contingency plans. If a contingency plan is in place in a case where there is a high demand of products from customers that overwhelms the organisation's current capacity, an organisation can quickly make arrangements to meet the demand of their customers.

Strategic management can be seen as the procedure of formulating strategies and strategic plans, and managing the organisation to accomplish these strategies and plans. Organisations and managers who think and act strategically see into the future and define the way they need to follow for the middle and longer term (Armstrong, 1993:24). Outstanding organisational performance does not present itself as luck; rather, it is determined via decisions made by the managers (Daft, 2006:269).

Rosen (2013:263) defines strategic planning and management as a group of processes involving strategic planning where managers come together to formulate their strategic plans, management, and the implementation of such plans. The author adds that formulation and implementation are mutually essential as planning without implementation is fruitless, and implementation without planning is disordered. Daft (2006:278) notes that strategy formulation involves evaluating the outside environment and internal problems, and then consolidates the results into goals and strategy. Strategy implementation on the other hand involves the use of managerial and organisational tools to allocate resources such as equipment, money and employees in order to accomplish the strategic result or goals.

2.2.5.1 The essence of strategic planning and management

Planning of activities in a strategic way leads to greater sustainability in an organisation. Strategic planning is beneficial because it targets goals within a longstanding framework by shaping the future of an organisation. Planning strategically proposes change and standardisation at the same time, and assists in decision making (Bayat, 2008:186).

“Strategic” is among the most generally used words in the vocabulary of business (Rosen, 2013:261; Shivakumar, 2014:78). For example, the Royal Bank of Scotland acknowledges providing its customers with strategic funding solutions; Research in Motion states that it is undertaking a strategic review; Kraft Foods claims that the decision to split its company was strategic, while Microsoft states that “its rejection to buy Yahoo! was certainly not strategic” (Shivakumar, 2014:78).

In the world of business, several iconic companies such as Blockbuster, Delta Airline and Kodak wavered as a result of their ill response to important economic, social and technological changes (Shivakumar, 2014:78-79). Kodak, for instance, celebrated several outstanding milestones; however, its strategic decision for not sponsoring the 1984 Olympics paved the way for Fujifilm to jump at the opportunity, which successively placed them at an advantage. Secondly, Kodak’s decision to not pursue their invention of the digital camera into the technology world when their printer initiative took over, led to a costly decision as this affected their income and competition, and eventually led them to bankruptcy (Wiles, 2012:8).

Strategic decisions can be powerful, having an impact on the kind, potency and depth of the resultant decisions. Another example of a strategic decision is Southwest’s purchase of Air Tran Airways (ATA) in 2010 at the rate of $1.4 billion. The purchase of ATA empowered Southwest to function greatly in its tactical games with other airlines. This led to its expansion to serve both domestic and overseas customers as well as led to a better flexibility in pricing and services (Shivakumar, 2014:89). Additionally, the story of Nintendo’s failure and the rise of Sony’s PlayStation product demonstrate yet again the need for strategic planning. Sony’s managers formulated and implemented strategies that positioned PlayStation as the master in the video console business, whereas managers at Nintendo failed to react to the growing expectations of their customers and increased competition (Daft, 2006:268).

2.2.6 Summary

The road transport sector has shown to be the highest carbon dioxide emitting sector. Thus, many long term technologies and policy solutions to alleviate traffic pollution have shown to be real, but no short term solutions, no change to the situation that people must still commute. Making changes to vehicle technology alone will not reduce the emissions needed in the short to medium term; a behavioural change precisely targeting the VKT of passenger vehicles is needed. Such a change will keep the type and number of vehicles constant but reduce

vehicle kilometres travelled, which will result in a reduction in petrol consumption, thus leading to a reduction in GHG emissions and air pollutants.

Strategic planning and management eliminate the weaknesses related to ignoring outside influences. A strategic perspective enables the physical environment to be accounted for in terms of the company's effect on their daily functional activities whilst economic, social and environmental aspects of sustainability (TBL) are concerned with achieving real environmental progress. The study embraces TBL in that companies can still achieve their economic aspects if social and environmental aspects are integrated into their business strategy. Therefore, what is needed in a company's strategic planning is sustainable development which incorporates TBL.

2.3 PART B: Green IT

One of the main focus areas of Green IT is promoting telecommuting and remote computer administration to reduce transportation emissions (Boudreau *et al*., 2008:2; Ruth, 2009:77).

2.3.1 Green IT introduction

The conceptual origin of *Green IT* and its alternative, *Green Computing* (Bose, Sahana & Sarddar, 2015:124), is over two decades old. It became generally popular and important because of the impact of IT on the natural environment (Harmon & Auseklis, 2009:1707). The Green IT idea began in 1992, following the launch of Energy Star by the US Environmental Protection Agency (EPA), a voluntary labelling approach to recognise the energy efficiency features of electronic devices. Energy Star has now developed into an important certification through significant name recognition worldwide. Presently, computers, servers, gaming systems and various IT devices have embraced Energy Star in their product descriptions (Ruth, 2009:74). EPEAT is another Green IT benchmark, a programme that assesses computer devices on 51 environmental standards, and awards EPEAT gold, silver and bronze certification for compliance. EPEAT is from the Green Electronics Council, and the leader in evaluating lifecycle environmental standards of electronic devices. It is based in the USA. EPEAT now covers 3,200 environmental choice electronic products, 41 countries, and has 45 participating manufacturers (Foster, 2010). These standards are taken seriously by vendors during product development and advertising. For instance, MacBook Pro from Apple advertises high ratings green features such as Energy Star and EPEAT (Ruth, 2009:74) and the Lenovo G570 has the EPEAT-Gold certification clearly stuck on it.

Green IT has been conceptualised in many ways with a variety of terms and concepts. It largely depends on one's viewpoint of IT. The Green IT definition mostly cited is as follows:

> "Green IT is defined as an environmentally sound IT. It is the studying and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems for example monitors, printers, storage devices, communications systems and networking—efficiently and effectively with a reduced or no effect on the environment" (Murugesan, 2008:25-27).

Simply put, Green IT focuses on making the production, use, disposal and recycling of IT greener (Molla & Abareshi, 2012:92). It includes the beliefs and activities of IT professionals in stopping pollution, improving product stewardship, and contributing to a sustainable development (Molla, Abareshi & Cooper, 2014:130). For most Chief Information Officers and IT vendors such as Dell, HP, Intel and Sun, Green IT has to do with data centre energy efficiency (Molla, 2008:660). So, energy efficiency in hardware and data centres continues to receive much attention, and is seen as a potential to reduce greenhouse gas emissions and lower energy costs. In IT industries, major hardware companies advertise environmentally friendly designs, stressing reusability and the elimination of toxic chemicals, and IT service companies offer Green IT consultation to their customers (Dedrick, 2010:174).

The impact of Information Technology on our natural environment can be grouped into first, second and third order effects.

2.3.1.1 First order effect of Information Technology

The first order effect denotes the negative environmental consequences of IT production, use and disposal of materials (Molla & Abareshi, 2012:92). The speedy increase of internet-based businesses, sometimes referred to as cloud computing, and the costs incurred from energy to run IT infrastructure, are among the main drivers of Green IT. Over the last decades, the connection between energy and carbon generation plus the desire to reduce both gave birth to Green IT (Harmon & Auseklis, 2009:1707). This viewpoint considers IT as impacting negatively on environmental sustainability (Molla & Abareshi, 2012:92).

Murugesan's (2008:27) holistic approach to Green IT stresses the life cycle of IT. Figure 2.2 gives an illustration of Green IT.

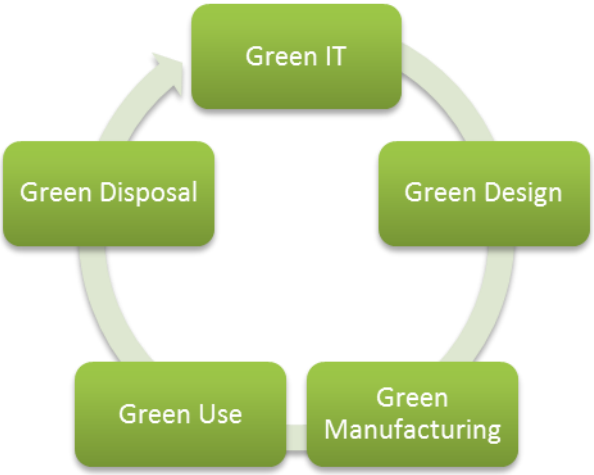


Figure 2.2: Comprehensive approaches for a sustainable Green IT
(Adapted from Murugesan, 2008:27)

- *Green Design* focuses on designing the hardware of computers to use low energy and cooling devices as energy saving is a vital point of Green IT (Murugesan, 2008:27). IT itself consumes energy, in data centres, networks, computers and other computer peripherals. For instance, computers generally use about 100 watts of power, and there are more than a billion around the world. So the power utilised is large if the electrical requirements are combined. HP indicated that the features of their newest Energy Star computer uses one fourth the power of a computer; this indicates success in reducing the energy output (Ruth, 2009:76)
- *Green Manufacturing* involves producing computers, electronic elements and computer peripherals with reduced or no effect on the environment (Murugesan, 2008:27). The words “green manufacturing” were devised to mirror the latest standards of manufacturing computers which include numerous green strategies and methods to be more eco-efficient
- *Green Disposal* is focused on properly reusing or refurbishing old computers and electronic devices as this is possible to prolong IT lifecycle equipment and minimise risk strategy (Murugesan, 2008:27). The dumping of used equipment is a Green IT legislative and litigating issue. Most countries are now regulating the disposal of electronic waste such as computers, monitors, video gaming systems, printers and television sets (Ruth, 2009:74). IT waste consumes space and releases toxic substances which impact negatively on people’s health and the natural environment (Chai-Arayalert & Nakata, 2011:221)
- *Green Use* minimises the power utilisation of computers or other ICT devices and related information systems, and use them in an eco-friendly manner (Murugesan, 2008:27; Bose & Luo, 2011:40-41; Deif, 2011:1553-1554)

2.3.1.2 Second order effect of Information Technology

The second order effect denotes the positive impact of using IT for economic and business processes. This viewpoint considers IT as part of a solution to environmental sustainability (Molla & Abareshi, 2012:92). Thus using IT to make businesses greener refers to *IT for Green*, also known as *Green IS*. This view consists of improving the efficiency in businesses that are key sources of GHG emissions, for example in the transportation, manufacturing and energy sectors (Dedrick, 2010:174).

Green IS helps organisations track environmental information (such as energy used, water used and toxicity) about the creation of products and the fulfilment of services. It monitors the emissions of a firm's operation and waste products to manage these more efficiently (Boudreau *et al*., 2008:3). Although the terms *green IS* and *Green IT* are frequently interchangeably, these two connected concepts have emerged in the IT/IS literature. They are deeply rooted in the difference observed in their definitions and in the role of IT and IS in producing and solving environmental sustainability, in that order. IT refers to the hardware and software technologies that capture and process data while IS denotes a broader blend of IT, people and processes to advance individual, group and business objectives (Chen, Watson, Boudreau & Karahanna, 2010:24; Molla, 2013:705).

The study will refer to both green IS and Green IT as *Green IT* henceforth, unless otherwise stated. This covers all efforts from the use of IT to positively assist in delivering environmental objectives in order to reduce the environmental hazards caused by using IT.

2.3.1.3 Third order effects of Information Technology

The third order effects of IT on the environment are longstanding and dynamic. It happens when an extensive use of ICTs results in changes in the structure of economy and lifestyles. Telecommuting or the development of home-based businesses built on ecommerce platforms such as Amazon or eBay are good examples of third order effects of IT. Unfortunately these transformative effects are slow in adoption (Dedrick, 2010:175). Green IT promotes telecommuting and remote computer administration to decrease emissions from transportation (Boudreau *et al*., 2008:1).

2.3.2 Establishing Green IT strategy in organisations

The key reason for establishing Green IT in organisations is to reduce the carbon footprint. In 2012, about 4.7% of global electrical energy was consumed by ICT,

releasing roughly 2% of the CO_2 emissions into the atmosphere. These numbers are increasing; however, the improvement in energy efficiency of ICT equipment is an indication of slow growth of carbon footprint from ICT (Gelenbe & Caseau, 2015:1). From this standpoint, ICT appears to be contributing to a small amount of the overall climate change issue. But, much of the other 98% of the CO_2 emissions by other industries may potentially be addressed by the use of Green IT—such as telecommuting—throughout the economy (Dedrick, 2010:175; Zheng, 2014:2).

Organisational culture has long been acknowledged as a great concern within business literature; considerable attention has been dedicated to its impact on adopting green initiatives. It has been debated that for organisations to steadily incorporate environmental issues into their processes, they need a key change of corporate culture (Campbell, Ratcliffe & Moore, 2013:126). This culture includes the establishment of environmental awareness and proactive behaviour of an employee's routine activities. Employees and stakeholders ought to be given the right tools and training so that working or living in a green culture is easy, rewarding and fun (Olson, 2008:23), although Green IT capability also encompasses factors such as aligning green initiatives with corporate sustainability strategy, culture, project planning, expertise and governance. Adopting Green IT can develop into sustainable IT solutions offering benefits internally and across the enterprise (Pernici, Aiello, Brocke, Donnellan, Gelenbe & Kretsis, 2012:5). More importantly, to achieve sustainability, innovation and repositioning are critical activities that will increase the value of stakeholders. It is essential to consider how proficiently the firm runs its present assets and how well new abilities for the future are repositioned and procured in pursuing short and long term sustainability activities (Lee, 2009:1104).

The adoption of Green IT may defer from other IT adoption due to the importance of ethical and environmental sustainability considerations during the decision making process. Usually, IT adoption is motivated by the economic profits of using the technology. However, the adoption of Green IT practices may be motivated due to the climate change concern, even though economic benefits may not be tangible in the short term. The adoption of Green IT may also defer from the adoption of other green concepts as Green IT practice enables organisations to accomplish their green objectives (Molla, 2009:3).

After a thorough search in the Green IT literature, it was observed that Green IT adoption in any organisation is driven by environmental effectiveness or responsiveness, legitimation and competitiveness. Business strategy also influences

the decision to adopt Green IT (Kuo & Dick, 2009:82; Jenkin *et al.*, 2011:22; Molla & Abareshi, 2012:94; Silva, Poleto, De Moura, Daher & Costa, 2013:747; Simmonds & Bhattacherjee, 2014:7).

2.3.2.1 Environmental effectiveness motivation for Green IT

The environmental effectiveness motive is found within an organisation. Environmental effectiveness happens when organisations start Green IT initiatives as a result of environmental sustainability beliefs and reasons other than economic gains. It denotes the wish to adopt technologies and practices to improve the environmental sustainability of IT and the firm as a whole due to concern for the natural environment or as a way to set standards and lead in a specific industry. The commitment to adopt sustainable practices is seen in managers and organisations that are environmentally driven and have a love for the natural environment (Molla & Abareshi, 2012:94). Additionally, such organisations are concerned with the rate and amount of depletion of natural resources (Jenkin *et al.*, 2011:22). Even though this motive is not explicitly discussed in the Green IT literature, it does exist implicitly.

2.3.2.2 Legitimation motivation for Green IT

Environmental legitimation happens due to government mandate or social pressures a firm is exposed to (Molla & Abareshi, 2012:95). Both of these motivations are aimed at survival, and both are based on satisfying the government, community and shareholders, and complying with standards and regulations to avoid penalties (Kuo & Dick, 2009:82-83). The general view of this motive is that organisations take part in Green IT or green practices when faced with regulatory authorities such as governments, social pressures or agency directives (Chen, Watson & Karahanna, 2009:7; Molla & Abareshi, 2012:95). Furthermore, in wanting to adopt green practices, businesses may be subjected to pressure from their supply chain partners who have adopted green practices. They could capitalise on cost reduction or discount and the social benefits of the adoption to encourage partners (Chen *et al.*, 2010:30). Traditionally, environmental compliance has been viewed as an extra cost of running a business and managers are often apprehensive that such initiatives may negatively affect the business competitiveness (Molla, 2008:659).

2.3.2.3 Competitiveness motivation for Green IT

Kuo and Dick (2009:82-83) maintain that organisations adopt Green IT practices based on competitiveness which emphases success and includes initiatives that generate revenue, decrease prices or increase efficiencies. Zheng (2014:6) holds that a competitive motive may well be divided into bottom line considerations and external competitive pressure where bottom line consideration is seen as the

economic drivers—e.g. better effectiveness, efficiency improvement and cost savings—and competitive pressure is measured as external market forces, which may be in the form of adopting Green IT based on inducement.

Finally, Newton and Harte (1997:77-93) focus on *evangelism* as a salient feature that leads to the adoption of green practices. The evangelism may be in text format to convince readers that commitment to environmentally friendly practices will make them and their organisation feel good, thereby capturing their heart towards green business strategy.

2.3.2.4 Importance of motivations

Hart and Milstein (2003:60-61) note that programmes aimed at addressing pollution and legitimation are widely adopted (due to profit) or seen by managers as the fastest way to grow their shareholder value by raising the bottom line for current businesses through reducing cost and liability. The literature shows that economically viable environmental programmes have been adopted by firms. Among the reviewed motives it is obvious that initiatives with greater economic benefits are likely going to be adopted by firms (Simmonds & Bhattacherjee, 2014:13). Furthermore, if Green IT practice, for instance telecommuting, is fully adopted, these three motives—environmental effectiveness, legitimation and competitiveness—will be met.

2.3.3 Summary

In summary, Green IT became popular and important because of the impact of IT on our natural environment. The impact of IT on the environment is grouped into first, second and third order effects; telecommuting falls under the second and third order which consist of using IT to improve the efficiency in economic and business processes in businesses that are key sources of greenhouse gas emissions (e.g. in transportation). This happens when the extensive use of ICTs results in changes in the structure of the economy and lifestyles. The adoption of Green IT in any organisation is driven by environmental effectiveness or responsiveness, legitimation and competitiveness. Business strategy also influences the Green IT adoption decision.

2.4 PART C: Telecommuting

2.4.1 The emergence of telecommuting

Telecommuting began as a concept in 1973 during Jack Nilles' research days at the University of Southern California. Nilles coined the theory of telecommuting while working on the idea of moving outer-space technology to inner-space technology

(Slaughter, 2013:8) where the context is based on an approach to increase the work-life balance in urban and rural areas through the ability to move work to, or nearer to, the houses of employees rather than having employees commute to work on daily basis—with an instant effect of reducing vehicle congestion, fossil fuel consumption and air pollution (Nilles, 1991:411). Even when employees work for only one day per week from home rather than at their place of work, there would still be a considerable decrease in commuting, related congestion and energy use (Rietveld, 2011:148). Employees, employers and communities are gradually learning that when they are not guarded when and where work must be done, individuals are more creative, productive and successful (Lister & Harnish, 2011:4). Service representatives, consultants and several other professionals can perform their job duties as telecommuters away from the typical office (Gandolfi & Oster, 2011:25). Telecommuting is defined as an arrangement where an employee works from home or out of office, using telecommunication links (internet, email and/or telephone) to replace commuting to and from work (Nilles, 1991:413; Handy & Mokhtarian, 1996:227; Mungly & Singh, 2010:4; Chepken, 2012:1).

2.4.1.1 Telecommuting adoption and use

The international rate of telecommuting has been on the increase in the past decades even though this trend has experienced ups and downs around the world. Telecommuting literature has shown that regions such as the USA, Canada, Australia and Europe have a larger telecommuting workforce (Aboelmaged & El Subbaugh, 2012:4; Kite, 2013:25). In North America, telecommuting has touched a significant level of the workforce, possibly because nearly every traditional office job can be executed by a telecommuter at least part of the time (Gandolfi & Oster, 2011:214). According to Shieh and Searle (2013:2), about 16 million USA workers perform their jobs from home at least one day in a month, which is around 10% of the entire workforce.

Gandolfi and Oster (2011:214) note that a nation's federal government is often said to be lagging behind the private sector, but the US government has been a major catalyst to telecommuting and its increasing popularity with the beginning of *Flexiplace* in 1990 via Clinton's Administration, to the passing of Public Law 106-346, Section 359 in 2000—a law demanding each executive agency to initiate the telecommuting policy. Such an important step serves as a possible model for effective telecommuting practice (Gandolfi & Oster, 2011:214). Additionally, the Clean Air Act as well as the flexible workplace project, Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, enabled all levels of the US government, including federal and local states, to keenly pursue the telecommuting

policy as a sustainable transportation demand management (TDM) choice to improve air quality and reduce road congestion (Piozet, 2013:11). The UK government also promoted telecommuting via initiatives such as the Work-Life Balance campaign 2000 and legislative procedures such as the Employment Act 2002, a tool for improving the quality of live/work and reducing unemployment (Jones, 2013:29).

Interestingly, Handy and Mokhtarian (1996:227) note that the future of telecommuting largely depends on whether organisations will provide employees the opportunity to telecommute, whether workers will take advantage of the opportunity, and whether government policies will encourage both. Proof has shown that a key barrier to telecommuting is organisational or management doubt towards the programme (Lister & Harnish, 2011:7).

2.4.2 Human resource management

The human resource factor has demonstrated to be of great value over the years, with growing interest in the way it has contributed to organisational success. For example, success in today's competitive markets does not necessarily depend on advantages related to economies of scale, technology or equipment, patents and access to capital, but depends more on innovation, speed and adaptability (Pfeffer & Veiga, 1999; Datta, Guthrie & Wright, 2005:135).

"The key to managing people in ways that lead to profits, productivity, innovation, and real organisational learning lies in the manager's perspective or human resources" (Pfeffer & Veiga, 1999:47), although Bayat (2008:15) holds that the management of human resources has demonstrated to be particularly difficult because of the nature of human beings as they are unique and complex organisms, both from a psychological and physical perspective.

From a management point of view, a human relations approach motivates individuals in organisations to develop a teamwork spirit and accomplish organisational goals efficiently and economically. According to Ukpere (2007:385), "human relation is an area of management practice in the integration of people into a work situation in a way that motivates them to work together productively, cooperatively and with economic, psychological and social satisfaction".

Worker productivity is an important organisational outcome. It can be defined as total output divided by workers inputs, which shows the level of productivity of a company's workforce (Datta *et al*., 2005:138).

2.4.2.1 Who should telecommute?

Several organisations who began practicing telecommuting established that organisational culture must first be learnt by an employee within a minimum number of years before he/she is allowed to telecommute (Bélanger, 1999:141; Turetken, Jain, Quesenberry & Ngwenyama, 2011:58), while in some organisations, managers act as gatekeepers by deciding on who should telecommute (Lautsch & Kossek, 2011:10). Telecommuters with longer work experience will report higher telecommuting performance, productivity and satisfaction with the telecommuting programme (Turetken *et al*., 2011:58). According to Goleman (1998), emotional intelligence and effective performance go together for jobs at all levels in the work environment. The author describes emotional intelligence as comprising of five components:

- *Self-awareness:* the ability for one to understand and identify his/her drives, moods, feelings, and how they affect others. People having self-awareness also have self-confidence
- *Self-regulation*: the capacity for one to regulate or control disruptive impulses, frame of mind, and to reason before acting
- *Motivation:* the desire to perform work beyond reasons such as money or statues, and the tendency to persistently pursue goals with energy (i.e. organisational commitment)
- *Empathy:* the skill to understand and relate with people according to their emotional character (such as to clients)
- *Social Skills:* the ability to manage relationships and develop connections such as being efficient in leading change and building teams (Goleman, 1998:88)

Additionally, personal control is a key factor organisations use to retain their best employees. It is a psychological concept that reflects a person's belief in terms of his/her ability to impact change in a preferred direction (Bélanger, 1999:143). Bernardino, Roglio and Corso (2012:290) maintain that some employees may not want to telecommute if chosen by their company or perform well in positions that have limited face-to-face contact with co-workers as employees forced into telecommuting may not appreciate the arrangement, while some employees may thrive in privacy by working from home or remote locations; such employees are therefore suitable for this kind of work. Employees who are actually interested/ motivated in telecommuting should be encouraged by their company to do so.

2.4.2.2 Managing telecommuters

Because of the features of telecommuting, it is essential to consider the need for a specific managerial approach or HRM practices. Telecommuting creates new demands on managers who must show commitment by adapting, interpreting and implementing emerging organisational policies concerning the virtual work arrangement. To ensure sustainability in this kind of work arrangement, it has been noted that managers need to have an open, positive attitude towards telecommuting and learn how to supervise, communicate and stimulate performance among telecommuters irrespective of their absence from the typical office (Lautsch & Kossek, 2011:10; Howington, 2014). Sikes, Mason and VonLehmden (2011:24) point out that managers' need to track progress by ensuring that employees have the ability to complete tasks and meet targets. It is essential to have milestones for work deliverables and steady virtual meetings to ensure workers understand what is expected of them in their task(s).

Madlock notes that managers need to undergo training periodically to develop their ability in communicating task-related information to telecommuters via ICT devices because telecommuters may prefer supervisors who are task-oriented as their communication behaviours would be more task-focused (Madlock, 2013:207). Online training is significant as materials can be retrieved by each person (manager and/or telecommuter) in their own time. Collaboration and sharing ideas are key elements, thus collaboration and conferencing tools such as Microsoft Lync or Skype are important as they keep people connected. For instance, Stones (2014) notes that Dimension Data has a corporate university called DDU (Dimension Data University) with 30 offices across 16 nations in the Middle East and Africa; through virtual learning, people in these areas learn together via DDU. Two kinds of online learning platforms exist; the first supports Stones' description (online learning), while the second shares the instructor's computer screen in a manner that every activity is displayed over the internet on the learner's screen. Many of these programmes have videos, so learners may well see the instructor teaching (Bernardino, Roglio & Corso, 2012:302).

According to Golden and Raghuram (2010:1079) and Brenner (2013:44), managers can introduce informal face-to-face meetings occasionally to encourage the exchange of stories and expertise to nurture and reinforce warm affective-based relationships. These communications can aid in knowledge sharing, which may provide chances for the continuous building of ties and self-disclosure (Golden & Raghuram, 2010:1079; Brenner, 2013:44). A study done by Raghuram and Fang (2013:523) in China shows that employees become interested in telecommuting

when their manager's influence is high and when the managers also telecommute. Bernardino *et al*. (2012:292) note that if managers telecommute, it may lessen the fear of control linked to telecommuting. This means that managers who telecommute will not only be responsible for results, they would also determine adequate techniques for accomplishing goals**.**

Managing telecommuters can be summarised with these four concepts:

- *Communication:* being accessible via phone, instant messages or email at reasonable times will add to better work deliverables as successful telecommuting needs effective communication. This will help avoid frustrations often related to telecommuting for both parties. Per occasion a worker may be away; an alert such as *out of office* with alternative contact details should be set if required
- *Quality of work:* work should be reviewed regularly (daily, weekly and monthly) to avoid mistakes
- *Meetings:* occasional, face-to-face meetings should be encouraged if possible
- *Flexibility:* managers need to be creative to ensure that telecommuting arrangements succeed otherwise both the telecommuter and manager need to come up with another plan to ensure good management (Sikes *et al.*, 2011:24)

2.4.3 Information technology infrastructure for telecommuting initiative

For new businesses planning to start telecommuting, it is important to estimate the costs of telecommunication resources and software needed for this type of work programme. The key areas to consider include connectivity and security as well as communication tools.

2.4.3.1 Connectivity and security

- *Broadband internet connection:* This simply means high speed internet access that is faster than the old-style dial-up connection (Federal Communications Commission, 2014). Potential telecommuters need to have broadband internet connection in their homes as slow internet connection will be frustrating and decrease productivity. According to Pearce II (2009:20), cable and digital subscriber line (DSL) and telephone lines are two main types of high speed broadband. DSL uses high frequency while normal telephone lines use low frequency. DSL is faster as it uses a fibre optic service that maxes out about 30 megabits per second, whereas the maximum speed of cable is 16 megabits per second.

- *Virtual private network (VPN):* Once there is a high speed internet connection, the employee can connect via a virtual private network (VPN) technology. VPN is one of the best choices for most telecommuting programmes (Ye, 2012:22). It is a technology that allows one to sign in from anywhere into office computers and services securely, and it allows for online teamwork with colleagues, from document sharing, editing and instant messaging to video conferencing (Kshetri, 2010:49; Mungly & Singh, 2010:10; Smith, 2013:64). For very sensitive data, a private IP environment offered by an internet service provider (ISP) firm could be considered. Usually, these providers interconnect their backbone circuits privately with "last mile" broadband providers, and can protect the telecommuting traffic from the public internet and on their private links although it is more expensive than VPN and public internet for transport (Ye, 2012:22).
- *Thin clients:* Thin client technologies provide organisations with costs effective approaches to install systems in their branches or remote offices. It offers a high level control of costs related to equipment maintenance and where processing takes place (Computer Business Review, 2006:1). In terms of security, thin client technology decreases the number of states maintained at the user's endpoint, and allows random disconnection/ reconnection of client computers without affecting the session at the server. It allows users to reconnect to the server at different locations without having to carry computing devices around (Richardson, Stafford-Fraser, Wood & Hopper, 1998:34). Client technologies have encryption options to ensure remote access is privately secured and can be configured to record activities when it is remotely used (LeClair, 2008:18). This technology is particularly good for telecommuting programmes because the telecommuter does not need a sophisticated computer as all work is done on the server. With thin client technology, the IT department of an organisation does not need to worry about securing employee computers at home or on the go, because files do not ever leave the company's network (Pearce II, 2009:21). Thus, a thin client setting is recommended for businesses having to maintain high sensitive data such as credit card numbers, medical information, government information and personal identifier information.

2.4.3.2 Communication tools

There are various communication/collaboration tools and information sharing technologies (free and paid) available to facilitate a telecommuting initiative, ranging from instant messaging to video and audio conferencing from various social media networks. Below are some of the most commonly used tools for communication and maintaining a sense of the virtual office:

- *Instant Messaging (IM):* Organisations can adopt instant messaging technologies to increase collaboration among distributed teams and decrease communication costs. Instant Messaging is a communications application that enables a mobile device user to receive and send short text messages in real time. IM applications have a presence awareness capability which gives one a general sense of who is available, what they are doing, and when they last actively used the system (Cameron & Webster, 2005:86). IM has become a computer-supported cooperative work community because it successfully supports informal communication as it is less intrusive and provides room to multitask (Isaacs, Walendowski, Whittaker, Schiano & Kamm, 2002:11). For example, users could respond to questions from co-workers whilst busy with other tasks such as surfing the web, answering phone calls and emailing. Users can also engage in concurrent IM chats (Grinter, 2002:25). Furthermore, free applications such as WeChat and Viber allow for free calls and instant messages to other users anywhere. WhatsApp and Facebook could also be utilised by firms for work purposes. Finally, using IM for telecommuting programmes can help telecommuters overcome a lack of context and absence from informal communication. Herbsleb, Atkins, Boyer, Handel and Finholt (2002:178) and Isaacs *et al*. (2002:11) found that IM in the workplace is primarily used for complex work discussions
- *Video conferencing:* High definition sound systems and video cameras such as Halo Video Exchange Network (HVEN)—a package operated and maintained by HP—allow for video conferencing with people in different geographic offices to feel as though they are present. These networks are usually optimised for video and audio performance, eliminating delays irrespective of where the participants are in the world (Pearce II, 2009:23). The concept of video conferencing has long been available (over thirty years ago). In its early days, it was mainly used by AT&T for large corporate meetings such as yearly stakeholders meetings (Egido, 1988:14). Now some video conferencing packages could be offered for free or less expensive, depending on what a firm's budget is. For example, there is

ooVoo—a package that can take up to six users—as well as Skype, Yahoo! and even gmail, all providing audio, video and data communication between remote video stations. Each one of the video stations transmits and receives audio, video and information through the network (Tompkins, Arends & Barry, 1991). Video conferencing enables telecommuters to see one another and respond to visual cues, and this stimulates a great sense of affiliation (Brenner, 2013:44)

- *Information sharing:* Organisations nowadays provide paid file storage options such as Adrive.com, Citrix ShareFile and Microsoft products for their employees. A large number of businesses deploy Microsoft products, allowing co-workers to log on to SharePoint remotely and create a web space devoted to their project. In this portal, co-workers can have access to corporate resources, create requests for meetings, share documents, and relate information via emails (Pearce II, 2009:22). However, many inexpensive or free cloud storage services such as Google Drive, Dropbox, SkyDrive and many more are available to the public. With Google Docs one can collaborate on spreadsheets, documents and presentations. Dropbox allows up to 2 gigabytes free files storage for easy recovery on devices that are connected to the internet (Smith, 2013:65)

These tools can make telecommuting existence more efficient as everything about a project is online and centralised, and new remote users may visit a folder online and have access to all the material needed to execute a project. Organisations need to consider which tool is most appropriate for them, be it paid or free, to employ sustainable telecommuting.

2.4.4 Telecommutable jobs

An individual's personality type and skills may be suited for telecommuting but their jobs may not be. Managers have stated that the content of an employee's job determines whether this person may telecommute (Jones, 2013:48). To be a telecommuter, an employee must have a job that some portion of it can be done away from the traditional office. Jobs such as a waiter, hairdresser, crane operator and massage therapist obviously cannot be done from a distance. Information workers are more tuned to tasks that may be done away from the traditional office. The basic economic activities of these workers include creating, manipulating, processing or distributing information. Information workers count as more than or equal to 50% of the labour force, and according to Handy and Mokhtarian (1996:229), this percentage will further increase. Consequently, suitable jobs for telecommuting should lean towards the following features: well-defined tasks, low

face-to-face communication needed, measurable work undertakings, objectives with time frames, low requirements for special equipment other than IT devices, tasks that need attentiveness and enough time, and minimal supervision (HR Focus, 2011:2). Below are some identified jobs employees can perform away from their typical office:

- *Writers and editors:* Writers, authors and editors create written content for online publications, books, newspapers, screenplays, advertisements and songs. Writing and editing are fantastic flexible jobs that do not require work to be done at a specific time. The latter includes fields such as journalism, technology, medicine, arts and advertising
- *Research:* Attention to detail and investigative skills are necessary assets in the research field
- *Consulting:* A consultant helps both small and big businesses to maximise efficiency, streamline processes and resolve issues in jobs such as IT (technical) or security consultancies and sales business analysis. This profession requires someone with experience in coaching and consulting to use his/her analytical skills to determine business strategies and set financial priorities
- *Computer and IT:* The use of IT has been adopted virtually in all modern day business sectors. The duties of an employee working in an IT department or firm may include software development and management, technical support, systems engineering, training and system security—both remotely and in person
- *Administrative:* A telecommuting administrative position which includes communication, record keeping, human resources, business and executive support, sales analysis or marketing, and accounting
- *Data Entry:* As the name implies, data entry jobs include information processing, record keeping, word processing, transcribing and clerical duties. A specialist in data entry may work in customer service, administration, technology, health records, payroll/billing and finance
- *Education and Training:* Telecommuting educational jobs require working in a typical academic setting and on a contract basis for firms. Corporate, medical, business and technology training are done online nowadays (U.S. Bureau of Labor Statistics, 2016; Bibby, 2014; CommuteZero, 2016). Thus, the indication above implies that the practice and flow of telecommuting is within the field of knowledge workers (Ruiz & Walling, 2005:422)

2.4.5 The perception of organisations towards telecommuting

Companies instituting telecommuting programmes have felt the need to keep telecommuters 'visible' by requiring them to work at the office at least one day per week. This is considered necessary to keep workers from becoming completely isolated from their peers and the social aspects of the office environment (Perez, Sanchez & De Luis Carnicer, 2002:776). Organisations tend to avoid telecommuting programmes due to the fear of lack of control over telecommuters and a reduction in productivity. Management has the feeling that "if they are not seeing what their staff is doing daily then they are not getting quality service from them", although the fears usually vanish when they experience first-hand benefits (Sikes *et al*., 2011:23; Piozet, 2013:10).

The industry perception towards telecommuting originates from two groups: the adopters and non-adopters. Illegems and Verbeke (2004:327) note that adopters perceive improved flexibility and enhanced productivity whilst non-adopting managers foresee negative effects in terms of social isolation and organisational culture. These viewpoints are classified under benefits and challenges of telecommuting in this study and are discussed in the sub-sections below.

2.4.5.1 Benefits that can accrue to businesses implementing telecommuting

Businesses are discovering that a virtual work arrangement gives them access to hiring professional workers (such as the disabled, elderly and nursing mothers) who are not interested in coping with the typical office setting (Illegems & Verbeke, 2004:321). This work arrangement appeals to employees as it reduces or eliminates costs/time of commuting and decreases personal expenses, for example lunches, automotive and laundry (Kepczyk, 1999:16). Telecommuting provides employees with the freedom to organise their employment to fit in with other aspects of their life. The flexibility for an employer may be to align labour processes with the needs of customers or with peaks of demand. However, the shortage of professional employees in many sectors demands from businesses to offer attractive work packages to their employees, beyond mere remunerations 'deals'. Telecommuting arrangements are increasingly becoming the *modus operandi* in certain knowledge-based roles and occupations (Morgan, 2004:345-350). Baard and Thomas (2010:2) add that this kind of work arrangement is often applied by companies as incentive or reward package for dedicated and hardworking employees to work from home, which in turn builds trust and loyalty between employees and management. In order to achieve telecommuting, companies must look beyond their 50-mile radius, but not all companies are ready to expand beyond their immediate four walls.

i) Increased operations during a disaster

The operations of a company tend to be disturbed in the case of a natural or human disaster, but businesses implementing telecommuting will be able to realise some continuity in their services and production due to the efforts of their telecommuters (Pearce II, 2009:18). Possible disasters include an increased risk of terrorism such as the September 11, 2001 terrorist attacks in the USA (Hart & Milstein, 2003:56), main road or rail road disturbances, floods, fire, hurricanes and an economic downturn or emergency. Telecommuting progresses the operational flexibility and operations steadiness of organisations (Pearce II, 2009:18). For this reason alone companies should embrace telecommuting programmes as much as possible.

ii) Improved communication with customers

Telecommuting allows organisations to manage flexible workloads, in other words, to successfully meet peak periods of demand. It creates additional and suitable coverage over weekends or holidays for specific business fields (Baard & Thomas, 2010:2; Bernardino *et al.*, 2012:297), thus leading to improved communication with customers, for example, resolving customer issues and encouraging staff members "to be on the field" with their customers (Kepczyk, 1999:16). Telecommuting brings customers and suppliers closer together. It provides timeous and comprehensive responses to competitive challenges, potentially exploiting opportunities and circumventing threats, and this gives value to information distribution and responsiveness (Morgan, 2004:350).

iii) Increased productivity

Telecommuters who work away from a typical office one to three days per week increase their overall productivity, with greater levels of loyalty established towards the flexible "enlightened" employer (Morgan, 2004:350). If the right motivated employees telecommute, there would be huge progress in productivity due to less interruption, the freedom to work comfortably, the absence of office politics (a.k.a. gossip), and working in a more quiet and focused environment (Kepczyk, 1999:16; Perez *et al.*, 2002:776). Pearce II (2009:17) reports that Compaq Computer Corporation, IBM Canada, Hewlett-Packard and US West have reported productivity increases of 15% to 50% resulting from telecommuting programmes. Telecommuting is made possible by advancements of technology and it is attention grabbing because of the need for organisational agility, worker flexibility and productivity in today's business (Kowalski & Swanson, 2005:238). In order to maintain a business atmosphere dedicated to delivering value to stakeholders, businesses have to increase productivity and cut down on cost of operations by resorting to technologically innovative work arrangements such as telecommuting to

promote organisational efficiency and productivity (Nyaanga, 2012:3). Moreover, it is noted that telecommuting decreases the spread of communicable ailments from an employee to other workers, and in so doing, productivity increases. Although absenteeism will increase when an employee is sick or has a sick child or elder to attend to, telecommuting could slightly encourage productivity in such a case. Additional merit is that performance is calculated by output—which includes the quality and timeliness of completed work—and not by the number of hours worked (Olson 1982:83; Fuhr & Pociask, 2011:43). In spite of Marisa Meyer's (CEO of Yahoo!) decision in 2013 to ban the virtual working arrangement in the company's policy, telecommuting continues to thrive and it is obvious—the growth from 2005 to 2012 was 80% and it is estimated that regular telecommuters will increase again (Agustin, 2014).

Reasons why telecommuting is on the increase include the speedy innovation and costs reductions of IT, costs of real estate, the shift from blue-collar production to white-collar work, change in family structure with an increasing number of double career households, and the need to be flexible and maintain competiveness in the world (Kowalski & Swanson, 2005:238).

iv) Reduced real estate cost

According to Lister and Harnish (2011:8), renting of office space is expensive, inefficient, inflexible and difficult to scale. The cost/drain of owning or letting real estate can be reduced by telecommuting programmes if companies can consolidate inefficient space and lessen the need for physical presence in regionally controlled industries such as healthcare, insurance and finance. Additionally, organisations owning their buildings and seeing substantial savings in converting some of their staff into telecommuters will do so and let out the freshly vacated space. This revenue making decision may help to offset the costs of employee training and home workstations (Ford & Butts, 1991:20).

Global Workplace Analytics and the Telework Research Network estimate that employees who have telecommutable jobs and work from home half of the time will result in an economic benefit of more than $700 billion per year. The breakdown is as follows:

- Real estate, power, turnover and productivity saving of over $500 billion per annum; this is over $11,000 per employee in a year
- Increased nation-wide productivity by $270 billion worth of work

- Savings on stationary, maintenance, utilities, janitorial services, security, coffee, water service, rented parking spaces, transit subsidies, environmental penalties, equipment and furniture (Global Workplace Analytics, 2015)

Employees also benefit from reduced costs, stress and tiredness related to commuting to and from work (Fuhr & Pociask, 2011:43). During March 2011, a partnership programme between public and private organisations called *Telework Exchange* focused on demonstrating the real value of telecommuting by declaring the results of its National Telecommuting Week from 14-18 February in 2011. The report shows that during that week, a total 39,694 employees teleworked, 86% of which were federal government workers. Collectively, a total of $2.7 million was saved in commuting, and 148,000 hours were gained by not commuting (HR Focus, 2011:1).

Kite (2013:25) identifies how an important federal proceeding was in favour of David Bixby, a former employee of Chase, who sued the company (Chase) for denying him access to telecommute. He claimed that telecommuting lessened his anxiety and depression. The court of law simply acknowledged the legitimacy of telecommuting in the American workplace and argued that the old believe of virtual work likening to unproductivity no more applies.

v) Lower Absenteeism

Telecommuting provides balance/satisfaction between work and personal life. For instance, sick leave may reduce as slightly ill employees will be able to work from home and non-ill employees can still work while caring for a sick loved one (HR Focus, 2011:1). A telecommuter supported these reports by acknowledging that they worked productively while being ill and if he/she was not allowed to have worked from home, sick leave would have been taken on some occasions (Perez *et al.*, 2002:776).

Finally, studies have shown that telecommuters tend to work for longer hours with fewer breaks, thus leading to more productivity (Baard & Thomas, 2010:7; Wilton, Páez & Scott, 2011:280; Piozet, 2013:96).

2.4.5.2 Environmental and societal benefits of telecommuting

On a normal working day, millions of South Africans travel with their personal vehicle between home and work. According to the June 2014 Quarterly Employment Statistics (QES), 8,666 000 persons are formally employed in the non-agricultural sector in South Africa (Statistics South Africa, 2014:3). The transportation statistics of the National Household Travel Survey (NHTS) in South Africa shows that about

57.6% of workers (or 4,939,620 million workers) drove in their personal vehicles to work as this is the top mode of commuting, while taxis and aircraft are the second most used modes of travelling (Statistics South Africa, 2013:5). Assuming that 4,939,620 million vehicles commute the same number of workers on a daily basis, this activity takes time, costs accidents and death, generates road traffic and air pollution, and wastes motor vehicles, maintenance, public resources and fuel.

With telecommuting practice, the above listed negative impacts of commuting could be reduced, and the reduction in traffic congestion will benefit all other drivers who may continue to travel as the road becomes freer during rush hours. To emphasise the future environmental benefits of telecommuting, if 10% of the labour force could telecommute full-time, emissions of carbon dioxide and other pollutants into the air could be decreased. For example, a US study conducted by Fuhr and Pociask (2011:45) notes that if more than 10% of the labour force telecommutes, the cumulated savings of greenhouse gases will be about 588.2 million ton of which 247.7 million ton can be attributed to reduced driving by personal motor vehicles, 28.1 million ton to reduced workplace construction, and 312.4 million ton for less energy usage by companies.

The increase in control and flexibility in the daily lives of individuals resulting from telecommuting definitely increases quality time with families and liberates society from what is believed to be a downward spiral of societal fragmentation or depreciation of traditional principles. Overworked or absent employees of elderly relatives and uncontrollable children may now be adequately cared for, reinstating the essence of community. Telecommuting arrangements can be achieved without employees sacrificing their own careers and families suffering economically (Jones, 2013:29). Furthermore, telecommuting increases the ability of organisations to hire employees with special needs (Crandall & Gao, 2005:32).

Given the required technology, employees who telecommute may decide to work during the day, night or any other time to complete their tasks with whole access to the necessary information or data (Ford & Butts, 1991:21). Though the benefits of telecommuting establish a convincing case for its adoption of a friendly environment and today's modern business, there are a number of challenges that exist for both employers and employees.

2.4.5.3 Challenges of telecommuting

There are some challenges to be addressed in order to fully embrace telecommuting. The key business-side challenge includes trusting or controlling the

telecommuter. Most managers find it difficult to assess employees unless they can be observed and interacted with face-to-face.

i) Fear of whether a telecommuter can be trusted

Ford and Butts (1991:21) outline quite a number of challenges feared by organisations with regard to telecommuting. Firstly, the possibility that a telecommuter will put personal projects above theirs; secondly, a telecommuter may have a part time job with another company using office equipment or branded information; and thirdly, telecommuters may likely distribute their own work to other persons, thus decreasing employers' control over delicate business information and work procedures (Ford & Butts, 1991:21; Bélanger, 1999:141). According to Mungly and Singh (2010:9), organisations dealing with sensitive information, for instance the government, bank, medical and legal occupations, mainly fear for the security of their data.

Employers concerned with the performance of telecommuters may monitor work patterns via software applications that measure an employee's logon times, hours spent on company computers and number of keystrokes of data entered (HR Focus, 2011:2), although performance is best calculated by the quality of the task performed or output with regard to meeting deadlines, and not by the number of hours spent on the company's network.

ii) IT Security issue

IT security is often among the top concerns faced by organisations with regard to performing work remotely, thus, an extensive security strategy must be planned to address issues such as connecting and accessing the company's network and email. A second concern is the security of physical equipment or data at home, mainly for businesses dealing with sensitive information, for example the government, bank, medical and legal occupations (Pearce II, 2009:23; Mungly & Singh 2010:9; Sikes *et al.*, 2011:22). Guaranteed security includes a two-factor authentication and the adoption of restrictive strategies and procedures such as calling for more frequent changes in passwords and the use of more virtual private networks (VPNs). It actually requires a company to intensely plan for different ways to access their business networks (Sikes *et al.*, 2011:22).

iii) Telecommuters may feel isolated

Several scholars, including Madlock (2012:3) and Nyaanga (2012:12), note that isolation is often a challenge pointed out by employees who telecommute. These employees may feel slightly overlooked for certain opportunities compared to typical

office workers because they are physically less connected to the typical office and the state of affairs of their organisation, which might result in less job satisfaction (Shieh & Searle, 2013:3). For employees to succeed in telecommuting they need to work with their managers and take part in activities to ensure their career paths are well defined (Sikes *et al.*, 2011:22). Furthermore, if telecommuting programmes are built into the company's strategic plan, the issue of promotion opportunities for telecommuters will be well taken care of in the policy.

iv) IT Training

Telecommuters mostly depend on their home IT environment (computer and network connection) to maintain communication with the rest of the organisation, and often times these workers receive slight or no training with regard to managing their IT environment. Basically, telecommuters need to be able to fix their own minor IT difficulties and receive training on how to utilise the company's software and hardware equipment. The fact that telecommuters are not within the physical office with an IT department closeby repairing IT issues, implies that they should be able to troubleshoot minor technical problems with computer hardware or software programs otherwise the productivity of telecommuters may decrease. A company therefore needs to combine specialised technical training with suitable IT to keep up the productivity and efficiency of a telecommuter (Bayrak, 2012:291). Organisations truly committed to developing their employees have positive results because of training, and development may increase confidence when a telecommuter realises the company is investing in their professional development (Bernardino *et al.*, 2012:293).

2.4.6 Summary

This section elaborated on telecommuting research as coined in 1973 by Jack Nilles who identified telecommuting as an approach to increase the work-life balance in urban and rural areas through the ability to move work to employees rather than having employees commute to the office on a daily basis. This had an instant effect on reducing vehicle congestion, fossil fuel consumption and air pollution. It shows that telecommuting is mostly practiced in regions such as the USA, Canada, Australia and Europe. The US government adopted the telecommuting policy as a sustainable transportation demand management choice to improve air quality and reduce road congestion.

The section pointed out the benefits and challenges of telecommuting, who should telecommute, and how telecommuting should be managed for sustainability. The IT infrastructure for telecommuting focuses on broadband internet connection as well

as mobile, social media or collaborative technologies needed to be integrated into the process of employees working from home. This is the channel studied during the research in order to define the adoption and use of telecommuting in South Africa.

The next section presents information systems theories reflected in this study for the adoption and use of technology.

2.5 PART D: Theory underpinning the study

Many authors describe and report on innovation methods, frameworks and models associated with technology adoption and use. This part discusses the models used in the information systems field.

2.5.1 Information systems

Information systems (IS) emerged fully as a discipline in own right. IS has three categories: related applied disciplines (for example computer science, finance, accounting, management and management science), fundamental theory (for example systems science), and underlying disciplines (for example sociology, psychology and political science). More disciplines are being added to the IS list of references. Research in the field of IS usually targets two audiences: the academic discipline and applied field of practice (Baskerville & Myers, 2002:1-2).

As an academic discipline, IS focuses on training and preparing people with the necessary skills in the working environment (Benbasat, Zmud & Price, 1999:14). As a result, people acquire useful skills and produce research. The academic side of IS thus connects the business world and the field of computer science (Wade, Biehl & Kim, 2006:260). As an applied and interdisciplinary research field, products are manufactured for the public to consume. One example of these products is systems such as websites, applications, software, databases and even frameworks. The academic discipline supplies knowledge and skills to practitioners so that products may be used correctly**.** Consequently, this study falls under the Information Systems field of study.

2.5.1.1 Research theoretical underpinning

A theory can be described as an organised set of logical principles presenting an explanation of a specific phenomenon by displaying and representing the relationship that exists between the phenomenon and others (Zikmund, Babin, Carr & Griffin, 2010:39).

Ever since information systems science emerged, technology acceptance has become an interest area for many researchers, and due to the huge number of

studies in this area, it has become a matured unit of information systems research (Elli, 2011:18). According to Davis (1989:319), users' unwillingness to agree and make use of available ICTs has often obstructed the adoption of a technology. Due to the importance and tenacity of this problem, explaining user acceptance has always been very important in IS research. Davis maintains that research has been constrained by a shortage of high-quality measures for key determinants of user acceptance. As a result, Davis maintains that studies need to develop key theoretical constructs of user acceptance in the information systems field.

For this study to come up with an appropriate and applicable theory to help understand and investigate the reasons behind the slow adoption of telecommuting by South African organisations, three models were selected as useful approaches to access the adoption and use of technology for a purpose:

- Technology acceptance model (TAM)
- Unified Theories of Acceptance and Use of Technology (UTAUT)
- The G-readiness Model

i) Technology Acceptance Model (TAM)

In order to make use of ICTs for a purpose, Davis (1989:319) maintains that someone would have to accept and adopt the system, and this is based on the Technology Acceptance Model (TAM). This model was initially developed by Davis (1986), and later on advanced by Davis *et al.* (1989). TAM is founded on the Theory of Reasoned Action (TRA) which was developed as an attempt to explain the effect of attitude on behaviour. TRA aims to explain and predict behaviour in view of beliefs, attitude and intention (Fishbein & Ajzen, 1975). TAM substitutes the behavioural attitude and subjective norm aspects of TRA with two technology acceptance features: "perceived usefulness" and "perceived ease of use". These two features differentiated TAM from TRA and they are defined as follows:

- *Perceived usefulness (PU)* is described as the subjective likelihood of a potential user that the use of ICT resources will increase his or her performance and productivity level based on organisational context
- *Perceived ease of use (PEOU)* describes the extent in which the potential user expects the target ICT tool to be free of effort (i.e. relatively little or no effort needed to use the technology)

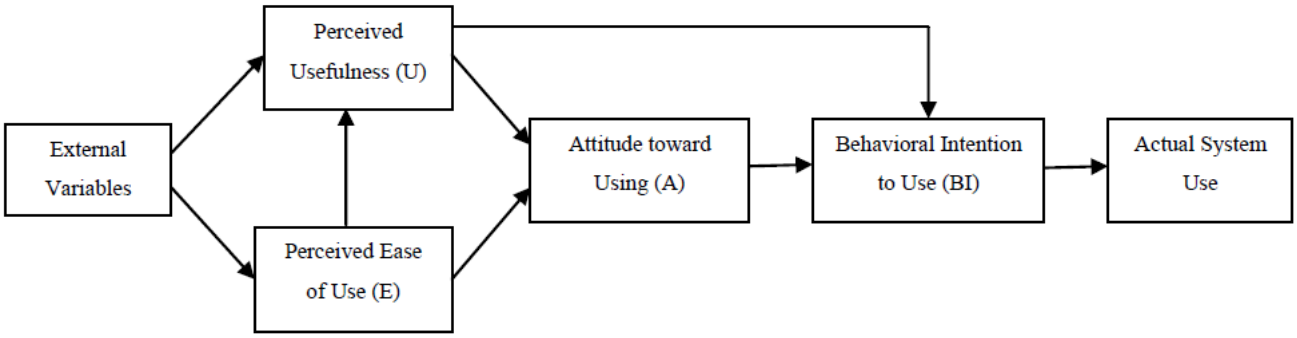


Figure 2.3: The Technology Acceptance Model
(Davis et al., 1989:985)

However, TAM is still very influenced by behavioural components assuming that an individual is open to make decisions shaped on an intention without any constrictions. TAM maintains that these two features or constructs, PU and PEOU as indicated in Figure 2.3, are very important for computer acceptance behaviours. Several studies have found constructs similar to these two TAM features, and they have been linked to attitude and usage (Davis *et al.*, 1989:985; Bopape, 2010:131). PU and PEOU are regarded as determinants of acceptance in this study.

ii) Unified Theory of Acceptance and Use of Technology (UTAUT)

Viswanath Venkatesh (2000) extended TAM by adding psychological determining factors such as intrinsic motivation, control, emotions with perception of anchoring, and amending the two TAM beliefs—PU and PEOU. This gave UTAUT the capability to describe the resulting behaviours from interacting with the initial technology and furthermore predicting the result of non-stop usage. Due to the popularity of TAM, many authors added to it and a unified interpretation was reached between theorists, thereby further expanding the understanding of the effects of psychological factors in accepting a technology in UTAUT (Venkatesh *et al.*, 2003:447). The UTAUT theory is a combination of the following theories:

- Theory of Reasoned Action (TRA)
- Technology Acceptance Model (TAM/TAM2)
- Theory of Planned Behaviour (TPB)
- Combined TAM and TPB (C-TAM-TPB)
- Motivation Model (MM)
- Model of PC Utilisation (MPCU)
- Innovation Diffusion Theory (IDT)
- Social Cognitive Theory (SCT)

The UTAUT theory has four determinant constructs namely *Performance Expectancy*, *Effort Expectancy*, *Social Influence* and *Facilitating Conditions*. The first three constructs connect to the element "behavioural intention", and they equally affect the "use behaviour" element. The fourth construct directly connects to "use behaviour", and there are four moderators—gender, age, experience and voluntariness of use. Each moderator impacts on one or more of the four constructs.

The combination strategy of Venkatesh *et al*. (2003) has been developed to introduce managers to new technology assessment tools, enabling the managers to understand the driving factors involved in technology acceptance. Lee, Li, Yen and Huang (2010) assert that UTAUT helps managers predict and explain different behavioural patterns of users' acceptance of technology, thereby creating a holistic platform for user readiness to accept and participate in a new technology (such as telecommuting). Figure 2.4 presents the diagram of UTAUT, displaying relationships between the constructs and attitudes.

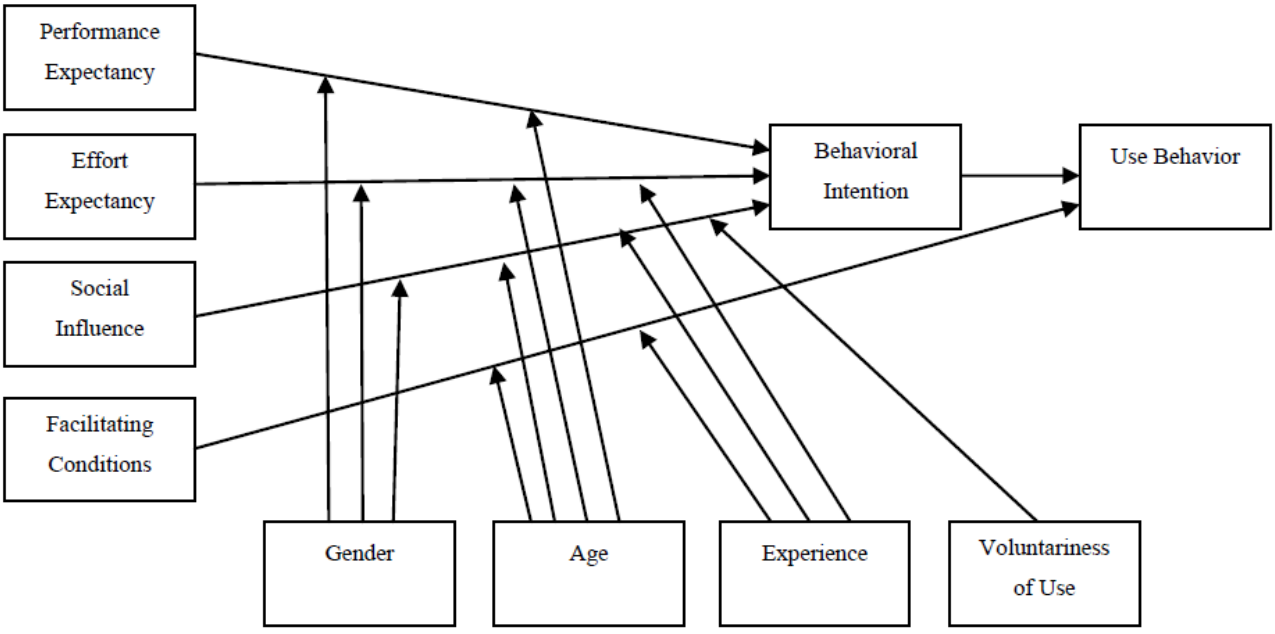


Figure 2.4: The Unified Theory of Acceptance and Use of Technology Model
(Venkatesh et al., 2003:447)

iii) The G-readiness Model

The G-readiness Model originated from Green IT studies. It took insights from IT infrastructure and capability, readiness, and eco-sustainability theories. The theories provided grounds to the conceptualisation of Green IT and the G-readiness Model. This aided in theorising the impact of IT not just in causing problems to the environment (such as IT infrastructure's energy consumption), but also in resolving

problems via using IT in changing business processes and automation, and via the activities and leadership role of the IT management and human infrastructure (Molla *et al*., 2011:83). Molla (2008:664) notes that Green IT readiness is a vigorous assessment of organisations' own and environmental preparation to adopt Green IT. Furthermore, it captures the awareness characteristics of the adoption context. This model consists of five constructs, i.e. Green IT Attitude, Policy, Practice, Technology and Governance, with eight sub-components (Figure 2.5).

From an exploratory perspective, the G-readiness Model is an indicative roadmap to discovering constructs for telecommuting adoption in an organisation. As such, the G-readiness Model is adopted for this study and it forms the basis for the theoretical assumptions that underpin the study.

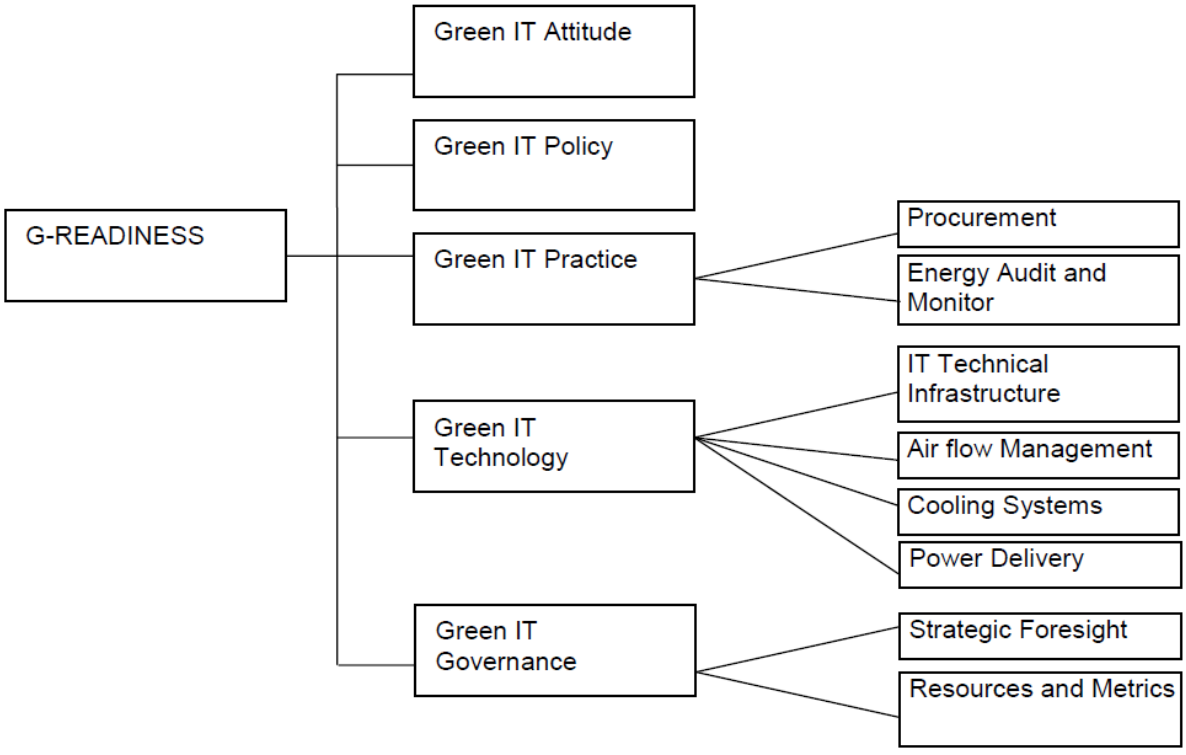


Figure 2.5: The G-readiness Model
(Molla et al., 2011:84)

The adopted model (Figure 2.5) helps as a guide to enable the study transverse and explore the reasons associated with the slow adoption of telecommuting in South African organisations. The G-readiness Model is adopted because it has been developed for the Green IT field and it has constructs that relate to this research study. Furthermore, Molla *et al*. (2011:85) note that the Green IT readiness instrument can be very helpful for a study examining the usage of IS—such as collaborative technology—to replace travelling in an organisation.

The research findings will be inferred back to this theoretical model in order to provide support validating the findings, and perhaps new insights that will conceptualise Green IT and telecommuting.

2.5 Summary of Chapter Two

Climate change imposes indisputable burdens on economic development by significantly causing damage to the environment. In the transportation sector, emissions from cars are seen as top environmental pollutants around the world and in South Africa. However, despite increasing environmental issues, many people, including business leaders, generally think of environmental issues as disconnected from their everyday business lives and behavioural patterns.

Literature on sustainability has shown that organisations can engage in activities that positively impact the environment, society and in lasting economic growth (triple bottom line), and the Republic of South Africa as a member of the UNFCCC encourages any practices and processes that will control, reduce or prevent anthropogenic emissions of greenhouse gases. Thus, the literature review explained how the adoption of telecommuting can be used for travel reduction and how it impacts positively on environmental sustainability. Telecommuting is an arrangement where an employee works from home or out of office, using telecommunication links (internet, email and/or telephone) to reduce commuting to and from work.

Three theories were selected as useful approaches to access the adoption and use of technology. The study adopted the G-readiness Model (Figure 2.5) as it helps as a guide to explore the reasons associated with the slow adoption of telecommuting in South African organisations. The model took insights from IT infrastructure and capability, readiness, and eco-sustainability theories. These theories provided grounds for the conceptualisation of Green IT and the G-readiness Model. Findings of the study present the adopted model as limited; therefore, some features of TAM and UTAUT were adapted in order to provide a comprehensive description and conceptualisation of the features of assessment and adoption of technology for telecommuting. The researched conceptualised model is presented in Chapter Six.

The next chapter (Chapter Three) is a description of how this study assessed telecommuting in organisations. The chapter explains the techniques employed for this investigation.

CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Thus far, academic literature has been cited from a variety of sources to place this study within the existing body of knowledge. There is ample justification in literature regarding the interdisciplinary nature of IS. While this study resides within the IS field of study, it is connected to environmental sustainability. This link directed (in terms of literature) into areas such as climate change, air pollution (from road transport vehicles), sustainability, Green IT, green business, green strategies, strategic planning/management and computer science. Wade *et al*. (2006:248) and Baskerville and Myers (2002:2) have long argued the necessary interconnectedness of IS and other disciplines.

This chapter explains and justifies the nature of the project, the interpretivism paradigm, qualitative approach, sampling, techniques utilised for data collection (interviews, documents and literature), analysis (qualitative content analysis) and standards utilised for interpreting the data. The chapter also explains the framework upon which this study was founded as well as its philosophy. The study was founded using the "research onion" model of Saunders *et al.* (2009:108). The design and methodologies identified in this study are generally used in Information Systems research.

3.2 Research design

Research is a step-by-step procedure of *finding out* or acquiring knowledge via diverse methods (Welman, Kruger & Mitchell, 2005:2). These methods have in common the generation of knowledge at different stages of fact, complication and generalisability. Research leads to knowledge development that helps in answering questions, solving problems and creating a better understanding to describe something. In a general sense, producing new knowledge highlights the process of research aimed at *finding out* (Clough & Nutbrown, 2012:6). On the other hand, *design* means choices made by the researcher during the preparation of the study (Fouche & Schurink, 2011:307)**.** So, research design enables the researcher to anticipate what the proper decisions ought to be in order to take advantage of the validity of the eventual results. It is a set of guidelines and instructions on how to reach a set goal (Mouton, 1996:107).

Saunders *et al*. (2009:108) used the symbol *of* an *onion* to explain the general process of research. With the diagram in Figure 3.1, the authors note that every research project begins with the outer layer, right through to the inner layer in the

following progression: research philosophy, research approach, research strategy, research choices, time horizon, and data collection methods. Consequently, the same method was adopted for this study.

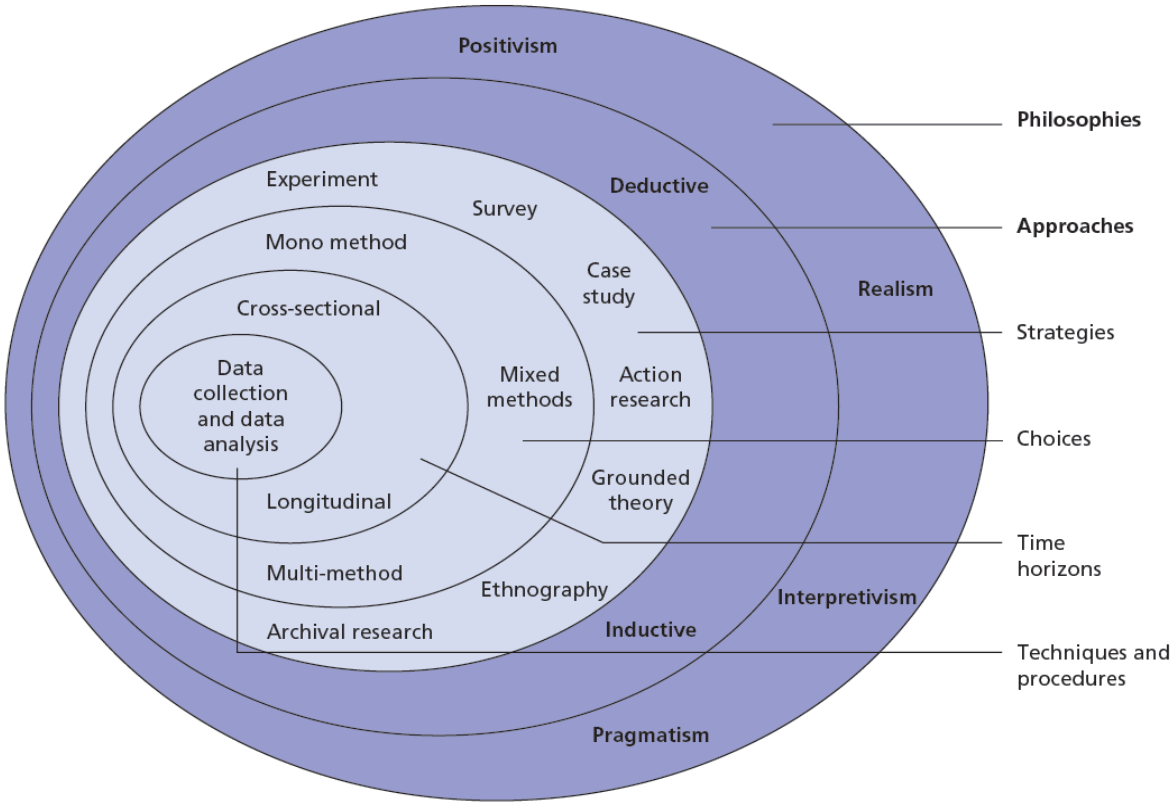


Figure 3.1: Research onion
(Saunders et. al., 2009:108)

The next sections provide an explanation of the research layers as indicated in Figure 3.1.

3.3 Research philosophies and paradigms

The research philosophy or paradigm relates to knowledge development and the nature of that knowledge. The philosophy one adopts in research contains key rules on how the person views the world, and this view will strengthen the research strategy and the methods chosen for the strategy (Saunders *et al*., 2009:108). Paradigms in social science are referred to as world views or research traditions. In following a specific paradigm, researchers adopt a particular manner of studying phenomena relevant to their field (Du Plooy-Cilliers, Davis & Bezuidenhout, 2014:19).

To conduct research, there are at least three practices, namely philosophical, social and technical practices. Philosophical practices comprise of axiological, ontological and epistemological positions (Mchunu, 2013:18).

3.3.1 Ontological position

Ontology is concerned with questions such as "what is reality, and how do we recognise what is real?" Ontology has its roots in the Greek language, *Ontos* meaning "being, or that which is", and *logos* meaning "the study of". Ontology then denotes the study of being, reality or existence. These result in questions about assumptions researchers have concerning the way in which the world operates (Du Plooy-Cilliers *et al*., 2014:23).

Two positions exist in ontology: ***Objectivism,*** which holds that social entities exist in reality external to social actors concerned with their existence. *Objectivism* is totally free from an individual's perception as it is value free, culture free, and universally and totally certain. ***Subjectivism*** holds that social phenomena are created from opinions and subsequent actions of those social actors concerned with their existence (Saunders *et al*., 2009:110). Furthermore, some scholars do not accept that objective knowledge is possible. They argue that subjective factors from the phenomenon itself plus the researcher definitely take part in knowledge attainment. For instance, subjective factors such as the researcher's interest in a particular phenomenon will influence the type of questions that he/she will ask, and this is mostly seen in social sciences where objects of observation lean towards individuals (Du Plooy-Cilliers *et al*., 2014:22).

The arguments of ontological philosophy are that humans create reality by defining or naming constructs. This is known as social construction of reality, whereby reality is created subjectively as it happens within human consciousness (Mchunu, 2013:19). A subjectivist view aligns with the interpretivist epistemological paradigm of knowing about reality. This philosophy (subjectivism) is used as a background to the interpretivist epistemology this study followed. The philosophy of knowledge (epistemology) is discussed below.

3.3.2 Epistemological position

Epistemology is concerned with questions such as "what counts as knowledge and what are the limitations of Epistemology?" Epistemology is a multifaceted philosophy originated from Greek words: *episteme* meaning "knowledge", and *logia* or *logos* meaning "the study, science or theory of". Epistemology then denotes the study of knowledge or science of knowing. In other words, epistemology is concerned with

the nature of knowledge (Du Plooy-Cilliers *et al*., 2014:23), because any undertaken research study is believed to contribute to the existing body of knowledge.

Three main ways regarding the epistemological research philosophy have been identified, namely positivism, realism and interpretivism**.** Each holds a key difference that influences the way a person thinks about research processes, not only in assumptions and concepts but also the research problems being considered important (Bailey, 1982:25). Below are brief explanations of the key philosophical paradigms as a way to demonstrate awareness.

3.3.2.1 Positivism paradigm

Positivism holds that the creation of knowledge or science should be limited or restricted to what can be measured and perceived. Positivism tends to exclusively depend on theories that can be tested directly. It led to a blind faith or empiricism in the data observed, and rejects any attempt to reason away from observable facts (Bhattacherjee, 2012:18). Positivism encompasses phenomenalism which holds that there is a single experience and all ideas, whether matter or spirit, should be rejected. Nominalism states that ideas, words and generalisation does not offer new insight to the world, separating facts from values and the unity of the scientific method (Krauss, 2005:761). Therefore, positivism encapsulates the spirit of enlightenment, as scholars in this domain insist that only objective, observable and verifiable facts ought to be considered when we attempt to understand and explain natural and social phenomena (Du Plooy-Cilliers *et al*., 2014:24).

This study aims to subjectively provide in-depth understanding of the slow adoption of telecommuting in South African organisations—rather than theory testing or quantifiable measurements, a positivist paradigm is not suitable.

3.3.2.2 Realism paradigm

Realism is also known as post-positivism and critical realism. It was established out of frustration with positivism's non-humanistic, thin focus and its emphasis on the unplanned nature of universal laws. There was also frustration with interpretivism's passive, contextual, subjective and relativistic view. So, critical realism took features from both philosophies and combined it in a unique way (Du Plooy-Cilliers *et al*., 2014:31). Realism in its place is conscious of the values of human systems and researchers as it identifies that perceptions have a certain 'softness', and there are dissimilarities among an individual's perception of reality and reality itself (Krauss, 2005:761). The philosophy of realism shows that reality is relatively independent of the mind (Saunders *et al*., 2009:119). Thus, the critical realist maintains that

researchers need to transform social relations by critiquing, exposing and changing any undeserved practices in society. Its main aim is to expose myths, transform society and free individuals from all forms of oppression, and empower individuals to build a better world for themselves in the process (Du Plooy-Cilliers *et al*., 2014:31).

3.3.2.3 Interpretivism paradigm

Interpretivism is known as relativism, idealism, constructionism and even constructivism. It has its foundation on the philosophical doctrines of humanism and idealism and states that the perception of the world around us is created by the mind. This means that we may only experience the world individually via our perceptions that are influenced by our principles, preconceptions and values (Walliman, 2011:21-23). Interpretivism proposes that the researcher, in the role of social actor, needs to understand the differences between individuals. The term *social actor* indicates that as humans we take part on the stage of human life. For example, actors interpret roles given to them in a particular way by acting. In the same manner we interpret our daily social roles with regard to the meaning we assign to these roles, and we also interpret other people's social roles with regard to our own set of meanings (Saunders *et al*., 2009:116). Interpretivists seek to understand a phenomenon by reviewing meanings that participants give to them. Thus, researchers need to critically reflect on the social and historical background of the study and their role in the study to ensure that a good interpretation of participants' views have been established, show how data findings match or contradict previous theory, and relate the findings to the theory by showing an understanding of biases and distortions (Walsham, 2006:326).

This study followed the interpretivist paradigm as the researcher aimed at studying reality subjectively, understanding and explaining (human perception) what is happening, finding reasons for the slow adoption of telecommuting in South African organisations and the fundamental meanings attached to telecommuting, not only at organisational level but also in terms of employee readiness. The study also displays features of the critical realism paradigm as the findings of the study will be exposed through publications.

The research approach or methodologies for the study are further discussed below.

3.4 Research approach - qualitative research

Qualitative, quantitative and mixed methods are generally three major approaches or methodologies for research (Creswell, 2009:4). Methodology can be referred to as the science of finding out (Babbie, 2013:4). A strong difference exists between

qualitative and quantitative research. Not only do the exact data have distinct features, different methods are also needed for data analysis. Traditionally, natural science focused on hard quantitative (positivist) analysis; human sciences adopted this too until its limitations became obvious as some researchers noticed that subjective human feelings were difficult or hard to quantify; this led to the evolution of qualitative (anti-positivist) analytical methods, which took more account of the soft, personal data (Walliman, 2005:270-271). The quantitative methodology mostly makes use of statistical analysis and scholars work with figures (Mchunu, 2013:24).

Qualitative research basically deals with qualities of subjective experiences and the meanings associated with the phenomena (Du Plooy-Cilliers *et al*., 2014:173). A qualitative approach is a process whereby the researcher studies or empathises with different people in a particular setting comprehensively with the purpose of providing an account of them (i.e., the various meanings of one's experiences and meanings historically and socially constructed, with the intent to develop a theory or pattern). It does not matter whether it is an organisation or individual. However, it is seen as being complete (Kothari, 2004:3; Creswell, 2009:18). In other words, research is termed qualitative if the primary aim is to understand or describe the 'what', 'how' and 'why' of a condition or phenomena (Fouché & Delport, 2011:64)**.**

Another aspect of a research approach exists as noted in Figure 3.1. The research project involves the use of theory; this theory may or may not be visible at the initial stage of the research but it becomes obvious during the presentation of findings and conclusions. This approach is ***deductive***, where a researcher develops a theory and hypothesis (or hypotheses), and then designs a research strategy to test these hypotheses (Saunders *et al*., 2009:124). For example, *deductive approach* means beginning from the general belief that all deans are meanies, and then anticipate that he/she will not allow you change courses. The anticipation here is a result of deduction (Babbie, 2013:22). On the other hand, with an *inductive approach*, the researcher gathers data and develops theory as a result of the findings (Saunders *et al*., 2009:124). Inductive reasoning begins with precise opinions, comments, observations or experiences to a general conclusion developed from the comments. Induction has been the most common general procedure of scientific activity as we use it in our normal lives on daily basis as we learn from experiences and the environment; conclusions are drawn from our experiences and we generalise using these, putting them up as a belief (Walliman, 2011:17; Babbie, 2013:21).

This study followed a qualitative, inductive research approach as it involved the perceptions of participants to understand, explain and possibly generalise from the

findings. Research is conducted for numerous purposes, including exploring, describing or explaining the phenomena. Below is a discussion on the purposes of research.

3.4.1 Research purposes

This section describes the aims or purposes of research as research may be conducted for several reasons, including exploring, describing, explaining or any combination of these qualities. This phase helps the researcher making sense of specific aims when research is conducted, which determines to a great extent the process and outcome of the research. The three main purposes of research are exploratory, descriptive and explanatory.

Exploratory research studies are also known as formative research studies (Kothari, 2004:36). In exploratory studies, the validity and reliability of data are usually not according to scientific standards as the research has to be flexible to enable the understanding of an unknown area of research due to the continuous changing of technology, social and economic systems. Exploratory research can be founded on one or more of the following purposes:

- To confirm assumptions
- To become aware of unknown situations, policies, conditions and personalities
- To discover concerns regarding the research problem
- To acquire new perceptions as part of pilot testing or pre-testing
- To identify main constructs
- To identify main shareholders
- To develop hypotheses from an operational point of view, and to highlight social needs (Du Plooy-Cilliers *et al*., 2014:75)

Descriptive research portrays an accurate profile of phenomena (people, situations or events). It may be an extension of exploratory research or often part of the explanatory research (Saunders *et al*., 2009:140). According to Du Plooy-Cilliers *et al.* (2014:76), descriptions can be grouped according to the classification of systems that might be used to compare diverse responses; it may also be founded on statistical data such as a study showing that 87% of South Africans are opposed to the e-tolling system.

Explanatory research studies a situation or problem to explain *how* and *why* variables or phenomena are related (Saunders *et al*., 2009:140) or to clarify reasons why certain things occur or the way they are. It also helps to indicate the direction of

a cause-and-effect relationship among an independent variable (A) or a dependent variable (B) (Du Plooy-Cilliers *et al*., 2014:77).

This study possesses the qualities of both exploratory and explanatory research. The aim of the study is to understand and explain the reasons established in the research problem. Also, it has descriptives in the analysis section. Zhang and Wildemuth (2009:5) note that a qualitative content analysis study needs to have a balance between description and interpretation so that readers will understand the background or context of the study.

3.5 Research strategy

There are various types of research strategies. Normally there are five major groups, namely experiment, survey, historical, archival and case study research strategies. Each one offers a different way of collecting and analysing data and has its own advantages and disadvantages. This study followed the case study approach.

3.5.1 Case study as the research strategy

A case study is an intensive study of a case with the aim to shed light on a larger class of cases (Gerring, 2007:20). A case studies is an ideal strategy when it focuses on contemporary phenomena within a real life setting, and it lets investigators record the general and meaningful characteristics of the actual events; for example, an individual's life, organisational and managerial procedures/ processes, neighbourhood change, international relations and industry maturation (Yin, 2003:1-2). Even if a single person is studied in a case, he/she should be a key representation of a particular population (Fox & Bayat, 2007:69). Case study techniques could produce studies with new policies, for instance a framework showcasing how telecommuting can be successfully adopted into organisations in South Africa. The target of case study research is to understand the reasons affecting a particular situation (Koranteng, 2012:36)**.**

The case study strategy was chosen because it gives room to arrive at broad generalisations depending on the evidence of the case studied, and the research questions contain a justifiable foundation for conducting an exploratory case study (Yin, 2003:6,15). It is often the preferred strategy of research as it can be epistemologically in agreement with a reader's experience and therefore be a natural foundation for generalisation (Stake, 2000:19). An embedded multiple-case study design was used to address the research questions in this study.

3.5.2 Embedded multiple-case study

Firstly, multiple-case study simply means choosing two or more cases (such as organisation or individual) to study. Multiple-case design can be preferred over single-case designs even if it is a “two case” study as it offers a better chance of being a good case study; the logical benefits from taking up two or more cases may be considerable (Yin, 2003:53). Secondly, embedded in this is that the same multiple-case may involve a sub-unit or sub-units of observation (such as HR/IT managers and staff members) in the organisations researched (Yin, 2014:53). The choice for this method basically comes from the phenomenon being studied and the research questions. The embedded part in this study is focused on managers and staff members.

3.6 Research choice

The next layer to discuss is the choices of research as noted in the research onion symbol (Figure 3.1). This includes the mono method wherein a single research methodology or approach (either qualitative or quantitative) is used for data collection and analysis, and the mixed method which utilises both quantitative and qualitative data collection techniques and analysis processes either in parallel or one after the other (sequential), but not as combination of parallel and sequential (Saunders *et al*., 2009:152). This study followed a qualitative approach which has been discussed in section 3.4.

3.7 Time horizons

The fifth layer of the research onion (Figure 3.1) is the time horizon which comprises of cross-sectional and longitudinal investigation (Saunders *et al*., 2009:152). The study followed cross-sectional research since it only investigated a specific phenomenon (that is, to understand the reason for slow adoption of telecommuting in South Africa) at a particular time. The study did not observe any form of changes in the phenomenon studied. The longitudinal study takes a long time investigating change and development of a particular phenomenon.

3.8 Techniques and procedures

Finally, the last layer of the research onion in Figure 3.1 is techniques and procedures which include sampling, data collection and analysis techniques. The decisions taken from the previous layers of the research onion influence the techniques and procedures discussed below.

3.8.1 Unit of analysis

Unit of analysis is defined as the population, people or items with the characteristics one wishes to study (Bhattacherjee, 2012:65). A population is the whole set of individuals a researcher is interested in. However, the whole population typically does not participate in the study; rather, the obtained results are generalised to the entire population (Gravetter & Forzano, 2009:128). A population consists of, *inter alia*, individuals, groups, companies, movements, artefacts, institutions or countries (Neuman, 2011:58). For this study, the unit of analysis is companies identified as using ICT as part of their strategic business purposes and having the potential to use ICT for telecommuting.

3.8.2 Sampling technique used for this study

Sampling in qualitative research is expected to be chosen in a deliberate manner known as ***purposive sampling*** as the aim is to have samples that will yield the most important and abundant data with regard to the research problem (Yin, 2011:88). Lunsford and Lunsford (1995:105) define a research sample as "a small sub-set from the research population that has been chosen to be studied", or a selected set of individuals from the population. Furthermore, Bailey (1982:101) emphasises the importance of having the smallest sample size required that perfectly denotes the population from which one is sampling, otherwise it will result in an error.

In sampling there are two broad techniques: probability (random) sampling and non-probability sampling (Bhattacherjee, 2012:66). ***Probability sampling*** is used if the study intends to generalise the findings numerically—although it is hardly used in qualitative studies. For this study, ***non-probability sampling*** was utilised because it is preferred for qualitative studies since it uses a non-numerical mode of generalisation (Yin, 2011:89). It is a sampling method where certain units of the population have zero chance of selection (Bhattacherjee, 2012:69).

Snowball sampling was utilised as well. Snowball sampling is a type of non-probability sampling. The researcher begins by finding a few participants fitting into the criteria for inclusion in the study, and then request them to recommend other people or companies to contact as possible participants (Bhattacherjee, 2012:70). The snowball method is acceptable if it is purposeful (e.g. the prospective participant is believed to have more information relevant to the study), and not due to convenience (e.g. the prospective participant happens to be around and has enough time to talk to the researcher) (Yin, 2011:89).

The snowball method was utilised purposefully (decisively) and the ***units of observation*** purposefully chosen for this study. This included IT/HR managers, telecommuters and non-telecommuters, which provided a good insight into the perspectives of managers, users and non-users.

3.9 Data collection methods utilised in this study

Data collection is the process of gathering information for relevant variables in a recognised systematic approach; it may be in the form of primary and secondary data, and it may contain words, numbers or pictures aiding the researcher in answering the research question. Various data collection methods can be employed during the data gathering process (Yin, 2011:130; Wahyuni, 2012:73) and each of these methods depends on the field of study plus the chosen methodology (Fox & Bayat, 2007:71).

The research strategy for this study is a case study. Below are the methods utilised for data collection and analysis.

3.9.1 Semi-structured and in-depth interview

This is a face-to-face interview where questions compiled are directed to the respondent by the interviewer and their responses are recorded. Thus, the interviewer has the opportunity to clarify issues raised by the respondents by asking follow-up questions (Bhattacherjee, 2012:78).

In the ***semi-structured*** phase, a list of themes and questions were compiled to be covered during the interview, though this varied from interview to interview. Some questions were omitted based on the participant's responses and the flow of the conversation. On the other hand, the ***in-depth*** interview (i.e. unstructured interview) was used to clarify issues raised by participants through asking follow-up questions (Saunders *et al*., 2009:320-321). The in-depth interview is considered suitable for a case study research strategy due to questions which cannot be briefly answered, as the researcher is expected to ask for explanations or examples of the given answer to deepen the understanding of the subject (Wahyuni, 2012:74).

In-depth interviews were carried out with selected members (IT/HR managers, telecommuters and non-telecommuters) from the researched companies. The interviews were focused on the feelings of participants, their experiences towards telecommuting, and how telecommuting can be adopted into an ICT/business strategy.

3.9.2 Literature and document review

A literature and document review is classified as part of secondary data, meaning the secondary data has been collected and examined by another person. With the use of secondary data, several sources are looked into in order to retrieve the correct information for a study (Kothari, 2004:111). Thus, educational publications were reviewed in accordance with the research title to deepen the understanding of related constructs and theories, and to take record of earlier similar studies. Also, available information from the researched companies' brochures and websites were accessed to account for definite line of business and practices of telecommuting.

3.10 Data analysis technique

Data analysis simply means breaking up data or facts into different parts to enable an understanding of the information (Schiellerup, 2008:164). This process lets the researcher have a broad view (generalise) of the findings from the sample utilised in the study, to the greater population that the researcher is interested in (Bless, Higson-Smith & Kagee, 2006:163).

The method used to analyse collected data aligns with qualitative methodology as the study is based on a qualitative approach. The analysis of the multiple-case study focused on the perceptions of organisations towards telecommuting, staff/managerial readiness and factors that may lead to the adoption of telecommuting into ICT/business strategy in South African organisations.

3.10.1 Qualitative content analysis

The interview with the participants was audio-recorded and transcribed, that is, the interview was verbatim reproduced in writing (using the exact words). Thereafter it was subjected to qualitative content analysis where patterns and themes where inductively identified from the data (Wahyuni, 2012:76). Elo and Kyngäs (2008:109-111) called this process inductive content analysis. ***Inductive content analysis*** is the organisation of qualitative data. This procedure comprises of open coding, category creation and abstraction where *open coding* means notes and headings written into the text during *several* reading processes, and *abstraction* means compiling a general description from the research title through the generation of categories (Elo & Kyngäs, 2008:109-111). These categories were named using themes or noticeable consistencies that emerged from the descriptions and explanations of words from the text (or content).

The process below was followed during the qualitative inductive content analysis (Zhang & Wildemuth, 2009):

- Data transcription into written text
- Comparing and contrasting of data received from different participants
- Selection of data to analyse, and defining the unit of analysis for the process
- Development of categories and coding schemes (was done inductively from the data)
- Coding all the text
- Assessing the coding consistency and selecting additional important categories to fit into the theoretical framework
- Drawing conclusions from coded data
- Reporting on the techniques, findings and future work

3.11 Data quality assurance

The data quality was taken into consideration by following the quality standard, validity and reliability (credibility) noted by Saunders *et al*. (2009:328). A valid study accurately collects and interprets its data in a manner that the conclusions correctly represent and reflect the real world studied (Yin, 2011:78).

3.11.1 Validity

The interview questions accurately measured what it was supposed to; the author provided participants insight into information requested. The title, aim, summary and themes of the study were sent to participants before the day of the interview to enable them to prepare (gather supporting documents). The steps below were taken to ensure the validity of data collected:

- Data collected were from trustworthy and precise sources
- The interview date and time were carefully selected to ensure events did not influence the data collection process
- Interview questions were both pre-tested and pilot tested before finalisation for the in-depth interview with participants

Pre-test

The pre-test phase is basically to address things that need to be dealt with before collecting data (Burke & Miller, 2001:2). To ensure that the list of designed interview questions were correctly interpreted by participants and the needed information precisely captured, pre-testing was carried out with a manager that fits into the study's sample profile. This helped in eliminating potential problems, both with the interview questions and protocol and in conducting the interviews.

Pilot study

Once the pre-test was done and questions adjusted for clarity, a pilot study was performed with an IT manager having the qualities of the unit of observation to further check the interview instruments. Again, the participant was asked to provide a debrief comment. The participant assured the researcher that the questions were appropriate and that the correct data would be captured. The participant advised on protocols to be observed, for example, a good introduction of the study before proceeding to the actual interview, and that the culture/business of the companies should be known. Minor adjustments were made to the instrument which led to the final arrangement of the instruments.

3.11.2 Research questions and objectives

Table 3.1 shows the research problem, research main question, research sub-questions (RSQ) and interview questions designed for each sub-question. The table is comprised of questions directed to company representatives and staff members during interview.

Table 3.1: Extended research questions and objectives

Research problem		Despite the well documented benefits of telecommuting, it appears that South African businesses are still not building telecommuting into their strategies.	
Research main question		What are the organisational reasons for the slow adoption of telecommuting in South Africa?	
Research sub-questions (RSQ) /Interview questions (IQ)		**Research Approach**	**Objectives**
RSQ 1	**How does the organisation perceive telecommuting?**	Interviews	To identify the organisational perceptions towards telecommuting, and identify the would-be reasons for the slow adoption
IQ 1.1	Do you have a Green IT strategy?	Interviews	To identify if companies have Green IT strategy
IQ 1.2	What green strategies do you have?	Interviews	To identify if companies have any form of green strategies
IQ 1.3	What future strategic plan do you have for Green IT?	Interviews	To identify if there are future plans to strategise Green IT
IQ 1.4	Do you have a telecommuting strategy, please explain?	Interviews	To understand if companies have a strategy for telecommuting
IQ 1.5	What future strategic plan do you have for telecommuting?	Interviews	To identify if there are future plans to strategise telecommuting

RSQ 2	**How can the organisation adopt telecommuting as part of their ICT/business strategy?**	Interviews	Identify approaches in which telecommuting can be adopted into business strategy
IQ 2.1	In your opinion, what are the factors that can drive the adoption of telecommuting into your organisation's business strategy?	Interviews	Understand people's opinion on factors that may drive telecommuting adoption
IQ 2.2	What management style is best suited for telecommuters since they are out of sight half of the time?	Interviews	Understand best way to manage telecommuting
IQ 2.3	What qualities or skillset should an employee have before he/she can be allowed to telecommute?	Interviews	Identify qualities required for a telecommuter
IQ 2.4	How ready is your firm for telecommuting in terms of management support, technological infrastructure and the staff?	Interviews	To determine companies' readiness to telecommuting in terms of management support, technological infrastructure and the staff
IQ 2.5	Do you see that management will need to change in a company like this before for telecommuting to take place?	Interview	Identify if management needs to change attitudes towards telecommuting
RSQ 3	**What potential benefits can accrue to a business implementing telecommuting?**	Interviews	To establish the potential benefits of telework programmes to businesses
IQ 3.1	What benefits do you think your company can get if telecommuting is adopted?	Interviews	To understand how participants think telecommuting will benefits their organisation
RSQ 4	**How ready are staff members for telecommuting?**	Interviews	To determine the readiness of staff members towards telecommuting
IQ 4.1	Do you telecommute or would you want to telecommute if given the chance?	Interviews	Determine if staff members are ready for the programme
IQ 4.2	How skilful are the staff members in terms of ICT usage?	Interviews	Determine staff members' expertise in ICT usage
IQ 4.3	What impact will IT skilled employees have on telecommuting?	Interviews	To determine if IT skilled employees will lead to telecommuting sustainability

3.11.3 Reliability and confirmability

The data collected from participants consistently gave the same descriptions of the situation being studied (repeatable), or results were the same with data collected. Reliability ensures that if the research is conducted again by other researchers within the same context, the same results will be produced (Kothari, 2004:38;

Saunders *et al*., 2009:156) although it is unlikely for research to yield the same outcome as human nature is certainly not static. Therefore, in order to be taken seriously by the scientific community and to ensure reliability is met, inconsistencies from the collected data were identified and set aside as it was interpreted as possible errors from the participants' judgement. A full description of the participants has also been made available. Furthermore, a compact disk containing the recorded interviews and transcribed notes has been attached to the thesis for confirmation that the study was embarked on, and that the findings recorded are based on the design followed by the study.

The best way to establish dependability or reliability and confirmability is through reviews of the research processes and findings. Dependability is determined by checking the consistency of the study processes, and confirmability is determined by checking the internal coherence of the research product, which includes the data, findings, interpretations and recommendations (Zhang & Wildemuth, 2009:7).

3.12 Ethical considerations

Participation in the study was voluntary, and participants were free to withdraw from the study without any repercussions. The study excluded possible participants who could not give informed consent. The participants have not discussed sensitive topics, nor had the interview process generated arguments or potentially harmful procedures (e.g. drugs or other materials to be administered to participants). Participants were treated with respect. Finally, the study has not involved any materials or processes that could cause harm to the environment.

3.12.1 Ethics and consent

The Merriam-Webster Dictionary defines ethics as rules of behavior based on ideas about what good and bad behaviour constitute. In other words, it means conforms to the code of belief of a group. Thence, this study followed proper behavior by ensuring that the rights of organisations and individuals were upheld. Furthermore, data collected was presented without manipulation of results in accordance with the standards of the Faculty of Informatics and Design, Cape Peninsula University of Technology Research Ethics Committee.

The data collection methods, aims and objectives of the study were explained to participants before consent was given. To ensure that participants were eligible for inclusion in the study's sample, the positions they occupied at their place of work were verified. The time and date to conduct the interview were selected, and the interview themes were sent to participants prior to the interview date for them to

prepare (gather supporting documents) (Saunders *et al*., 2009:328). Furthermore, participants signed an informed consent form clearly describing their right to (or not to) participate and withdraw from the study before their responses are recorded (Bhattacherjee, 2012:138).

3.12.2 Confidentiality

To protect the interests and identity of participants, two important constructs (anonymity and confidentiality) are used in social science/scientific research. ***Anonymity*** implies that the researcher or readers of the completed thesis or paper should not be able to identify a particular participant's response, while ***confidentiality*** implies that a participant's response can be identified but his/her identity should not be known (Bhattacherjee, 2012:138). Consequently, participants were assured that their identity will be kept confidential through the use of pseudonyms (i.e. pennames). It was also explained to participants that the requested information was needed for academic purposes (Master's thesis, articles and conferences) and would not be used against them (although the information could be used by affected organisations and government sectors to advise developmental strategies as the research seeks to inform decisions and policy).

3.13 Summary of Chapter Three

Research design and methodology guide a researcher on how to acquire knowledge in a study. It describes what research techniques are to be used to realise the objectives of the study. Chapter Three started by explaining the Information Systems discipline and how it is interlinked with other fields, providing a clear background of this discipline that had little attention in the past.

The chapter continued to explain the general process of research in accordance with the research onion symbol of Saunders *et al*. (2009:108). It described the process starting from the outer layer and working inwards to the inner layer, i.e. from the research philosophy to the research approach, strategy, choices, time horizon and data collection methods, indicating the processes selected with reasons supporting these decisions.

The embedded multiple-case study strategy was adopted to answer the research questions (i.e. organisational perception of the study field and the readiness of staff members to telecommute). It is an exploratory study and inductive in nature. Data were collected from literature, a document review and semi-structured and in-depth interviews. Data were analysed using a qualitative content analysis technique.

Furthermore, the quality of the research was realised through addressing validity, reliability, confirmability and ethical issues throughout the study.

The following chapter (Chapter Four) reports on the fieldwork, data collection, analysis and interpretation of data. It also provides an explanation of the author's personal experiences during the research process.

CHAPTER FOUR: FIELDWORK REPORT

4.1 Introduction

The preceding chapter described the research design and methodology this study followed. This chapter reports on how the fieldwork progressed. It shows that standards were adhered to which increased the dependability of the findings. The chapter gives an account of data collection process as well as the data analysis.

4.2 Data collection

In-depth interviews were performed between the period of November 2014 and March 2015.

4.2.1 Document collection

Documents were obtained mainly from the researched companies' websites, brochures collected from some of the participants, and publications in order to extract information about the companies' line of business as researched companies were from different sectors. Information about the companies was also obtained from interview data.

4.2.2 Description of companies researched

Nine (9) companies were purposively selected from different sectors including ICT, financial, manufacturing and business services, which were the units of analysis (Table 4.1). All are situated in the Cape Town Metropolis and their sizes vary from big to small, multinational and local.

Table 4.1: Unit of analysis used

Companies	Sector	Area of operations
1	ICT and services	International
2	Financial services	South Africa
3	Financial services	International
4	ICT and services	International
5	Business services	International
6	Business services	Cape Town
7	ICT and services	Cape Town
8	Manufacturing	South Africa
9	Higher institution	Cape Town

The character “C” and the corresponding number (Table 4.1) are used to identify these companies in order to maintain confidentiality although some of the researched companies gave consent to use their names. Pseudonyms are used in this thesis for easy of writing.

C1: This Company is in the business of managing print services. They take over printers, faxes, copiers and paper of medium and big-sized organisations, maintain these, and provide long-term technological support and advice.

C2: This Company provides nourishment and financial shelter to businesses and people. They aim to help all sectors in the South African economy and beyond by providing products and services that are accessible and affordable. Their products and services include, *inter alia*, savings, investment, life assurance, asset management, and property and casualty.

C3: This Company is privately owned and Africa’s biggest investment management company, consisting of a group of companies which offer the following products and services: trading, research, compliance, customer service, portfolio accounting, and investor administration. The company provides these services to both individual investors and institutions with the aim to help investors build significant savings or wealth over a long term.

C4: This Company believes that technology has the power to transform businesses to a higher level. They have established themselves as a global brand and leader in the IT industry as they manage and provide specialist IT infrastructure solutions and services. Basically, they are in a customer servicing environment where they look after customers working in various buildings across the country during business hours. The company ensures that their customers’ IT (i.e. end user devices) is fully functional. This means the company has a presence on site to support their clients in speeding up the successes of their business goals through IT.

C5: This industry falls within the hospitality sector. They are one of the fastest growing hotels in the world, an international brand hotel. The hotel provides its customers with a friendly and vibrant environment that offers both tourists and business travellers an affordable, reliable and hassle-free hotel experience from well-designed rooms to conference spaces.

C6: This Company offers a range of educational services. They provide and maintain eLearning platforms for education providers and companies. They are an authorised Certified Moodle Partner in South Africa. The company run Open Journal

academic e-publishing solutions for a local publisher, which enables them to deliver support and publishing services in small academic journal markets. The company further offers online professional development and provides cost-effective solution training support to organisations.

C7: This is an IT firm that develops software applications for its clients. Basically, they provide next generation intelligent medical information systems and a user friendly application interface to help increase patient care and boost the efficiency of administrators and clinicians.

C8: This is a chemical company that has maintained a notable reputation as foremost manufacturer and dealer of sealants, glues and DIY products. The company manufactures according to ISO standards and remain the first to offer *cold glue* to the South African market. They are a single privately owned company with three operator sites: Cape Town being the head office, Johannesburg and Kwa-Zulu Natal. Their products are both for customers and industrial markets. Applications are done in specialised requests and in a general form.

C9: This is an institution of higher learning where students study towards degrees and where academic research is conducted. It is a place where knowledge is transferred from lecturers to learners—not only to learners, but also to industry, businesses and the communities it functions in. The university prides itself with over 70 academic programmes; it is the largest university in the Western Cape region, with five campuses and a large number of enrolled students.

4.2.3 Participant sampling

All the participants in this study came from the nine researched companies. The participants were selected purposively as the most representative person(s)—IT/HR managers, telecommuters and non-telecommuters to explore their feelings, experiences and perceptions towards telecommuting, how telecommuting can be adopted into ICT/business strategy, staff members' readiness to telecommute, and to notify them of the environmental benefits of telecommuting.

4.2.3.1 Description of the participants

Nineteen (19) participants were selected for the process (see Appendix B for list of participants). Participants 1 to 12 are the key *company representatives*, and participants 13 to 19 form the *staff members* group.

Three participants from company C6 were jointly interviewed in a group, as were two participants from company C8. The other companies had one participant each,

totalling twelve participants for the *company representatives* group. Their positions are: CEO, IT managers, HR managers, finance manager and marketing manager.

Seven participants were interviewed for the *staff members* group which included telecommuters and non-telecommuters—four telecommuters (telecommuting one day a week or once a month) and three non-telecommuters. The participant descriptions are presented below:

Participant 1: This participant is a strong-willed mature man, educated, and the CEO in his organisation. He was very engaged during the interview, open and always ready to speak on why situations are the way they are. He seems to be a traveller as was very insightful. The interview took place in a coffee shop as it was the easiest place to get hold of him.

Participant 2: This participant is a branch manager in his organisation. He is a young man between the age of 35 and 40, a gentleman who answered every question with a smile, enjoyed the meeting, and found the study interesting. The interview was held on a Saturday at his office as this was his least busy day at work. He has computers and phones in his office.

Participant 3: This interviewee is an IT manager in his organisation, an energetic man, and has computers and phones in the office. He was a bit concerned to share information.

Participant 4: This participant is a mature woman (probably early 50s), educated, and the HR manager in her organisation—versatile, receptive and calm. She provided all the information needed within her reach, and was a link to finding other participants from her organisation. It was easy to have her audio recorded. The interview was conducted onsite in her organisation.

Participant 5: This participant is a very passionate marketer in his organisation. He is an energetic man. During the interview he took time marketing his organisation, which was truly insightful.

Participant 6: This participant is an HR manager (mature woman probably in her late 40s) who was very receptive during the interview. She found the study interesting and requested that the interview schedule be emailed to her before the meeting date.

Participant 7: This interviewee is an IT manger in his organisation—a calm looking man who found the study interesting and gave very strong views.

Participant 8: This participant is a mature woman, the finance manager in her organisation. She was concerned about the cost of the infrastructure for telecommuting and had strong views on that.

Participant 9: This participant occupied two roles in his firm: Chief Information Officer and Programme Manager for strategic sub-systems development infrastructure. He is a mature man, found the study interesting and is well aware of issues, although somewhat defensive.

Participant 10: This participant is an HR manager, a mature woman. She was the first to be interviewed for this study apart from the pilot study. She was somewhat tense during the early stage of the interview and opted to rather sign the individual participant form after the interview. About 10 minutes into to the interview she became more relaxed. She had very strong views.

Participant 11: This respondent is a mature man, probably late 50s, and the IT manager in his organisation. He was gentle, open minded and shared his views with regard to his firm, South Africa and the globe in general.

Participant 12: This participant is a confident, mature man, probably in his late 50s, and the IT manager in the organisation. He spoke courageously, is well aware of the issues in his section and enjoyed the meeting.

Participant 13: This participant is a lady (maybe in her early 30s); her position in the firm is contract specialist and she indicated that she “loves the study”. She sounded like someone who knows what she needs in life as she selected to be a full-time telecommuter. She spoke smilingly in a soft voice, almost whispering. She appeared calm and was not forceful in answering the questions. The researcher asked many probing questions to obtain the needed information.

Participant 14: This participant is a mature woman, probably in her 50s. She is very passionate about the study and interested in knowing the final outcome. She was very open-minded and shared her thoughts about her organisation without reservations. She is the sales coordinator in her firm.

Participant 15: This participant is of average height, a young, energetic IT engineer (maybe in his 30s). He was receptive but seemed not sure whether he truly enjoys what he does for a living. He had strong thoughts.

Participant 16: This participant is a mature woman, open-minded and well knowledgeable on issues, but reluctant to opt for or against telecommuting. She is probably in her late 50s. She is the billing office manager for her company's finance team in the Western Cape Province. She was very out spoken.

Participant 17: This person had strong thoughts, an average height young man (maybe in his 30s), and the regional operations IT manager for internal IT in his firm. He is a smart young man and satisfied with his job, which was valuable to the study as he shared his thoughts without concerns.

Participant 18: This is an average height woman, a marketer in her firm. She was somewhat concerned in sharing her thoughts, but the researcher managed to obtain the needed information.

Participant 19: This participant is a tall, slim man, probably in his late 40s, a planner in his organisation and motivated to participate in the study. He audio recorded the interview conversation using his mobile phone. He stressed each point by nodding his head and used his hands to bring his points across. He had strong views.

4.2.3.2 The interview protocol and process

- The interview protocols were explained to the participants and a relaxing environment was created for an open deliberation
- Interview appointments were fixed via phone calls, and a series of follow-up emails were sent to ascertain suitable time slots for meetings
- Once the venue, date and time were ascertained, the researcher arrived at the venue on time
- Before the interview process began, an introduction was done which included the topic of study and interview questions
- Participants were reminded of their rights as stipulated on the informed consent form sent to them prior to the meeting
- Permission was requested to audio record conversations
- The conversation began as permission was granted

Some questions were developed for the interview and some of the participants' responses to the questions led to probing further questions which assisted in

obtaining useful information relevant to the study. The interview was planned to last for 30 minutes, but some sessions continued for about 60 minutes because of the large volume of information provided. At the end of the interview, participants were thanked for participating in the study and the conversations were saved and uploaded to Google Drive.

4.2.3.3 Transcribing the interview

A verbatim transcription was carried out with the interview data. Careful listening and several replays of tracks were done to ensure the correct wording was transcribed. Some recorded interviews took days to write out as it was extremely lengthy. Transcription requires much patience in order to correctly write out conversations and interviews.

4.2.4 Summary

Data were collected from relevant literature and documents and an in-depth interview was conducted. There were nineteen (19) participants from the nine researched companies. Participants were all receptive and very engaged during the interview session. They all have a cupboard to store folders or documents, a table with desktop computers, laptops connected to the internet and landline telephones in their offices. Researching companies from various sectors showed that telecommuting is not meant for certain sectors, while some job positions do allow for telecommuting.

4.3 Performing qualitative content analysis

After the data collection, the data were transcribed (Appendices E and F). Having all the interview transcripts at hand, the crucial step began—coding and analysing the data. The analysis was performed using a combination of different coding methods. The *initial coding* was done by breaking down the interview data into different parts and then examining each part closely. During the initial coding process, *in vivo coding was* employed whereby codes were rooted in participants own language. For example, phrases were derived from the interview transcripts. Additionally, *values coding* was used in the study to reflect on participants' beliefs, attitudes and values, representing their opinions or worldviews. *Value* is the meaning people attribute to another person, oneself, thing or idea. "The greater the personal meaning of something to someone, the greater the personal payoff; the greater the personal payoff, the greater the personal value" (Saldana, 2009:6, 7, 81 & 89). The emotions of participants were coded as well. *Descriptive coding* was employed in order to document and categorise the breadth of the opinions stated by several participants (Saldana, 2009:6, 7, 81 & 89).

4.3.1 The analytical process

The process used to analyse interview data went through a number of coding stages to arrive at the categories and themes presented in this study. Below are the steps which have been followed:

- Interview data were partitioned into two groups—key *company representatives* and *staff members*
- The transcribed interview data were seen as the units of analysis during the content analysis process
- Transcribed data were read several times for comprehensive immersion and understanding of the text
- Figures 4.1, 4.2 and 4.3 show the text marked with font colours and identified with codes (i.e. keywords and phrases) as meanings were suggested by the texts

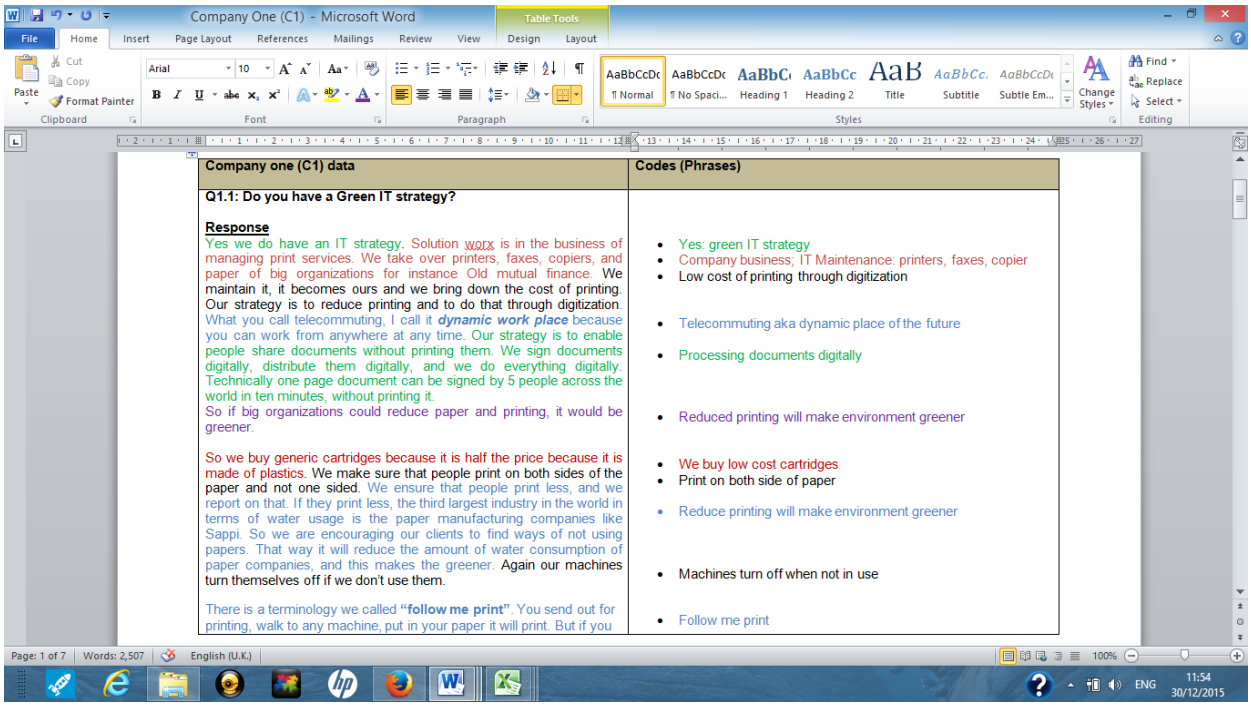
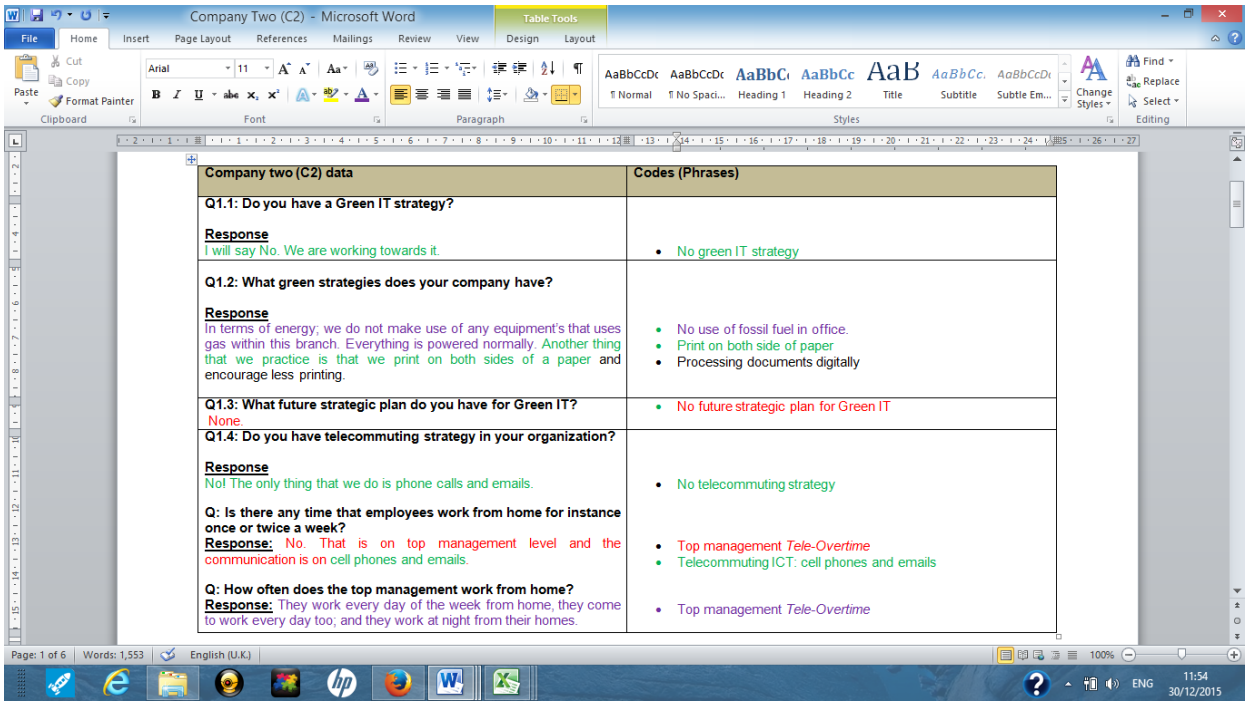
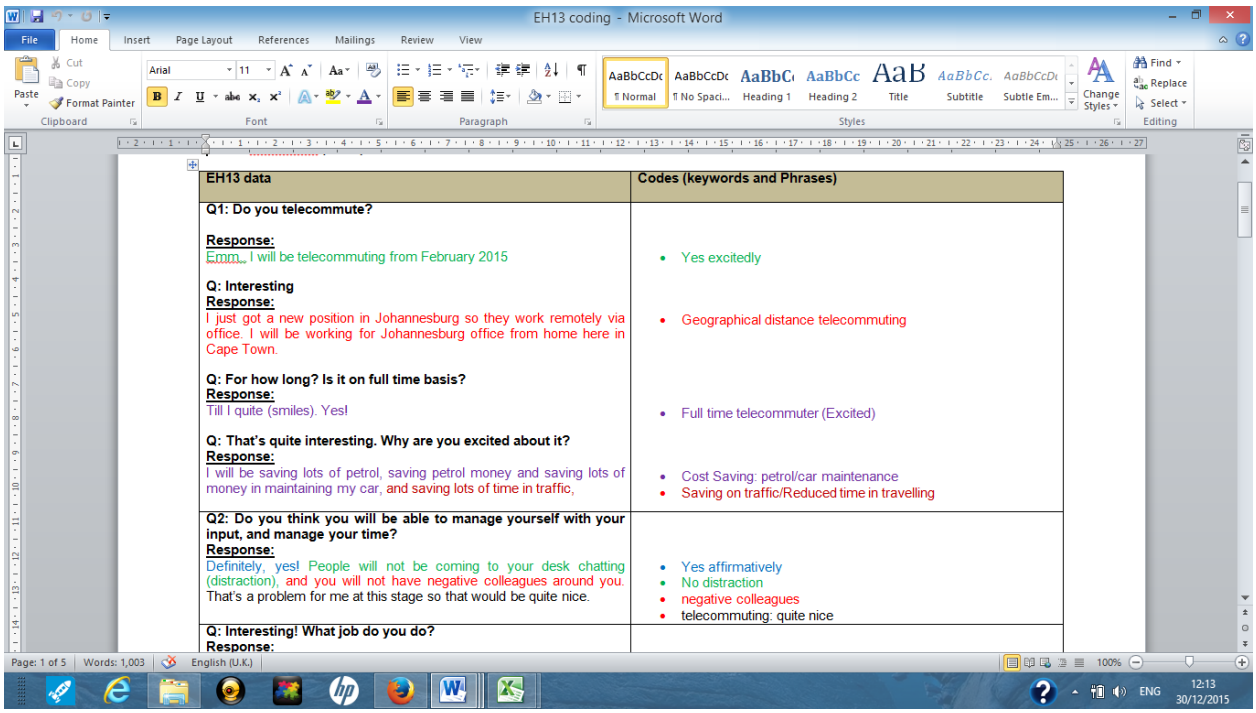


Figure 4.1: Data coding for company one (C1)



Company two (C2) data	Codes (Phrases)
Q1.1: Do you have a Green IT strategy? **Response** I will say No. We are working towards it.	• No green IT strategy
Q1.2: What green strategies does your company have? **Response** In terms of energy; we do not make use of any equipment's that uses gas within this branch. Everything is powered normally. Another thing that we practice is that we print on both sides of a paper and encourage less printing.	• No use of fossil fuel in office. • Print on both side of paper • Processing documents digitally
Q1.3: What future strategic plan do you have for Green IT? None.	• No future strategic plan for Green IT
Q1.4: Do you have telecommuting strategy in your organization? **Response** No! The only thing that we do is phone calls and emails.	• No telecommuting strategy
Q: Is there any time that employees work from home for instance once or twice a week? **Response:** No. That is on top management level and the communication is on cell phones and emails. **Q: How often does the top management work from home?** **Response:** They work every day of the week from home, they come to work every day too; and they work at night from their homes.	• Top management *Tele-Overtime* • Telecommuting ICT: cell phones and emails • Top management *Tele-Overtime*

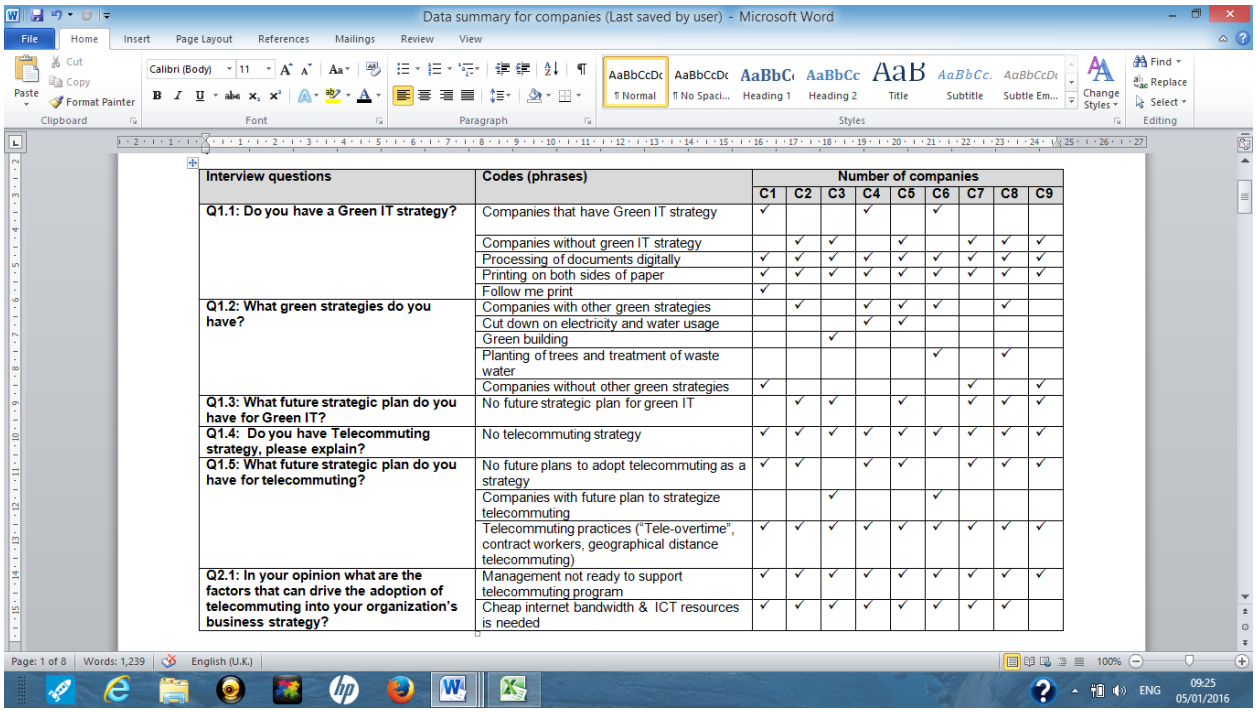
Figure 4.2: Data coding for company two (C2)



EH13 data	Codes (keywords and Phrases)
Q1: Do you telecommute? **Response:** Emm.. I will be telecommuting from February 2015	• Yes excitedly
Q: Interesting **Response:** I just got a new position in Johannesburg so they work remotely via office. I will be working for Johannesburg office from home here in Cape Town. **Q: For how long? Is it on full time basis?** **Response:** Till I quite (smiles). Yes! **Q: That's quite interesting. Why are you excited about it?** **Response:** I will be saving lots of petrol, saving petrol money and saving lots of money in maintaining my car, and saving lots of time in traffic,	• Geographical distance telecommuting • Full time telecommuter (Excited) • Cost Saving: petrol/car maintenance • Saving on traffic/Reduced time in travelling
Q2: Do you think you will be able to manage yourself with your input, and manage your time? **Response:** Definitely, yes! People will not be coming to your desk chatting (distraction), and you will not have negative colleagues around you. That's a problem for me at this stage so that would be quite nice.	• Yes affirmatively • No distraction • negative colleagues • telecommuting: quite nice
Q: Interesting! What job do you do? **Response:**	

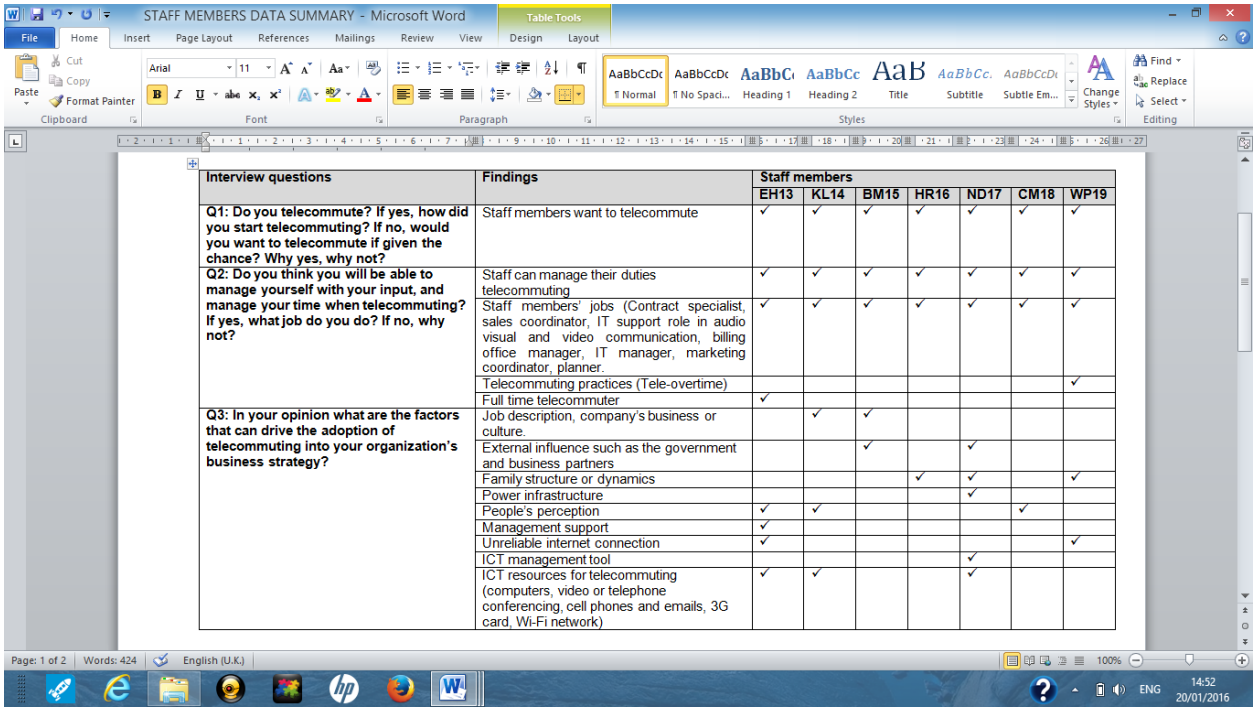
Figure 4.3: Data coding for staff members

- Codes and phrases were then summarised by identifying similarities and dissimilarities from the different companies and the *staff members* group as shown in Figures 4.4 and 4.5.



Interview questions	Codes (phrases)	Number of companies							
		C1	C2	C3	C4	C5	C6	C7	C8	C9
Q1.1: Do you have a Green IT strategy?	Companies that have Green IT strategy	✓			✓		✓			
	Companies without green IT strategy		✓	✓		✓		✓	✓	✓
	Processing of documents digitally	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Printing on both sides of paper	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Follow me print	✓								
Q1.2: What green strategies do you have?	Companies with other green strategies		✓		✓	✓	✓		✓	
	Cut down on electricity and water usage				✓	✓				
	Green building			✓						
	Planting of trees and treatment of waste water						✓		✓	
	Companies without other green strategies	✓						✓		✓
Q1.3: What future strategic plan do you have for Green IT?	No future strategic plan for green IT		✓	✓		✓		✓	✓	✓
Q1.4: Do you have Telecommuting strategy, please explain?	No telecommuting strategy	✓	✓	✓	✓	✓	✓	✓	✓	✓
Q1.5: What future strategic plan do you have for telecommuting?	No future plans to adopt telecommuting as a strategy	✓	✓		✓	✓		✓	✓	✓
	Companies with future plan to strategize telecommuting			✓			✓			
	Telecommuting practices ("Tele-overtime", contract workers, geographical distance telecommuting)	✓	✓	✓	✓	✓	✓	✓	✓	✓
Q2.1: In your opinion what are the factors that can drive the adoption of telecommuting into your organization's business strategy?	Management not ready to support telecommuting program	✓	✓	✓	✓	✓	✓	✓	✓	✓
	Cheap internet bandwidth & ICT resources is needed	✓	✓	✓	✓	✓	✓	✓	✓	

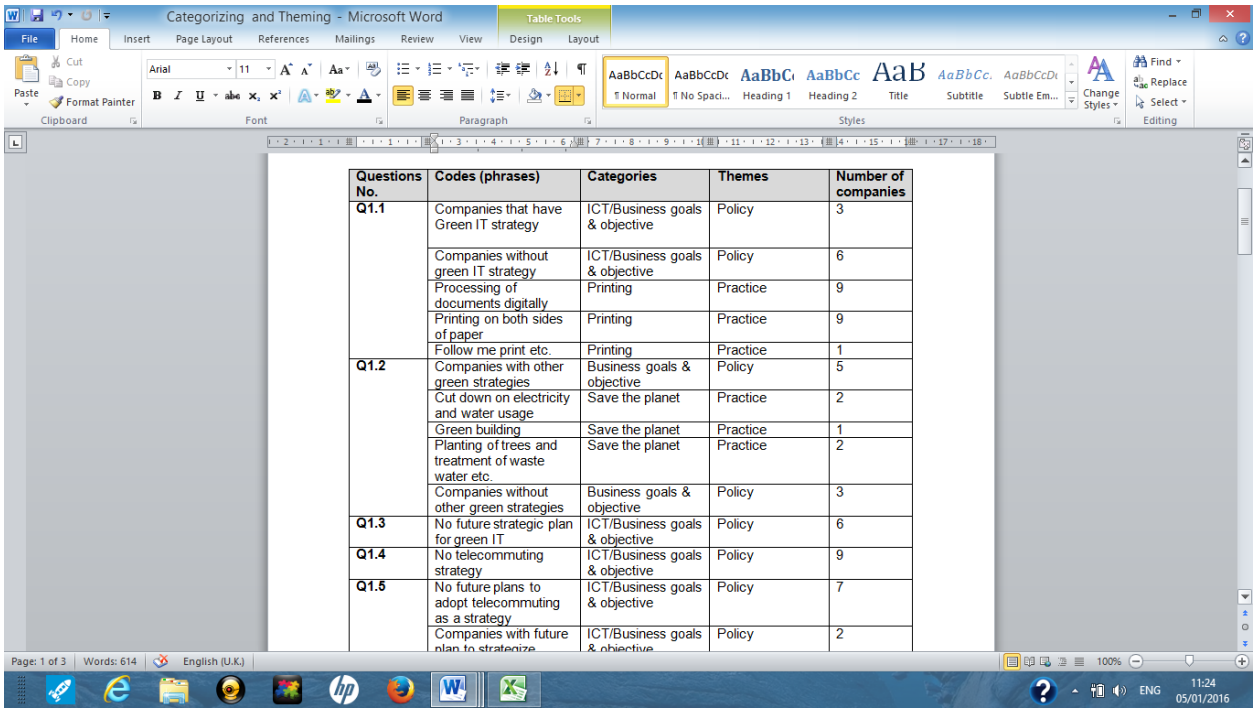
Figure 4.4: Data summary for companies



Interview questions	Findings	Staff members						
		EH13	KL14	BM15	HR16	ND17	CM18	WP19
Q1: Do you telecommute? If yes, how did you start telecommuting? If no, would you want to telecommute if given the chance? Why yes, why not?	Staff members want to telecommute	✓	✓	✓	✓	✓	✓	✓
Q2: Do you think you will be able to manage yourself with your input, and manage your time when telecommuting? If yes, what job do you do? If no, why not?	Staff can manage their duties telecommuting	✓	✓	✓	✓	✓	✓	✓
	Staff members' jobs (Contract specialist, sales coordinator, IT support role in audio visual and video communication, billing office manager, IT manager, marketing coordinator, planner.	✓	✓	✓	✓	✓	✓	✓
	Telecommuting practices (Tele-overtime)							✓
	Full time telecommuter	✓						
Q3: In your opinion what are the factors that can drive the adoption of telecommuting into your organization's business strategy?	Job description, company's business or culture.		✓	✓				
	External influence such as the government and business partners			✓		✓		
	Family structure or dynamics				✓	✓		✓
	Power infrastructure					✓		
	People's perception	✓	✓				✓	
	Management support	✓						
	Unreliable internet connection	✓						✓
	ICT management tool					✓		
	ICT resources for telecommuting (computers, video or telephone conferencing, cell phones and emails, 3G card, Wi-Fi network)	✓	✓			✓		

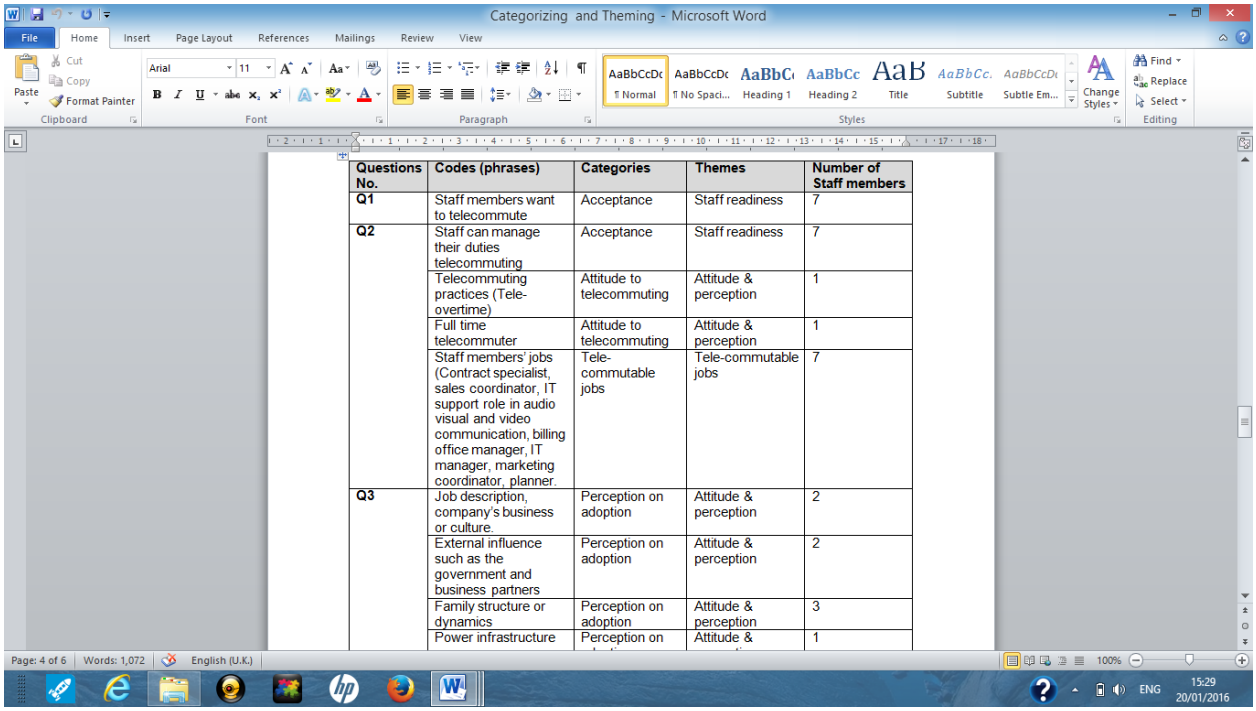
Figure 4.5: Data summary for staff members

- The codes and phrases were then categorised and themed as shown in Figures 4.6 and 4.7.



Questions No.	Codes (phrases)	Categories	Themes	Number of companies
Q1.1	Companies that have Green IT strategy	ICT/Business goals & objective	Policy	3
	Companies without green IT strategy	ICT/Business goals & objective	Policy	6
	Processing of documents digitally	Printing	Practice	9
	Printing on both sides of paper	Printing	Practice	9
	Follow me print etc.	Printing	Practice	1
Q1.2	Companies with other green strategies	Business goals & objective	Policy	5
	Cut down on electricity and water usage	Save the planet	Practice	2
	Green building	Save the planet	Practice	1
	Planting of trees and treatment of waste water etc.	Save the planet	Practice	2
	Companies without other green strategies	Business goals & objective	Policy	3
Q1.3	No future strategic plan for green IT	ICT/Business goals & objective	Policy	6
Q1.4	No telecommuting strategy	ICT/Business goals & objective	Policy	9
Q1.5	No future plans to adopt telecommuting as a strategy	ICT/Business goals & objective	Policy	7
	Companies with future plan to strategize	ICT/Business goals & objective	Policy	2

Figure 4.6: Categorising and theming for companies



Questions No.	Codes (phrases)	Categories	Themes	Number of Staff members
Q1	Staff members want to telecommute	Acceptance	Staff readiness	7
Q2	Staff can manage their duties telecommuting	Acceptance	Staff readiness	7
	Telecommuting practices (Tele-overtime)	Attitude to telecommuting	Attitude & perception	1
	Full time telecommuter	Attitude to telecommuting	Attitude & perception	1
	Staff members' jobs (Contract specialist, sales coordinator, IT support role in audio visual and video communication, billing office manager, IT manager, marketing coordinator, planner.	Tele-commutable jobs	Tele-commutable jobs	7
Q3	Job description, company's business or culture.	Perception on adoption	Attitude & perception	2
	External influence such as the government and business partners	Perception on adoption	Attitude & perception	2
	Family structure or dynamics	Perception on adoption	Attitude & perception	3
	Power infrastructure	Perception on	Attitude &	1

Figure 4.7: Categorising and theming for staff members

- Appendix G shows the full arrangement of these codes and phrases into categories and themes. Appendix G was found to be too long to present in the main body of the thesis.

4.3.2 Categories and themes after analysis

A total of sixteen (16) categories emerged after concatenating and aggregating codes from interview data. These categories mostly emerged from interview data, questions in the interview protocol and common sense constructs. Categories were then themed and a total of eight (8) themes emerged. These themes were also derived from common sense constructs and theoretical literature understanding of the phenomenon being studied (Ryan & Bernard, 2003:88).

Table 4.2 is a summary of the categories and themes that emerged for *company representatives* (participants in this group are key representatives of the companies this study had access to).

Table 4.2: Categories and themes for company representatives

Shareholders	Categories	Themes
Company representatives	ICT/Business goals and objective Business goals and objective	Policy
	Printing Save the planet	Practice
	Connectivity IT device readiness	Technology
	Attitude towards telecommuting Perceptions on adoption Perceptions on benefits	Attitude and Perceptions
	People and project management Telecommuters' attributes	Governance
	Good communication skills Trust issues	Emotional Intelligence
	IT skilled Acceptance	Staff Readiness
	Information job	Tele-commutable Job

Table 4.3 represents categories and themes of the stakeholder group *staff members* (participants in this group are staff members from the researched companies).

Table 4.3: Categories and themes for staff members

Shareholders	Categories	Themes
Staff members	Save the planet	Practice
	Connectivity IT device readiness	Technology
	Attitude towards telecommuting Perceptions on adoption Perceptions on benefits	Attitude and Perceptions
	People and project management Telecommuters' attributes	Governance
	Good communication skills Trust issues	Emotional Intelligence
	Acceptance	Staff Readiness
	Information job	Tele-commutable Jobs

Tables 4.2 and 4.3 above show the categories and themes columns for the stakeholder groups (company representatives and staff members).

In total, the study produced eight themes of which five fits into the G-readiness Model of Molla *et al*. (2011:84). The five G-readiness Model themes are: (i) Policy; (ii) Practice; (iii) Technology; (iv) Attitude and Perceptions; and (v) Governance. The other three themes are: (vi) Emotional Intelligence; (vii) Staff Readiness; (viii) Tele-commutable Jobs.

The interpretation of categories provides the ground for these themes. Bhattacherjee (2012:115) notes that the thematic analysis process is achieved when "coding of new data and theory refinement continues until **theoretical saturation** is reached". Results of the findings were used in developing a recommendation and inductive inference prepared to complement previous and related theories. This was done to offer a contribution to the slow adoption of telecommuting in South Africa.

4.4 Summary of Chapter Four

The fieldwork was adventurous and a learning curve. Data were collected and analysed notwithstanding time constraints and other limitations during the project. Data were collected from relevant documents, literature as well as the nineteen participants from nine companies all spread across Cape Town in the Western Cape Province of South Africa. These exercises allowed for the development of competencies in the researcher.

This chapter presented information on booking appointments with participants, collecting data, transcribing and analysing the data with a combination of different coding methods, and making a conclusive induction.

The detailed thematic presentation of the research findings is presented in the next chapter (Chapter Five).

CHAPTER FIVE: THE RESEARCH FINDINGS

5.1 Introduction

The aim of this study is to explore the reasons behind the slow adoption of telecommuting practice in South African organisations. The procedures followed include:

i) identifying the perceptions of organisations towards telecommuting;
ii) understanding factors driving the adoption of telecommuting into business strategy;
iii) understanding the benefits organisations perceive can be accrued to them if telecommuting is adopted; and
iv) determining if staff members are ready for a telecommuting programme.

The previous chapter provided a review on how fieldwork was carried out, describing the participants and the nine researched companies. It presented methods and procedures on how data analysis progressed and identified categories and themes after analysis. This chapter presents the detailed findings from the analysis of the embedded multiple-case study regarding telecommuting in the South African context.

The findings report on telecommuting in nine companies in South Africa, bringing together the G-readiness Model elements (section 2.5.1.1) such as the attitude and perceptions of companies towards telecommuting. This attitude and perceptions construct is a determinant of the researched companies' policies on the use of ICT for their business purpose.

5.1.1 Thematic presentation of findings

This section presents the findings of telecommuting in thematic format: (i) Policy; (ii) Practice; (iii) Technology; (iv) Attitude and Perceptions; (v) Governance; (vi) Emotional Intelligence; (vii) Staff Readiness; and (viii) Tele-commutable Jobs.

The themes link to their corresponding categories (Appendix G), and the categories represent the aggregation and concatenation of codes regarded as having specific shared characteristics during the analysis phase. The categories and themes presented here mostly emerged from the analysis of the interview data, interview questions, common sense constructs and a theoretical literature understanding of the phenomenon being studied.

Findings are discussed under two headings because the study is an embedded multiple-case study in which data were obtained from top management executives

and staff members to obtain clear insights from the different groups and achieve the objectives of the study. Participants in the *company representatives* group were selected because they are key representatives of the companies being researched, and participants in *staff members* group were all from the nine researched companies. Findings are drawn from the in-depth interviews held with the participants (outlined in Appendix B).

In the next section (5.2) the **Policy** theme is discussed. This theme appears only in the *company representatives* group (Table 4.2) and not in the *staff members* group (Table 4.3) as some interview questions were specifically designed for the *company representatives* group (Appendices C & D).

5.2 Policy theme

The **Policy** theme describes environmental frameworks and standards set by a company to guide the purchasing, using and disposing of ICT resources. These items focus on strategies in green ICT and the pollution prevention strategy in using ICT to lessen overall emissions (which includes telecommuting). The theme is divided into two categories:

i) ICT/business goals and objective; and

ii) Business goals and objective.

5.2.1 ICT/business goals and objective

The category, *ICT/business goals and objective*, was constructed with significant codes (phrases) such as documented strategy for telecommuting, future plans to adopt telecommuting, Green IT strategy and future strategic plan for Green IT. Constructing this category stems from the understanding that top management of different companies have needs and issues which are considered as the most important with regard to ICT adoption. These are seen within the researched companies' vision and mission statement, which led to formulating the *ICT/business goals and objective* category. The category has the following sub-categories:

- *Telecommuting strategy:* denotes companies with a telecommuting strategy and those without
- *Future plans to adopt telecommuting:* denotes companies who have plans to adopt telecommuting into business strategy and those without plans
- *Green IT strategy:* denotes companies that have a Green IT strategy and those that do not have a documented Green IT strategy
- *Future strategic plan for Green IT:* denotes those companies with future plans to strategise Green IT and those without such plans

5.2.1.1 Telecommuting strategy

Findings show that all nine researched companies (100%) do not have a documented telecommuting strategy. This is illustrated in the following responses:

Participant 1 of C1 stated that "it is not documented! It is just an agreement that we have". Participant 2 of C2 said: "No! The only thing that we do is phone calls and emails". Participant 3 of C3 stated: "We don't really have a strategy for that…" Participant 4 of C4 indicated: "We don't have [a] specific telecommuting strategy". The lack of a telecommuting strategy is also illustrated by Participant 7 of C7 who said: "There is not a formal telecommuting strategy but it does happen from time to time as the need arises". Participants 5, 6, 8 and 9 from C5, C6, C8 and C9 respectively also stated they do not have a telecommuting strategy (Appendix E: pages 2, 7, 12, 17, 23, 27, 34, 42 & 49).

Despite having no telecommuting strategy, all nine companies practice telecommuting. Eight of the nine companies (C1, C2, C3, C5, C6, C7, C8 & C9) (89%) practice telecommuting as an *ad hoc* approach, usually driven from a personal circumstance perspective and not as a company's drive to implement a telecommuting strategy. Only one of the companies, C4, (11%) is actively practicing telecommuting on a part time basis although it is done by a few staff members and not as a companywide approach. For instance, only one staff member practices Full-time telecommuting.

5.2.1.2 Future plans on strategising telecommuting

Determining the future plans of companies on adopting telecommuting is essential to aid in understanding the reasons for the slow adoption of telecommuting. Seven of the nine companies (78%) have no future strategic plans for telecommuting. Participant 1 of C1 stated: "I have not thought of that". Participant 2 of C2 stated: "I am not sure if there is any future plan for that", and Participant 4 of C4 said that "we are more trying to make our physical work places more kind of plug in and go, that's kind of where we at". The lack of future plans for telecommuting is also illustrated in companies C5, C7, C8 and C9.

However, two of the companies (22%) have future strategic plans for telecommuting, as Participant 3 of C3 stated: "…except during a disaster recovery situation". Participant 3 further explained that in the event of a disaster occurring in the company's building, there is a core set of people who will go to alternative sites while the rest of the staff will work from home.

Participant 6 of C6 stated his view on future strategic plans to be as follows: “For permanent staff that point will be reached when we have reached capacity here. So we have decided that if we can’t accommodate more people in this premise, we would allow telecommuting” (Appendix E: pages 3, 8, 12, 17, 23, 28, 34, 42 & 49).

Interestingly, all nine companies (100%) revealed that their top managements are not ready to support telecommuting programmes as the managers want to see employees in the office. Participant 4 of C4 acknowledged that staff in their offices in Asia and Europe telecommute but people in this part of the world (Africa) are resistant to change and do not take invention serious (Appendix E: page 19). Participant 11 of C8 added that people’s resistance to change is attributed to their comfort zones (Appendix E: page 44). However, Participant 3 of C3 indicated that telecommuting can be supported if management sees it as a workable business proposition (Appendix E: page 13).

5.2.1.3 Green IT strategy

Six of the nine researched companies (67%) do not have a Green IT documented strategy. Participant 11 of C8 said: “Em… not specifically Green IT but we do have an IT strategy, which is generally for the benefit of the business … Green IT is not our need right now, I am sorry, I am being that direct” (Appendix E: page 40). The lack of a Green IT strategy within companies is illustrated by Participant 3 from C3 who said: “No! Not really” (Appendix E: page 11). Companies C2, C5, C7 and C9 also indicated that they have no Green IT strategy (Appendix E: pages 7, 22, 33 & 48 respectively).

Contrary to the above mentioned companies, three companies (C1, C4 & C6) (33%) do have a Green IT strategy. Participant 1 of C1 noted: “Yes, we do have a Green IT strategy. Our company is in the business of managing print services”. Participant 4 of C4 said: “Yes! We are solid; we have to (laughs). So we are very much aware of the global trends. It’s been on the cards and visible to every employee for the last 4 years now” (Appendix E: pages 1, 16 & 27 respectively).

Companies with a Green IT strategy understand the benefits because it falls within their line of business. Two of these companies with a Green IT strategy (C1 & C4) are global firms, making money by selling, installing and servicing IT products such as video conferencing facilities, managing printing services for individuals, and have businesses invest in Green IT (Appendix E: pages 1 & 16 respectively). Companies that do not have a documented Green IT strategy (C2, C3, C5, C7, C8 & C9) believe Green IT does not fall into their areas of special interest and it does not benefit their

business. It has been found that for some companies, their IT strategy is to use ICT equipment in a way that adds value to their business.

According to Participant 9 of C9, the reason why Green IT is difficult to adopt is because of changes in IT governance, for example, Green IT practices are initiated but later dropped because it does not fall within the high priority list of issues in terms of operation activities/governance, but Green IT is seen as a noble matter (Appendix E: page 48).

5.2.1.4 Future strategic plans for Green IT

The six companies (67%) without a Green IT documented strategy (C2, C3, C5, C7, C8 & C9) have no future plans to strategise Green IT (Appendix E: pages 7, 12, 22, 33, 40 & 49). These companies believe that getting the basics of business right is better than the so called 'nice to haves'. They are of the view that once business is implemented in the market, a formalised IT strategy such as Green IT will stand in line as part of the whole strategic implementation. Participant 9 of C9 indicated that support is needed from management for a Green IT initiative to be effective.

5.2.2 Business goals and objective

This category denotes companies having various green non-ICT related strategies—e.g. planting of trees—and those companies without. These strategies do not fall within the scope of this study and are therefore excluded in the discussion in Chapter Six. However, five of the nine researched companies (C2, C3, C4, C5 & C6) do have a green strategy (Appendix E: pages 7, 11, 16, 22 & 27 respectively). Three of the companies (C1, C7 & C9) do not have a Green IT strategy (Appendix E: pages 2, 33 & 48 respectively). One company, C8, does not have their green approach documented (Appendix E: page 41).

Various green strategies exist in the researched companies. These are presented under the **Practice** theme (section 5.3).

5.2.3 Summary of findings for the Policy theme

In summary, most companies' frameworks contain needs and issues considered to be most important to their business. The main findings for the **Policy** theme are presented below:

- None of the companies (100%) participating in this study has a telecommuting strategy. However, eight of the nine companies (89%) practice telecommuting as an *ad hoc* approach. Only one company (11%) is actively practicing telecommuting although limited to only a few staff members

- Seven of the nine researched companies (78%) have no future plan to strategise telecommuting. One of the nine companies (11%) plan to adopt telecommuting during a disaster period, while one company (11%) plans adopting telecommuting when their company has reached capacity
- All of the companies (100%) indicated they are not ready to support a telecommuting programme because managers want to see employees in the office daily. However, telecommuting will be supported if management views it as a workable business approach
- The findings show that the managements of the companies are resistant to change and not ready to leave their traditional office style comfort zone of wanting staff to be present in the office
- Six of the nine researched companies (67%) have no Green IT documented strategy and they have no future plans regarding it either. The other three companies (33%) have a Green IT strategy based on factors such as Green IT forming part of their line of business and being a global firm which is fully aware that *climate change* is a global trend
- Changes in IT governance make strategising on Green IT difficult for companies; it also excludes Green IT from the high priority issue list of companies

5.3 Practice theme

The **Practice** theme describes the actual implementation and realisation of environmental sustainability in purchasing, using and disposing of IT resources. It also has findings on non-IT related practices. The theme is divided into two categories:

i) Printing

ii) Save the planet

This **Practice** theme appears in both the *company representative* and *staff members* stakeholder groups (Tables 4.2 & 4.3).

5.3.1 Printing

This *printing* category denotes organisational practices relating to the printing of documents which can be regarded as a Green IT practice.

Company representatives

Findings show that all nine researched companies (100%) process documents electronically and print on both side of the paper. Participants 1 to 14 representing

these companies gave a positive indication that documents are shared, distributed, signed without being printed and less printing is encouraged.

Participant 1 from C1 stated that technically, a one page document can be signed by five people around the world in ten minutes, without it being printed (Appendix E: page 1). Participant 1 continued by saying “we make sure that people print on both sides of the paper and not one sided. We ensure that people print less”. ‘Follow me print’ is a terminology used in his company to manage printing activities such as documents printed when papers are in the printing tray, documents deleted after 24 hours if not printed, and machines turned off when not in use (Appendix E: page 2).

Two Companies (C1 & C6) (22%) purchase plastic generic cartridges and refill their printer cartridges to reduce the cost of buying new cartridges every time. Furthermore, Company C6 recycles old ICT devices, for example, computers and screens are sent to a recycling company because they contain toxic substances and are hazardous waste. The company also reduces printing and the use of paper, and recycles printed paper no longer useful (Appendix E: pages 2 & 27). Interestingly, one of the companies, C9, reduced the number of printing devices as a green practice, so printers are shared within the organisation (Appendix E: page 48).

Staff members

The *printing* category did not appear in the *staff members* group (Table 4.3).

5.3.2 Save the planet

The category, *save the planet*, describes all organisational activities relating to green practices.

Company representatives

Two of the nine companies (22%) cut down on electricity and water usage. For instance, Participant 4 from C4 stated that lights turn off when no one is in a room (Appendix E: page 16). In the hospitality company (C5), Participant 5 noted that when the television plays for two hours, it prompts the press of a button to establish whether someone is in the room, otherwise it switches off automatically. Customers use cards issued to them to turn on lights and air conditioning in their rooms when inserted into a slot. Switches are within reach beside the bed for clients to easily turn off the light, and refrigerators are fitted with magnets to keep it closed as findings show that more electricity is consumed when refrigerator doors are left open. On saving water, Participant 5 explained that clients were educated, presented with two towels and advised to hang towels over the rails when washing is not required; when the towels are dirty, it must be left on the floor for room attendants to collect

for washing. Participant 5 further explained that their company entered into a joint programme with the City of Town to save water and electricity. When meeting targets are met in reducing electricity consumption and water usage, the company receives green certificates and this enables them to win business contracts.

Companies go green because they are required to present their green certificates during business tenders to win certain tenders for their organisations. For instance, Participant 5's (C5) business partner frequently asks: "What do you do, to give back to the planet?" (Appendix E: page 22-23). Participant 2 (C2) in support of green practice noted that, "in terms of energy, we do not make use of any equipment that uses gas within this branch. Everything is powered normally" (Appendix E: page 7).

Companies plant trees and treat waste water as green practice. This statement is supported by the responses of participants 6 and 10. Participant 6 (C6) noted: "We even plant trees" (Appendix E: page 27). Participant 10 (C8) stated that "we do need to treat waste water which is a legal requirement…" (Appendix E: page 41).

One of the nine companies, C3, (11%) takes advantage of their position next to the sea to cool their building. This is done by pumping sea water into the building, cooling the building, which in turn cools the data centre. However, the green side is basically focused on cooling the building and not on the amount of people in the building or the data centre. Participant 3 stated: "All our effort is in support of the green building, not necessarily Green IT practices… The green side is basically focused on cooling the building and not the amount of people in the building" (Appendix E: page 11).

Participant 4 (C4), whose business mainly aligns with Green IT, explained that video conferencing facilities are installed for clients so people can communicate without having to travel to meetings and interviews. Customers save their data in the virtual server, central server or the clouds. Participant 9 (C9) also noted that they have a virtualised server were data is saved (Appendix E: pages 16 & 48). A virtualised server helps lessen the need for air cooling devices in their company to reduce their own emissions.

It has been found that computers are purchased in the lower power usage range (e.g. Energy Star logo). Participant 9 (C9) explained this by saying: "We have a green practice in terms of purchasing our PC in the rating of low power usage. This is done from the manufacturing company. We don't purchase computers' which don't have it, e.g. Energy Star sign" (Appendix E: page 48).

Staff members

It has been found that only one staff member from C4 practices Full-time telecommuting, that is, telecommutes on a permanent basis. In support of this statement, Participant 13 stated excitedly: “I just got a new position in Johannesburg so they work remotely via office. I will be working for [the] Johannesburg office from home here in Cape Town”. She explains that the telecommuting position is on a Full-time basis until she resigns (Appendix F: page 1).

5.3.3 Summary of findings for the Practice theme

The Practice theme, which represents all green practices, summarises the determining categories *printing* and *save the planet* below. Findings for both stakeholder groups (*company representatives* and *staff members*) show that there are various Green IT practices in the researched companies:

- 100% of the researched companies process documents electronically and print on both sides of the paper; they all encourage less printing
- Technically, it was found that [a] one page document can be signed digitally by five people around the world in ten minutes
- ‘Follow me print’ is a terminology derived to manage printing activities such as documents print only when papers are in the tray, delete after 24 hours if not printed and machines turn off if not in use
- Printer cartridges are refilled to reduce the cost of buying new ones whenever a cartridge is empty. Old computers, screens and printed papers which are no longer useful, are sent to a recycling company
- Printing machines are reduced as a greening effect, so printers are shared
- Two of the companies (22%) save their data on a virtual server, central server or the ‘cloud’
- Findings show that one of the companies (11%) purchase computers in the lower power usage range (e.g. energy star logo)
- Other types of green non-IT related practices include cutting down on electricity and water usage, planting trees and green buildings. One of the companies (C5) noted that they do have a green strategy (e.g. reduced electricity and water usage) because their business partners require of them to present their green certificates during business tenders, and those with green certificates win contracts for their organisations
- Finally, only one staff member practices Full-time telecommuting

5.4 Technology theme

The **Technology** theme describes information technology systems or resources used in telecommuting in the companies. The theme is divided into two categories:

i) *Connectivity:* denotes ICT resources for telecommuting. The internet connections have to be accessible in all areas, reliable, fast and of global standard

ii) *IT device readiness:* describes the availability and non-availability of IT infrastructure in companies for telecommuting initiatives

The structure of the findings is presented below according to the stakeholder groups (*company representatives* and *staff members*).

5.4.1 Connectivity

Company representatives

Two of the companies (22%) use video or telephone conferencing to hold meetings with clients and colleagues from other branches, companies or provinces (geographical distance telecommuting). This view is consolidated in the responses of participants 1 (C1) and 4 (C4) respectively. Participant 1 noted:

> "We use video or telephone conferencing to do meetings. We also perform the video conferencing with our clients as well. For instance, our head office is in Johannesburg, I live in Cape Town; when we have meetings, everybody calls in and we perform the meeting. We do not all fly down to Johannesburg" (Appendix E: page 2).

Participant 4 also noted that they have video conferencing facilities: "so people can communicate without having to travel for meetings and interviews" (Appendix E: page 16).

Mobile phones and emails are used in performing jobs from the office and home after normal working hours. Participant 2 (C2) noted that "the communications are on cell phones and emails" and that management "work at night from their homes" (Appendix E: page 7).

One of the companies provides 3G cards with 2 or 3 gigabytes data bundles to their staff members who occasionally work from home. This view is illustrated in Participant 4's (C4) response, stating that "most of our individuals have a 3G card, and have about 2 or 3 gigabyte data bundle". But she also said that the reality is, 2 or 3 gigabytes of data are not really sufficient to deliver work over the internet

because of the type of work they do (Appendix E: page 18). Participant 8 of C6 is also in support of this: “You cannot work on [a] 3G network” (Appendix E: page 30).

The hospitality company (C5) installed [a] Wi-Fi network in the hotel for clients to use with ease, instead of clients driving around to search for a cyber café. Participant 5 (C5) mentioned that “my hotel provides free Wi-Fi to clients so they can communicate rather than have them drive out to look for where they can have access to the internet using laptops” (Appendix E: page 22). The hospitality company makes it possible for their clients to telecommute when they are away from home, without necessarily driving around in search of cyber cafés to connect to the internet. The installation of Wi-Fi in the hotel for the comfort of clients shows that ICT resources can be used for minimising client travel.

The findings reveal consistently that there is virtually no reliable bandwidth/internet connectivity in South Africa. Four of the nine companies (44%) noted that internet accessibility needs to be available in all areas, reliable, fast and of global standard for telecommuting to grow. This view is consolidated in the responses of participants 3, 4, 8 and 11 from C3, C4, C6 and C8 respectively.

Participant 3 (C3) stated: “When we can get over bandwidth cost and have efficient communication between people at their homes, I see no reason we shouldn’t be doing that” (Appendix E: page 15). Participants 4 (C4) supports the above claim, arguing that “the speed of internet connectivity in this country is not encouraging”. For instance, she explains that “some people go stay up the hill in order to have access to the internet. I stay in Plattekloof and even there the internet is very unstable” (Appendix E: page 18). Participants 8 (C6) continued by saying that “the other problem is the ADSL line is not available in South Africa, so it is a big problem because you cannot work on [a] 3G network”. She noted that “we need the ADSL line to work better. The unreliability of the internet is a very big problem” (Appendix E: page 30). Participants 11 (C8) explained that “the telecommunication resources are not dependable… it is finding the right service provider that can give us that quality of service” (Appendix E: page 43). In explanation why the internet connection is poor, the company representative from the IT Company, Participant 4 of C4, observed that:

> “The poor internet connectivity experienced within South Africa is because infrastructures that Telkom, MTN and Vodacom provide are not up to global standard. And even if the biggest and best technology is put in place by a company, at the end other ISPs without [the] same standard will still slow down the connectivity” (Appendix E: page 18).

Only one company is of the opinion that internet connectivity in South Africa is not a problem as far as telecommuting goes. Participant 12 of C9 points out that “the main problem of telecommuting is not actually the technology or connectivity because we do it at the moment; we have good connectivity when we have video conferencing from different campuses” (Appendix E: page 51).

Two companies are utilising ICT control software that manages work progress and deliverables over the internet—Rally and Microsoft Lync. Participants 9 (C7) and 12 (C9) made the following statements regarding the software. Participant 9:

> “We have a tool in my current organisation called Rally where you plan all your activity beforehand for six weeks. You plan everything that needs to be delivered. So you know exactly who is going to do what by when, and you know what needs to be delivered on a daily basis to get to your particular goal” (Appendix E: page 36).

Participant 12 added that “Microsoft Lync integrates a lot of things; it is actually a good tool” (Appendix E: page 52).

The Rally software assists in speeding up value delivery, aligning development with the utmost priorities of portfolios, and making responsiveness the backbone of the business. In other words, Rally allows one to verify if set targets were met the previous day, and if not, the right questions need to be asked. The tool is designed to see pieces of functionality appearing day by day and as the day progresses. Thus, telecommuters’ managers can use Rally to monitor the deliverables of each telecommuter (Appendix E: page 36). Furthermore, Microsoft Lync allows staff to see when team members sign on and off the computer, and when they have meetings in their calendar. It shows when a member is making a phone call, and when team members are away from their computers.

Staff members

In similar vein, staff members also pointed out that internet connection is problematic with regard to telecommuting. For instance, Participant 13 of C4 stated: “Connectivity problems; I am worried about unreliable internet connection, networks being slow” (Appendix F: page 3). Participant 19 of C8 emphasised that “the internet access in South Africa is very poor. The quality is very poor”. In explanation this participant indicated that the internet is at times difficult for people to access when they want to: “I have got to wait until everything is delayed until sometimes 10:00 pm at night to perform my duties”. Participant 19 also noted that a person’s environment contributes to poor internet connectivity experienced. “It is the environment where I

live whereby those are the type of challenges one experiences there" (Appendix F: pages 28-29).

One of the staff members (Participant 17 of C4) opined that internet connection is reliable in South Africa, but it depends on what type of connection (broadband or fixed-line) one subscribes to. This point is illustrated in the response of Participant 17 of C4: "It depends. You can consume internet in different ways: broadband, fixed-line, so yes" (Appendix F: page 18).

In terms of ICT management software for telecommuting, Participant 17 of C4 noted that internal communication platforms such as Microsoft Lync technology, Enterprise Mail, and Microsoft Exchange, are utilised. The Participant explains that the Microsoft Lync and Microsoft Exchange have integration, for example, Microsoft Lync integrates with the calendar and internal address book, and it works very similar to Skype. It has instant messaging, video and audio conferencing, and desktop sharing. It is a full A-Z collaboration tool. "This technology allows me to manage my team remotely… Microsoft Lync technology, Enterprise Mail environment, and Microsoft exchange" (Participant 17 of C4, Appendix F: page 22).

5.4.2 IT device readiness

This sub-section describes the availability and non-availability of IT infrastructure in companies for telecommuting initiatives. Below are findings from the stakeholder groups.

Company representatives

Eight of nine researched companies (89%) have IT infrastructure to support telecommuting initiatives. This point is illustrated in the responses of participants 1, 2, 3, 4, 5, 7, 11 and 12 from C1, C2, C3, C4, C5, C6, C8 and C9 (Appendix E: pages 4, 9, 13, 19, 25, 30, 45 & 52 respectively).

Participant 1 (C1) noted: "In terms of the technological infrastructure is 80%, we have all the technology in place" (Appendix E: page 4). In explanation, Participant 2 (C2) noted that his company is technologically ready for telecommuting because "the IT department have much equipment to support this kind of programme" (Appendix E: page 9). Participant 3 (C3) said that "for the technological part, I think that we are quite capable to dealing with telecommuters… We will be ready if about 30 or 40 people would regularly telecommute" (Appendix E: page 13). Furthermore, Participant 7 (C6) stated that they have a digitalised phone system which can be set up within a day in the homes of staff members if telecommuting was an adopted strategy (Appendix E: page 30).

Only one of the nine companies (C7) is not ready with the technology to support telecommuting because the organisation does not have the right technology to set staff members up for telecommuting success. Participant 9 of C7 responded: “From [a] technological infrastructure side, I think you have to put your money where your mouth is, in the sense that you have to invest in the proper infrastructure to be able to do that” (Appendix E: page 37).

Staff members

The availability of ICT resources allows people to carry out their duties from home. Staff members from C4 noted that their company provides 3G internet networks to staff members who occasionally work from home, and the staff use web-access and emails which is a world-wide tool to link with partners.

Participant 13 (C4) said: “Yes they paid for a 3G dongle and data for a year, and I also do have ADSL at home already” (Appendix F: page 3). Participant 14 (C4) pointed out that “there are certain things you can apply for like the 3G card which you can get from the company (Appendix F: page 6)… My work is done via email. I find it quite easy because we have the right equipment at home (Appendix F: page 5)… We use web-access, and emails which is a world-wide tool to link with partners” (Appendix F: page 4). In clarification, Participant 16 (C4) explained that “a normal office worker does not get the 3G or internet access tools unless it is specifically required for them to work after hours” (Appendix F: page 14). Participant 17 (C4) in support of their company’s IT readiness to telecommute noted: “Very important is the technology that you have. We have upgraded certain technologies; we are using the internal communication platform which enables people to work from home” (Appendix F: page 18).

However, for employees to work from home there are costs and specific requirements associated to telecommuting. They need high speed internet bandwidth to conduct a video conference from home or dial up to conduct an audio conference. To ensure that their internet stays connected all the time, employees are required to have specified bandwidth connectivity. Participant 17 (C4) noted that “they need to have a certain amount of bandwidth. If someone has 512 kilobyte ADSL at home we tell them, you need to work on SAP. You don’t have enough bandwidth so you can’t work from home” (Appendix F: page 20).

Thus, to make it easy to telecommute, staff members personally subscribe to a sufficient ADSL or data line from Telkom for a reliable and faster internet connection. This statement is consolidated in the responses of participants 13, 14

and 17 from C4. Participant 13 (C4) stated: “I do have my personal ADSL at home already, so I can use whichever is faster to perform my job” (Appendix F: page 3). Participant 14 (C4) added: “We got the data line ourselves… to make life easier sometimes you have to put your own stuff together like [a] data line from Telkom which is a little bit more reliable” (Appendix F: page 6). Participant 17 (C4) concluded by saying: “When it comes to home infrastructure, the employees need to carry the cost”. Although the participant notes that not every employee carries that cost, higher level executive employees receive full ICT infrastructure installation and support at home from their company, “from video conferencing units to internet connectivity to UPS environments and if anything goes wrong, we support them” (Appendix F: pages 20-21). Thus, these executives do not have to face the stress of unreliable or slow internet connectivity as they receive quality ICT infrastructure installed for them. According to Participant 14 (C4), their company only provides ICT equipment for an employee depending on the person’s negotiation, job that needs to be done or who the employee’s manager is. This can be seen in the following response: “…it depends what the employees’ job entails and who your manager is. If they can, they will assist” (Appendix F: page 6).

5.4.3 Summary of findings for the Technology theme

The **Technology** theme for telecommuting initiatives is presented below by summarising the determining categories *connectivity* and *IT device readiness*.

- Companies use video or telephone conferencing to conduct meetings with clients and colleagues from other branches or provinces (geographical distance telecommuting)
- Mobile phones and emails are used in performing jobs from home after normal working hours (tele-overtime) by top management officials from company two (C2) and staff members use web-access and emails which are world-wide tools to link with partners
- Company representatives and staff members use 3G network cards with 2 or 3 gigabytes data bundles to work from home occasionally, but this data bundle size is considered not reliable to deliver work over the internet
- Staff members can negotiate for reliable and fast ICT facilities to enable them to telecommute efficiently
- The installation of a Wi-Fi network in the hotel for the comfort of clients shows that ICT resources can be used to minimise client travel
- Findings from the stakeholder groups consistently reveal that some areas in South Africa have poor and unreliable bandwidth or internet connectivity. As a result, it is believed that internet accessibility and connectivity need to

be available in all areas, reliable, fast and of global standard for telecommuting to grow

- The stakeholder groups noted that the products Microsoft Lync and Rally are good ICT management tools, enabling the understanding of work progress and deliverables of team members
- Companies (eight of the nine researched companies, i.e. 89%) do have the ICT technology to implement telecommuting, but they have not adopted it

5.5 Attitude and Perceptions theme

This **Attitude and Perceptions** theme describes perceptions, beliefs and values of the stakeholder groups (*company representatives* and *staff members*) regarding the role of ICT towards environmental sustainability. This theme is divided into three categories:

i) *Attitude towards telecommuting:* denotes stakeholders' (company representatives and staff members) approach to telecommuting

ii) *Perceptions on adoption:* denotes stakeholders' (company representative and staff members) opinion on factors that can mar and drive the adoption of telecommuting as a part of the business strategy

iii) *Perceptions on benefits:* denotes benefits associated with telecommuting as identified by company representatives and staff members

5.5.1 Attitude towards telecommuting

Company representatives

When participants were asked whether telecommuting is strategised, they answered, "no" (see section 5.2.1.1). Some approaches to telecommuting found in the companies are tele-overtime (top management officials working from home after normal work hours), jobs allocation to contract workers, geographical distance telecommuting (communication with colleagues in other locations), telecommuting during winter, and when people call in sick. This view is consolidated from responses by Participants 1, 2, 3, 5, 6 and 12 from C1, C2, C3, C5, C6 and C9 respectively.

Participant 1 of C1 stated that "I telecommute anyway. My office is in Pretoria, I spend at least two to three days in Cape Town every week. I work from everywhere, anytime and anywhere" (Appendix E: page 5). Participant 2 of C2 noted that top management telecommutes: "They work every day of the week from home; they come to work every day too, and they work at night from their homes" (Appendix E: page 7). Participant 3 of C3 and Participant 6 of C6 employ the services of contract

workers for telecommuting. In explanation, Participant 3 noted that “we have a home user programme were people perform specific tasks but they are not directly employed by our company. They are contractors. So they help us process information when we have too much information to process for people” (Appendix E: pages 12 & 27). Participant 12 of C9 emphasised: “The truth is that a lot of guys work from home. For example some guys can call in sick and work from home”. Even physically challenged persons telecommute. “I have a guy in wheel chair. He works thrice a week from home” (Participant 12 of C9, Appendix E: page 49).

Staff members

In the same vein as the company representatives, one of the employees also practices tele-overtime. The organisation offered him tele-overtime to reduce the hours spent in the office. As a result, this employee no longer stays late at office and does not go to the office over weekends. Participant 19 of C8 illustrated this as follows:

> “They offered me telecommuting to be able to reduce the hours spent at work. I am Full-time employed and I Full-time come to the office. I work every day. I do no longer stay late, and it is no longer required of me to come in on Saturdays or whatever the case may be. That is the advantage” (Appendix E: page 28).

Participant 15 of C4 said that “telecommuting would be best suited for managers”. He explained that “it would be good for senior level employees to telecommute for reporting structure, because they would be able to resolve high priority technical issues for their clients by letting them know that the problem is been taken care of and they should excise some patient” (Appendix E: page 11).

5.5.2 Perceptions on adoption

This sub-section describes factors affecting the adoption and non-adoption of telecommuting.

Company representatives

From the responses of participants in this group, it became evident that businesses are essentially cost-driven. Eight of the nine researched companies (89%) noted that ICT resources are expensive for telecommuting to be adopted because some companies have a large number of workers. They stated that low-cost internet bandwidth is needed in South Africa for telecommuting to be fully adopted. This statement is supported by the following responses of participants 1, 2, 3, 4, 5, 6, 9 and 10 from C1, C2, C3, C4, C5, C6, C7 and C8 respectively.

Participants 1, 4, 5 and 10 mentioned that the cost of internet data is too expensive to telecommute (Appendix E: pages 6, 18, 24 & 42). Participant 2 of C2 indicated that “it will also involve lots of money to purchase the equipment that will enable employees to telecommute due to the number of workers here, and the management is not ready to spend such money buying equipment for telecommuting” (Appendix E: page 9). Participant 3 of C3 indicated that if the cost of bandwidth in South Africa is less expensive, “it will probably make it easier for us to go in that direction. The cost of the video conferencing is expensive too” (Appendix E: page 13). In support of less costly internet data, Participant 6 of C6 said that setting up internet for each staff member will be expensive, “so it is cheaper for them to all work in the office” (Appendix E: page 28). Participant 8 of C6 indicated that telecommuting is more of a financial strategy than an environmental strategy: “I think telecommuting is less of an environmental strategy for our company; it is more of a financial strategy” (Appendix E: page 27).

Company culture is also an obstacle as management believes in the principle of seeing staff in the office on daily basis. This point is illustrated by four of the nine companies (44%) as shown in the responses of participants 1, 4, 9 and 12 from C1, C4, C7 and C9 respectively.

Participant 1 of C1 noted that telecommuting adoption **“**depends on the organisation and staff structure” and that telecommuting “policy will be one that differentiates between the types of staff in the organisation” (Appendix E: page 3). Culture as a factor in telecommuting adoption is also mentioned by Participant 4 of C4 who said that “managers want to see the staff they are working with, and that is just a culture thing” (Appendix E: page 19). In support, Participant 9 of C7 argued that “there is a leadership culture that is not that open to implementing a strategy like this”, and “it will not change easily as old school leadership still prefers to see their people” (Appendix E: page 34). Participant 12 of C9 supported that the old school culture system in office hinders telecommuting adoption (Appendix E: page 37).

Companies are more focused on the issues that give them the most points in terms of their score card to eco-friendly activities. Many participants indicated that their companies are focusing on other issues and challenge, not telecommuting. Participant 4 of C4 said: “I think that there are [a] few things that are more appropriate. I don’t just think is going to happen in the next five years” (Appendix E: page 17). Participant 9 of C7 argued that “the focus of the organisation is to get functionality out, the sooner the better” (Appendix E: page 33), with Participant 11 of

C8 emphasising that “we have not really progressed to the extent that it is a key focus of our business needs” (Appendix E: page 40).

Findings also show that one of the reasons telecommuting may not be adopted, is managers wanting staff in the office daily to monitor them and to ensure that they meet the strict business deadlines. In support of this point, Participant 6 (C6) stated that “we find that staff need to be monitored otherwise we will not be able to reach deadlines. With publishing, we have got very strict deadlines” (Appendix E: page 28). Furthermore, the staff need guidance to acquaint themselves with business methodologies that changes all the time. Participant 1 (C1) continued by saying: “Most of our staff need guidance. What we do is not something that has a procedure… so we develop our methodologies and they keep on evolving” (Appendix E: page 4).

Most businesses are office-based organisations. Management, especially those dealing with clients’ personal information such as income, identification numbers and salaries, believe that all activities need to be done in the typical office as a way to create security measures on information captured from clients. As a result, customers’ demands come first, meaning their customers want to see their partners face-to-face first as they find it difficult communicating online. This statement is generally illustrated by the responses of participants 2 and 4 from C2 and C4 respectively.

Participant 2 (C2) argued that “it is an office based organisation, so everything will be done from the office, and because we deal with client’s personal information (e.g. income, salaries, and IDs), we do not want to give our clients the notion that their information will leak out or get into the wrong hands” (Appendix E: page 8). Participant 4 (C4) noted:

> “Face-to-face, some customers find it difficult; virtuality will even be more difficult… we have lots of IT-based out sources that our staff are based on site with our customers. There is no physical or technical reason why they should be based on site. They could very well be based at the office; we can’t even get that right let alone strategising telecommuting for customers. They don’t have time for it. They want to see the individuals” (Appendix E: page 17 & 18).

Telecommuting (virtual office) is considered an initiative that will lead to lack of physical interaction among professionals. Face-to-face meetings allow staff who have many tasks to have colleagues around that can assist them. Participant 1 of C1 said that “the problem of [a] virtual office is that there is a lack of physical

interaction between professionals. For instance, you want to test something with somebody, you will need to call them, but when it is face-to-face, you will have a lengthy discussion with that person" (Appendix E: page 3). In support, Participant 3 of C3 noted that employees "obviously have a lot of tasks that need them to be closer to one another, and this makes it easier for them to do their jobs" (Appendix E: page 13).

Two of the nine companies (22%) consider telecommuting to be more appropriate for large organisations to adopt. Participant 9 of C7 said their business "is a small organisation" (Appendix E: page 34). Participant 10 of C8 argued that "the number of people who could benefit from it is very small; it hasn't become something we find necessary to develop a strategy for" (Appendix E: page 42).

There is indication that long term office rental can hinder the adoption of telecommuting. Participant 9 of C7 said: "We are in the situation that the current floor space has been contracted for a three year period". He explains that if telecommuting is adopted, they will be deprived of the potential advantage of telecommuting in reducing office space and cost because they will be paying for spacing they are not utilising (Appendix E: page 34).

External influences such as government support may encourage or drive the adoption of telecommuting into the company's strategy. This is represented by Participant 8 of C6 who stated: "My point is, businesses, private sectors are ready for telecommuting but we need that support from government as well to be able to do it" (Appendix E: page 28). Participant 9 of C7 emphasised: "There has to be some benefit from government side to sort of encourage an organisation. For instance, if you adopt a strategy like this you will get certain benefit that is around it". The participant said that if the company starts implement telecommuting without support from government, they may ask: "What will I get from it apart from the bigger picture [to] contribute to less carbon emission? What is it going to mean on my balance sheet? What will I get from it? Will I be penalised if I don't do it? So if I don't do something with regard to carbon emissions, so what?" (Participant 9 of C7, Appendix E: page 35).

For the future, companies want to see staff members requesting to telecommute because of the benefits tied to it. This statement is represented by Participant 6 of C6 who stated that "if staff request that they wants to telecommute, then we would see to it whether the person can work from home and if it makes sense, then we would allow for that but if it doesn't, we won't. We need to do what's good for the

business" (Appendix E: page 28). In support, Participant 10 of C8 added: "…because people see the benefits of it and so employees would drive the adoption of telecommuting… because there are some employees who would tell you that they can function more efficiently from home" (Appendix E: page 42).

However, for staff members to be able to drive the adoption of telecommuting, they need to be able to convince management they have an unquestionable character, good work ethics, a high productivity rate and the ability to perform from home (section 5.7.2). Participant 12 of C9 argued as follows: "I think a lot depend[s] on how you perform, and [the] perception of people towards telecommuting. I think that is a key issue" (Appendix E: page 49). Participant 1 of C1 indicated that young people can drive the adoption of telecommuting. He explains it can be done when they open up their own business, which will allow them work from home. He believes that newer organisations will be quick to adopting telecommuting.

Staff members

Staff members mentioned that telecommuting can be adopted depending on the job description, company's type of business, manager and employee decisions. This statement is consolidated in the responses of participants 14 and 15.

Participant 14 (C4) is of the opinion that, "I think is the type of work we do, so not everybody can take part in it". She noted that telecommuting "is a bit of both me and my manager's decision" (Appendix F: page 5). Participant 15 (C4) stated that "business should realistically drive telecommuting" (Appendix F: page 10).

External influences or example government regulation are seen as factors that may increase telecommuting adoption, as Participant 17 of C4 explained: "I believe that certain external factors like government will also drive the adoption of telecommuting" (Appendix F: page 21).

The notion that 'customers are king' applies to the adoption of telecommuting. This is represented by Participant 15 of C4 who stated that "if the clients are happy with that kind of service that is managing their site remotely, then it is fine". This is because customers are the ones who pay for the services (Appendix F: page 12).

There is a perception that telecommuting is difficult to strategise. Participant 14 of C4 argued: "I don't think they will be able to strategise that; it is quite difficult for the company to look at", because "there are a lot of scenarios that have to be taken into consideration" (Appendix F: page 6).

Staff members believe that some managers need to change (have a mind shift) on how or what they think about telecommuting; some managers are already telecommuting, but it is a big gap for managers who are not yet telecommuting. It is understood that those managers who have not allowed some of their subordinates to telecommute are traditional managers (ancient thinkers) who believe that when staff are not sitting at their desks, they are unproductive. This point is generally illustrated in the responses of participants 14, 15, 16 and 17 below.

Participant 14 of C4 opined the following: “I will say some managers. So some managers are happy for it to happen whilst some managers aren’t ready for it. Some managers are already there. It is quite a big gap. For those who are not ready for it, they need to understand what it entails” (Appendix F: page 6). Participant 15 of C4 indicated that “change is very slow in a company like this. I would say perception should be changed from the management side” (Appendix F: page 11). Participant 16 of C4 explained her reason for saying that some managers need to change their negative perception about telecommuting:

> “Yes. The reason I said that is, it is being adopted by certain managers but not all the managers. It is actually all the traditional guys that haven’t adopted it… I come from administrative office bound traditional type work. If you are not sitting at your desk, you are not seen as being productive working” (Appendix F: page 15).

Participant 17 of C4 argued:

> “Yah. I think a lot of managers are very stuck in the past with regard to how people come to work and how they execute certain function[s], but I believe with going forward with regard to how other IT industry is, in terms of the technologies, internet. I believe that managers that have not adopted telecommuting are going to be falling off the bus” (Appendix F: page 22).

It has been indicated that if companies go paperless, there will be a reduction in the number of times people commute to the office. This point is seen in the responses of Participant 13 of C4 who stated: “At the moment we are working with files and things you cannot use at home; if the company completely goes paperless, I mean it won’t be necessary to be in the office all the time” (Appendix F: page 2).

The general sentiment of staff members is that individuals’ family structure or dynamics can mar the adoption of telecommuting. It is noted that the interruption one might experience when working at home could be more than in the office. It is believed that a family person (with children, wife, visitors and dogs) will be distracted

more easily working at home as babies cry, dogs bark and visitors will interrupt work that needs to be done. These points were captured by statements from participants 16, 17 and 19, with Participant 16 of C4 stating: “There are others in the team that I question the fact that they have got [a] six months old baby, they don’t have a nanny”. If the baby cries, who is going to take priority? If the employee is in the office and the six month old baby is at home, “someone is going to take responsibility and you will focus on your job” (Appendix F: page 16). Participant 17 of C4 indicated that:

> “…besides qualifying working from home, you got to have a certain personality and calibre. For instance, initially, the guys that were working from home say they need to be online from 8:00am to 5:00pm, and their gardener is coming to visit them, kids are running around them and the dogs are barking. So there are a lot of difficulties associated with that” (Appendix F: page 19).

Participant 19 of C8 said that “I don’t have the distractions, but if you are a family person and you have got your kids, you need to spend some time with them and therefore your attention is not going to be at your work” (Appendix F: page 29). According to Participant 17 of C4, residences are not always equipped with the appropriate power infrastructure, and a person working from home could become distracted if load shedding (power failure) occurs:

> “A simple thing that we run into which is quite complicated is people’s home environment doesn’t always have the same redundancy when it comes to power. So guys who work from home, when their internet goes down, that person will need to get into a car and come to the office to work” (Participant 17 of C4, Appendix F: page 20).

5.5.3 Perceptions on benefits

The benefits stated below are some factors that can drive the adoption of telecommuting.

Company representatives

Participants were asked to identify benefits that can accrue to their organisation if telecommuting is adopted. The findings show that telecommuting could benefit both the employees and the companies, and could help maintain an eco-friendly sustainable environment.

Five of the nine companies (56%) recognise that telecommuting will reduce traffic congestion, the amount of time spent travelling to and from office, and relieving people of psychological stress.

Participants 1, 2 and 3 from C1, C2 and C3 generally believe that with telecommuting in place, there will be no wasted time travelling as some staff members arrive at the office late because of hectic traffic. Thus, telecommuting will reduce the amount of time spent in traffic (Appendix E: pages 4, 10 & 14). Participant 11 of C8 stated: “Time saving, because it takes me one and half hour just to get here. This will be three hours to and fro” (Appendix E: page 45). Participant 12 of C9 emphasised that “one thing I know is that staff complain about traffic. I tell you if you can relieve people of that, just psychologically, it makes a lot of sense. That is based on my interaction with staff members in my department; it is not a formal thing” (Appendix E: page 52).

Five of the nine companies (56%) are of the opinion that telecommuting will increase flexibility, thereby allowing individuals quality time with their family and for themselves. Some people find it more practical to work remotely for personal reasons. This point is supported by participants 1, 2, 3, 8 and 9 from C1, C2, C3, C6 and C7 respectively, with Participant 1 saying that telecommuting will create “more time at home with children” (Appendix E: page 4). Participant 2 noted that “telecommuting will help one to plan their days properly” (Appendix E: page 9). Participant 3 argued that telecommuters “can work at any time that best suits them, and spend more time with the family” (Appendix E: page 14). In support, Participant 8 noted that telecommuting “provides [a] little bit of flexibility only if one’s job allows for it” (Appendix E: page 30). Participant 9 explained that “the organisation can benefit by helping the individual get on with his life as well. For some people it is more practical to work remotely for whatever reason” (Appendix E: page 38). As a result of this, telecommuting is considered by one of the company representatives as an initiative that will lead to better well rounded employees who will be happy because of the increased flexibility gained. Participant 4 of C4 said’ “I think we will have better world rounded individuals” (Appendix E: page 20).

It is recognised that the findings reveal a contradiction in attitudes in that previously staff members noted that people will be disrupted by their family if they telecommute, whereas here findings show that people will be happy and have quality time with family as a result of the increased flexibility gained through telecommuting. This will be highlighted and further discussed in Chapter Six.

Five of the nine companies (56%) believe that the adoption of telecommuting will lead to significant cost savings for employees and companies. They said companies will save money in renting large office space, office equipment, sufficient parking space, and in serving lunch. They also believe employees will save transportation

costs such as buying petrol and in vehicle maintenance. From [an] income tax perspective, the perception is that people will save money as there will be less 'bad' roads to fix because there will be less people driving on the roads. This point is illustrated in the responses of participants 1, 3, 6, 8, 9 and 10 from C1, C3, C6, C7 and C8.

Participant 1 of C1 explains: "I think there will be far less cost structures. Telecommuting can reduce the office and we will have what is called hot desk. For example, Company C2 practices hot desking" (Appendix E: page 4). Hot desking is a type of work sharing model in which employees outnumber desks. Each desk has its own computer and the employee logs on to a virtual desktop. Participant 3 of C3 emphasised that companies "will obviously need less office space, and we will be able to do hot-desking. We don't have to maintain so many parking spaces. We don't have to serve so much lunch" (Appendix E: page 14). Participant 6 of C6 argued that telecommuting "saves an office space for a company, and saves cost for the company so the company can employ people to have a viable business at the end of the day". Additionally, Participant 8 noted that "employees will save some money associated to transportation to and from work, and car maintenance" (Appendix E: page 30). In support of the claim, Participant 9 of C7 argued:

> "In terms of the infrastructure, the less people are out there on the roads, it will save our pockets. There are times you find that roads are in a bad state and they have not been fixed because sometimes the government cannot afford to fix the infrastructure. So I think if we improve the usage, from [an] income tax perspective that eventually will be light on all of us" (Appendix E: page 38).

Four of the nine companies (44%) noted that telecommuting will increase job productivity, good quality output, and will be a means to catch up on deadlines as employees will take responsibility and account for tasks allocated to them based on their ability to manage time. This statement is illustrated in the responses of participants 2, 4, 6 and 10 from C2, C4, C6 and C8 respectively.

Participant 2 noted that there will be an increase in productivity "if they are in their space at their own time, they will finish their duties". Employees will have to face the consequences of not completing their duties (Appendix E: page 9). In support of the claim, Participant 4 added that the increase in productivity is "because some people spend about two hours commuting to and from work, and that time can be invested to work" (Appendix E: page 20). Participant 6 noted that "we get good quality output, and deadlines are usually met" with telecommuting (Appendix E: page 17). Participant 10 explained that there is an increase in productivity because "people

don't have many interruptions" (Appendix E: page 45). According to Participant 11 of C8, task delivery time is shorter when doing similar tasks with telecommuting. He explained: "Now, if I can start six o'clock in the morning and finish off at four doing the same kind of thing, producing the same amount of throughput, then the delivery time working from home will become shorter doing the same kind of job" (Appendix E: page 45). His statement also shows that the person has to be disciplined in order to achieve increased productivity.

Telecommuting is perceived as an initiative that could make staff more responsible. Participant 2 of C2 said: "There will no longer be the problem of late coming or having to rush home when work for the day isn't completed". He mentioned that telecommuting will help develop employees' ICT and management skills through training that will be conducted before employees start working on their own (Appendix E: page 9).

Findings also show that organisations will have access to skilled workers. Participant 9 (C7) noted that telecommuting will bring about "access to additional skill[s], because if organisations start adopting telecommuting, technically it means they can hire anywhere in the world" (Appendix E: page 38). Participant 10 (C8) said: "I think telecommuting would provide a longer customer service day (Appendix E: page 45).

Staff members

Staff members believe that telecommuting will benefit organisations if encouraged, as they will be more productive in a day. They noted that productivity will increase, staff members will be happy, more efficient, focus on task deliverables and office politics will be reduced. They also believe that the delivery time in doing the same type of job is shorter if done at home. This point is illustrated in the responses of participants 13, 14, 15, 16, 17 and 19.

Participants 13, 14 and 15, all from C4, believe that telecommuting will lead to higher productivity depending on who telecommutes (Appendix F: pages 3, 7 & 10). Participant 16 of C4 opined that "there will be happier employees and less politics because people that are sitting at the office environment are not always 100% busy all the time". In explanation, she said that "lots of time they create office skimmers and politics… if you work from home, you will become more efficient, focused on your deliverables. So I think there will be a lot less politics if it was encouraged" (Appendix F: page 16).

Participant 17 of C4, in support of Participant 16, noted that there will be more focus on task deliverables from an individual working from home because of no distraction. He noted for instance, “I telecommute one day a week and I find that I actually get more work done working from home. I don’t get distractions that I will normally have on a day to day work from the office” (appendix F: page 23). Participant 19 of C8 added that “whatever job I should have done in five hours in the office, I do it in one hour at home”. For example, “the other day I was trying to do a target in the office and at the end of the day I was very exhausted, not because I was doing a lot but because I was dissected (interrupted)” (Appendix F: page 30). Additionally, Participant 16 said: “I did telecommute last week and I had a huge report I needed to get out, and in doing that I had to send out a mail saying [I] am actually working from home where am not disturbed. It normally would take me the entire day but two o’clock I was done!” (Appendix F: page 13).

Staff members spend more or less two to three hours travelling to and from work daily. They hate being in the traffic and they believe that telecommuting will reduce time related to travelling and reduce overall traffic congestion, save the environment, and eliminate stress. This point is illustrated in the responses by participants 13, 14 and 17 of C4 who generally believe that telecommuting will save petrol, large amounts of money, time, and the environment because there is less traffic on the road (Appendix F: pages 3, 5 & 19). Participant 15 (C4) noted: “Realistically, it will save me the 45 km drive every morning and if am in traffic, it takes me about an hour to get to work. So it will save me about 45 km to an hour one way to work. So to and from work will take me one hour 30 minutes to two hours every day” (Appendix F: page 9). Participant 17 (C4) stated that “it cost[s] so much day time out of your day. I travel about two hours to and from work every day and if there is [a] traffic jam, I get stuck or leave home early. Telecommuting eliminates that entirely” (Appendix F: page 23).

Telecommuting is seen as [an] initiative that reduces stress caused by distractions from co-workers. Findings show that when staff is distracted from their office tasks, they start all over again with same task, giving rise to stress. Furthermore, they believe that the typical office causes stress as one needs to obtain permission from superiors to solve personal issues. This statement is generally consolidated in the responses of participants 16 and 19 below.

Participant 16 (C4): “In this kind of typical office people are more stressed because you would look for permission to go pick up your child from school at three o’clock

and all that" (Appendix F: page 16). In explanation, Participant 19 (C8) gave an example of distractions at the office:

> "Walma, do you think you gonna make it to work? They should have emailed me. Walma I've got a customer online do you think… they would have emailed me. So what happens, every time I get distracted, when I get back to work, I start all over again. The distractions and starting all over with task[s] gives rise to stress" (Appendix F: page 30).

Staff members, including participants 13, 14, 15 and 17, point out that aggressive adoption of telecommuting will result in significant cost savings for both employees and companies. Savings could be in areas such as office space, furniture, power and transportation. Participant 14 (C4) noted that "it is definitely cost saving for office space because you wouldn't need much office space. Economically, it would be better for the employee… maybe [an] added benefit for the employee to work from home" (Appendix F: page 7). Participant 17 (C4) agrees and said:

> "When people are in the company, a lot of expenses go into the furniture, phone calls, and power. So there is cost benefit to the company, employee, and obviously to the environment because there is less traffic on the road, and you have people consuming less services at the office" (Appendix F: pages 19 & 23).

Interestingly, it is noted that although telecommuting is not being strategised, from a financial side it is a priority of saving cost as management (Finance department) purchases telecommuting facilities as a means to reduce cost. Participant 15 (C4) noted:

> "Yes there is no strategy for telecommuting but if you look at the financial side of it, there seems to be a strategy for it because the Finance department is looking for ways to cut cost, and this is a way to cut cost. So in the Finance department, telecommuting/video conferencing is a high priority of saving cost, and this is one way of saving cost" (Appendix F: page 11).

Finally, staff members consider telecommuting as a programme that offers convenience and flexibility with participants 14 and 16, both from C4, noting that working from home is convenient because there are less interruptions and no traffic (Appendix F: pages 4 & 13). Participant 19 (C8) argued that "to me, telecommuting works for me because I can adjust accordingly" (Appendix F: page 30).

5.5.4 Summary of findings for the Attitude and Perceptions theme

The **Attitude and Perceptions** theme towards telecommuting summarises the determining categories a*ttitude towards telecommuting*, p*erceptions on adoption*, and p*erceptions on benefits*.

Company representatives' attitudes and perceptions towards telecommuting

- It has been found that the attitudes of companies towards telecommuting lie in the allocation of jobs to contract workers who are not employed by the company, tele-overtime where top management officials work from home after normal working hours, geographical distance telecommuting where employees communicate with colleagues in other provinces, and allowing telecommuting during winter and when employees call in sick
- Findings show that a physically challenged person telecommutes on certain days of the week; this has been made possible (unofficially) by his manager
- Some companies (eight of nine; 89%) consider ICT resources expensive for telecommuting to be adopted because these companies have a large number of workers who will need ICT resources to telecommute
- A low fee structure for internet bandwidth is needed in South Africa for telecommuting to be fully adopted
- Telecommuting is considered as a financial rather than an environmental strategy
- Telecommuting is difficult to implement because of the lack of support from management teams
- Companies are more focused on the issues that give them the most value in terms of their score card than to eco-friendly activities such as telecommuting
- Employees are needed in the office to be monitored and to ensure they meet strict business deadlines and familiarise themselves with unstable business methodologies
- Management perceives that customers want to see their partners face-to-face as customers find it difficult communicating online
- Some companies (four of nine; 44%) believe that telecommuting could lead to a lack of physical interaction between professionals, as it was noted that face-to-face meetings allow individuals with many tasks to carry out their duties easily by having colleagues around
- Some companies (two of nine; 22%) believe telecommuting is more appropriate for large organisations to adopt as they believe that their

company and the number of staff are too small to benefit from a telecommuting programme

- Office space could be saved through telecommuting but companies are already committed to long term rental agreements and telecommuting would not necessarily be seen as a benefit in terms of space savings
- External influences such as government support and economic factors such as poor roads may encourage the adoption of telecommuting into the strategy of companies
- Companies want to see staff members take the initiative and request to telecommute because of the benefits tied to it
- It is considered that the adoption rate of telecommuting could be higher when young people open up their own businesses which will allow them to work from home
- Some companies (five of nine; 56%) believe telecommuting could reduce traffic congestion, reduce time spent in commuting to and from office, and relieve people of travel-related stress
- Some companies (five of nine; 56%) believe telecommuting could give staff members the opportunity to have quality time with their families. As a result, telecommuting is considered as an initiative that leads to better well-rounded employees who are happy because of increased flexibility gained
- Furthermore, the flexibility obtained from telecommuting is considered a factor that could make employees stay longer and remain loyal to their organisation
- Some companies (five of nine; 56%) believe telecommuting is an initiative that could lead to significant cost savings for companies
- Some companies (four of nine; 44%) believe telecommuting could increase job productivity and high quality output
- Task delivery time in doing the same type of work is shorter if one telecommutes
- It is believed that telecommuting could make staff more responsible, reduce late arrival at the office and is a means of developing the ICT and management skills of staff
- Company representatives believe telecommuting could give companies access to skilled workers, thereby allowing them to hire employees from anywhere in the world and provide a long service day to customers

Staff members' attitudes and perceptions towards telecommuting

- It is believed that telecommuting would be best suited for managers as they can better control difficult issues both in their organisation and with clients
- It is believed that one's work description, the company's type of business and manager and employee decision can drive the adoption of telecommuting
- Staff members noted that some managers need to change (have a mind shift) their negative perceptions about telecommuting; some managers are already telecommuting, but it could be a big gap for others
- It is believed that a paperless company could reduce the number of times people commute to the office
- Staff members believe that family structures could drive the adoption of telecommuting, especially if there are no distractions
- Staff members noted that their home does not always have the same required infrastructure as the office
- Staff members are excited about telecommuting as they believe telecommuting could reduce two to four hours of time related to travelling to and from work as well as lessen overall traffic congestion, save the environment and eliminate traffic related stress
- Staff members spend two to four hours daily commuting to and from office
- Telecommuting is seen as an initiative that could reduce stress caused by distractions from co-workers such as starting all over with duties when distracted, office politics, and the need to obtain permission from superiors to take care of personal issues

5.6 Governance theme

The meaning of the word *governance* in this section is derived from the G-readiness Model (Molla *et al.*, 2011:85). This **Governance** theme describes expected ways in which telecommuting programmes could be managed and the standards for measuring the impact of such a programme.

Measurement is frustrating, complex and important. Yet, if one cannot measure performance, then it does not exist (Lebas, 1995:23). Performance measurement monitors and reports on how well a telecommuter performs. Without measurement, the benefits a company, employee and the environment meant to gain from telecommuting could be undermined. No questions were asked specifically pertaining to performance measurement, as it was unclear at the time the interview

instrument was designed as to what extent telecommuting had been formally implemented in the target population.

The **Governance** theme is divided into two categories:

i) *People and project management:* denote ways in which telecommuting programmes and telecommuters should be managed; it covers resource allocation and management commitment.

ii) *Telecommuters' attributes:* describe qualities a staff member needs to have for a sustainable telecommuting initiative; it covers attributes such as being competent in the job, self-motivated and focused.

5.6.1 People and project management

Company representatives

On a management style that best suits telecommuters, participants 3 (C3) and 4 (C4) believe that managers of telecommuters must be people who would allow the telecommuters to self-manage their activities. Such a manager needs to be a strong matured leader with high EQ (emotional intelligence) and cannot be autocratic (Appendix E: pages 13 & 18).

Company representatives from three of the companies (33%) noted that the management style for telecommuters should be output driven as opposed to someone who is concerned with clocking in and out. This new management style ensures that the required output is produced independent of the mechanisms used (new age thinking). This statement is seen in the responses of participants 3, 9 and 10 from C3, C7 and C8 respectively.

Participants 3 (C3) indicated that "a management style that is focused on result. One that is not really keen on time spent on the task, as opposed to someone who is concerned about clocking in and clocking out. A management style that ensures that required output is produced" (Appendix E: page 13). Participant 9 (C7) believes that "you manage the output and not the input… whether the people are there or not or where they do it does not matter, as long as you see progress on [a] daily basis" (Appendix E: page 35). Participants 10 (C8) said that "the new style, new age thinking, not the old style, because the traditional management style of seeing people, seeing what they do, checking, does not work with telecommuting" (Appendix E: page 43).

In managing the successes of telecommuting, there is the believe that the managers of telecommuters need to carefully set clearly defined targets for their staff, follow up

on it, and enquire whether extra resources are needed for the job. Participant 6 (C6) mentioned that “it is about setting clearly defined targets with your staff. There has to be more conscious follow up (because out of sight is out of mind)” (Appendix E: page 28). Participant 8 added that “there has to be structure for the week… manager can follow the employees up by asking where you at with your week’s target? Do you need assistance, resources?” (Appendix E: page 28-29). Participant 12 (C9) emphasised that managers “must be clear about their responsibility. The key problem is what role the person plays” (Appendix E: page 50).

However, there are opinions that successful telecommuting programmes have to be founded on the policy structure and recruitment practices of the organisation. This statement is emphasised by the response of participants 8 and 10. Participant 8 (C6) noted: “I do not think that the success is based on the management side, rather is on the telecommuting policy structure that you put in place” (Appendix E: page 29). Additionally, Participant 10 (C8) said: “I think one would look at recruitment practices” (Appendix E: page 45).

Training people and team work is believed to be a means of sustaining a telecommuting programme. Participant 9 (C7) noted that “from [a] culture perspective, people may need training, so things will work properly” (Appendix E: page 35).

IT resources need to be made available to telecommuters for telecommuting to work. Participant 1 (C1) mentioned that “IT resources have to be in place to enable telecommuters work” (Appendix E: page 3). These IT resources may be computers and high speed internet connection.

Staff members

On staff members’ view regarding managing a telecommuting project, it is believed that external influences such as government or regulatory bodies will increase the environmental awareness of companies and can drive the adoption and management of telecommuting. This statement is supported by participant 17 who said that “as a big company, there are a lot of influences from outside perspective to obviously increase our environmental status. So I believe that certain external factors will also drive the adoption of telecommuting” (Appendix F: page 21).

Staff members also noted that the manager of telecommuters needs be someone that is mature, one that looks at output, quality and deliverables. In short, a manager who is result driven and allow employees to take responsibilities. Additionally, staff members noted that meetings need to be conducted occasionally for telecommuters

to ensure that things are on track. This statement is highlighted in the responses of participant 13, 14 and 17. Participant 13 (C4) argued that the manager of telecommuters should be "a manager that would allow you to do things your own way, definitely not a micro manager" She explains that a "micro manager" is a supervisor who always sits over ones shoulder, watching what he/she is doing (Appendix F: page 2). Participant 14 (C4) is of the opinion that "the manager would have to be mature and not a micro manager. Someone that gives you a job and allows you to carry it out but you contact him when you have a problem. There need[s] to be one on one meeting[s] to make sure that everything is on track. Managers need to look at the output, quality and deliverables" (Appendix F: page 6).

Participant 17 (C4) noted:

> "A manager that will give a task to an employee and allow that person to come back with results without managing the employee [un]till he provides that result. There are some managers that will sit on an employee's head until they deliver. So, such [a] manager doesn't lend himself to telecommuting" (Appendix F: page 22).

Potential telecommuters need to undergo ICT training on their company's available technology or products to enable them to "fix" their own IT problems as one person's telecommuting problem might be low priority for IT staff who have many IT issues to repair. This statement is illustrated in the response of Participant 15 who noted:

> "For technical skill[s], may be a 30-minutes training session for the candidate to have understanding of the technology, platform, product, and what the product can do practically. So the candidate should have basic IT skills and need[s] to undergo training too to understand how to use the products… there wouldn't be a quick turnaround to changes (e.g. IT faults)" (Appendix F: page 11 & 12).

5.6.2 Telecommuters' attributes

Company representatives

To promote sustainable telecommuting, potential telecommuters need have certain attributes. Participants were asked to identify these qualities.

Company representatives from three of the companies (33%) stated that an employee's competence or professionalism must be relied upon before he/she is allowed to telecommute. This is illustrated in the statements of participants 2, 8 and 12 from C2, C6 and C9 respectively.

Participant 2 (C2) stated that a telecommuter "needs to be well trained and equipped" (Appendix E: page 8). Participant 8 (C6) explained that a telecommuter needs to be "somebody that is a bit settled and does not need training from management. So, if an employee is still undergoing training, he/she cannot telecommute" (Appendix E: page 29). Participant 12 (C9) is of the opinion that "the key thing is if you want to have this kind arrangement, your competent issue should be relied upon. It is not a case of you must do your work but I trust his competency to doing that work" (Appendix E: page 50).

Company representatives from three of the companies (33%) opined that telecommuting employees must consistently show the ability to work independently. This statement is illustrated in the responses of participants 3, 6, 8 and 12. Participant 3 (C3) noted that potential telecommuters need have the "ability to… work on their own" (Appendix E: page 13). Participant 6 (C6) mentioned that a telecommuter needs to be "someone that is independent and does not need a team". She continued by saying introverts will be interested in telecommuting (Appendix E: page 29). Participant 8 indicated that "they know how to do the job, exactly what is expected and able to work on their own" (Appendix E: page 29). Participant 12 (C9) concluded by saying that potential telecommuters "have to consistently show that he/she can work independently" (Appendix E: page 51).

Company representatives from six companies (67%) stated that the potential telecommuter must be defined as a self-starter with self-management, planning, strong accountability and time management skills; he/she must also be self-motivated, focused, IT literate, a graduate and needs to have a positive attitude towards telecommuting (Appendix E).

Staff members

The view of staff members on telecommuter attributes include that the history of jobs completed by employees as well as the duration of the positions held need to be looked at before allowing staff members to telecommute. Participant 14 (C4) noted that "it is also a bit of history of what you have done so the manager can see that you do complete your work and there is nothing outstanding". The participant continued by saying the potential telecommuter "need[s] to have been in a position for a little while so they can know that your skills are up to date with what you need to do" (Appendix F: page 7).

Participants 14, 15, 16 and 17 believe a telecommuter needs to have managerial attributes such as maturity, accountability, commitment, dedication, self-management and being responsible (Appendix F: pages 7, 11, 16 & 23).

5.6.3 Summary of findings for the Governance theme

The **Governance** theme for telecommuting includes *people and project management* and *telecommuters' attributes*.

Company representatives' opinions on governing telecommuting

- Company representatives noted that the telecommuter's manager must be someone who allows the employee to self-manage his/her activity
- The telecommuter's manager needs to be a strong matured leader with high EQ and cannot be autocratic
- The management style for telecommuters needs to be output driven
- A clearly defined target must be set for telecommuters, and managers need to follow up on this target and enquire whether extra resources are needed
- Both managers and telecommuters need to undergo training on the technology/application to be used to enable them to "fix" their own IT issues, and they need to work in teams for sustainable telecommuting
- A successful telecommuting programme has to be founded in the policy structure and recruitment practices of the organisation
- An employee's competence should be relied upon before he/she is allowed to telecommute
- Potential telecommuters need to consistently show their ability to work independently, be able to self-manage and plan, and display strong accountability and time management skills. The employee needs to be self-motivated, focused, IT literate, a graduate and needs to have a positive attitude towards telecommuting as there is indication that high rates of illiteracy exist in South Africa
- Findings show that management needs to make ICT resources available for telecommuting staff members in order to maintain sustainability

Staff members' opinions on governing telecommuting

- Staff members believe that external influences such as government or regulatory bodies could assist in managing telecommuting
- It is suggested to occasionally conduct meetings with telecommuters to ensure that 'things are on track'
- Staff members believe that job history and the duration of previous positions should be looked at before telecommuting is allowed

5.7 Emotional Intelligence theme

The **Emotional Intelligence** theme describes the ability of an individual to be aware of his/her own and other people's emotions, distinguish between different moods and appropriately label them, and use emotional information to direct thinking and behaviour. The theme has two categories:

i) *Good communication skills:* indicting that both the telecommuter (employee) and manager must have the ability to manage relationships, develop connections and be efficient in leading change and building teams.

ii) *Trust issues:* denote that the telecommuter must be disciplined and a trustworthy relationship needs to exist between manager and telecommuter.

5.7.1 Good communication skills

Company representatives

A good communication skillset is a key quality noted by four of the companies (44%) that telecommuters' manager and potential telecommuters need to have. There is an indication that managers are generally poor in communication. This statement is represented by participants 2, 4, 5 and 9 from C2, C4, C5 and C7 respectively.

Participant 2 (C2) indicated that "there has to be a good communication between the staff member and the management". Participant 4 (C4) continued by saying "they need to be good delegators, in that they need to be able to give the people the detail of what they really mean. I think managers are generally poor regarding that".

Furthermore, Participant 5 (C5) noted that telecommuters need to have the "ability to communicate through whatever application that is made available", and Participant 9 (C7) concluded by stating that "It is a team player spot, the employee have to be good at interaction with people, and have emotional intelligence. So I won't hire the person if he does not have that entry level skill" (Appendix E: pages 8, 18, 24 & 36 respectively).

Staff members

Similarly, staff members considered that the telecommuters' manager should be able to manage people effectively and that both groups (manager and telecommuter) need have good communication skills. One of the staff further noted that effective communication is a weakness in their company. This point is supported by participants 13, 14, 15, 16 and 17, all from C4.

Participant 13 stated: "Definitely [the] employee must have good communication skills". Good communication is fundamental to the success of telecommuting. She

continued by stating that “because the employee will not be working face-to-face with others, the employee should be able to describe via email… or on phone specifically what he/she means” (Appendix F: page 3). The statement made by participants 14, 15 and 17 supports the point that potential telecommuters need to have good communication skills to effectively communicate with clients and colleagues both during video conferencing, phone calls and emailing. Participant 16 argued that effective communication is a huge weakness: “There has to be effective communication; that is our company’s biggest weakness” (Appendix F: pages 8, 11, 16 & 21).

5.7.2 Trust issues

Company representatives

Three of the nine companies (33%) recognised that trust is not inherent to their company’s management style. It is believed that a trustworthy relationship has to exist between both parties (manager and potential telecommuter) in terms of managing tasks outside the typical office for sustainable telecommuting. This point is highlighted by participants 9, 10 and 12. Participant 9 (C7) said: “So, from [a] management perspective, you have to trust that guys will do what is expected”. Emphasising this view further, Participant 10 (C8) noted that managers “need a style of delegating and trust which is of management style”. Participant 12 (C9) is also of supporting opinion that “you trust him best to deal with it… you have to be trusted in doing your job… I don’t think managers are really ready for it purely because of the issue of trust” (Appendix E: pages 35, 43 & 50-51 respectively).

In business, it is important to define and establish the qualities needed in employees in order to benefit from a programme. Five of the companies (56%) believe that telecommuting employees need to be disciplined and possess good time management skills. This statement is supported by participants 2 (C2), 3 (C3), 8 (C6), 10 (C8) and 12 (C9). In supporting of this, participants 2, 3, 8 and 12 generally noted that discipline and time management are important aspects in that an employee has to be able to perform duties as and when due, and prove that they can regulate their time without being pushed in order to meet deadlines (Appendix E: pages 35, 43, 50 & 51). Participant 8 of C6 said that a telecommuting employee “has to be very disciplined… the people that make telecommuting work are discipline[d] and are very successful, and those that don’t are not” (Appendix E: pages 29 & 32).

Staff members

Similarly, staff members said that managers need to trust more and develop better working relationships with telecommuters. It has further been found that managers have a problem trusting their subordinates in managing job output.

The responses by participants 13 and 14, both from C4, support the point that there should be a trustworthy relationship between a telecommuter and his/her manager, and managers should trust that employees will be deliver while telecommuting (Appendix F: pages 2 & 7). Participant 16 (C4) argued that "some managers have trust issues while other doesn't [sic]… The managers need to trust more, need to be a bit more open. In expectations, I think it needs to be a see through process". The participant further noted that the expectations of managers and telecommuters should be the deliverables, and telecommuters need to know they are expected to work from home. In so doing, there will be minimal disappointments from both sides (Appendix F: pages 13 & 15). Participant 17 (C4) added:

> "One of the big factors to me is developing a better relationship with the employees because a lot of this is around trust and accountability. There are a lot of managers that do not trust their staff although they are eligible and [have] potential; technology is there and they have the internet but won't just be allowed to telecommute" (Appendix F: page 21).

5.7.3 Summary of findings for the Emotional Intelligence theme

The summary for the **Emotional Intelligence** theme is presented below based on the determining categories *good communication skills* and *trust issues*. Similarities exist in the findings of both stakeholder groups (*company representatives* and *staff members*). The findings below have been combined for both groups.

- Good communication skills are needed to maintain and make telecommuting work
- Trust is not inherent to a company's management style; it is therefore considered that telecommuters should be trustworthy and disciplined, and a trustworthy relationship needs to exist between both parties (manager and telecommuter) for sustainable telecommuting

5.8 Staff Readiness theme

The **Staff Readiness** theme describes the competence or ability of staff members as demonstrated in the combination of attitude towards telecommuting, emotional intelligence and the attributes of telecommuters to reduce vehicle related emissions through the use of ICT. The theme has two determining categories:

i) *IT skilled:* describes employees that are IT experts as well as those with average IT skills

ii) *Acceptance:* describes employees who are ready to telecommute as well as those who are not

5.8.1 IT skilled

Company representatives

It is important to determine the expertise of staff members in ICT usage to define their readiness to telecommute. To establish this, key company representatives were required to state how skilful their employees are in terms of IT usage.

Findings from eight of the nine companies (89%) show that employees do have IT skills (average and experts). The IT skills of some lower ranked employees are limited to mobile devices or phones. Generally, the younger generation are seen to be extremely skilful in IT usage. This statement is supported by the responses of participants 1, 2, 3, 4, 6, 7, 9, 10, 11 and 12 from C1, C2, C3, C4, C6, C7, C8 and C9.

Participants 1, 2, 3 and 12 noted that most of their staff are IT qualified with average IT skills, meaning they are capable of taking care of their own ICT needs and do administrative functions such as using spread sheets (Appendix E: pages 5, 10, 14 & 52). Participant 4 noted: “Ours are generally obviously very good. In terms of the finance staff, we have [a] very small group [of] individuals that physically can’t work from home, but the majority could” (Appendix E: page 20). Participants 6 and 7 believe that young people are in touch with the technologies of today. They indicated that staff on site have varying degrees of IT literacy… and everybody can use a computer because of their company’s line of business (Appendix E: page 31). Participant 9 noted: “Very skilful! Being skilful in ICT is like entry level requirement due to they are IT people” (Appendix E: page 39). Participants 10 said: “Our office based person has got a lot more IT skills because of their exposure. Our factory field worker, IT skills are limited to mobile devices such as telephone”. Participant 11 concluded that “generally, I will say that the new generation are very skilful” (Appendix E: page 46).

Staff members

The staff members were not asked to comment on their ICT skills as this was directed to the *company representatives* group.

In conclusion, with an average IT skillset, employees can perform their administration functions through telecommuting. One can argue that company executives see the younger generation to be more in line with telecommuting as they are in touch with the technologies of today. However, as noted in the **Governance** theme, staff may need training to extend their ICT skills in order to maintain their own telecommuting ICT infrastructure.

5.8.2 Acceptance

Company representatives

Five of the nine researched companies (56%) noted that their staff members are ready to telecommute; one reason being that some staff members stay far from the office, and they spend at least two to four hours commuting to and from work. This is supported by participants 2, 3, 4, 9 and 12 from C2, C3, C4, C7 and C9 respectively. Participants 2 (C2) and 9 (C7) are positive that the majority of staff will agree to telecommute (Appendix E: pages 9 & 52). According to Participant 3 (C3), "I am sure that staff members are ready to telecommute, if they have the choice" (Appendix E: page 14). Participant 4 (C4) said: "I think in a vast majority. If you look at a good average employee in our company, they definitely will go for it. They would be quite happy with it" (Appendix E: page 19). Finally, Participant 12 (C9) concluded that "from the staff perspective, definitely...From [a] practical perspective, a lot of guys stay far away, at least two hours on the road in the morning and two hours in the evening driving to and from office. So more individuals have indicated they need something differently" (Appendix E: page 37).

Two of the companies (22%) believe that some staff members are ready to telecommute and some are not. This is illustrated in the responses of Participant 6 (C6) who noted that "some of them are ready; not all of them. Our people still require day to day training and guidance". Participant 10 (C8) added: "You know, I think everybody will initially go - yeahhhhhh (excited)… and then (with a low voice)… for some people it would not work… Some people, their personality is if they were staying at home they wouldn't work. It is not good for all" (Appendix E: pages 30 & 44).

Only one of the nine companies (11%) said their staff members are not ready for telecommuting. This is shown in Participant 1's (C1) response: "Staff readiness for telecommuting = 5%. Most of our staff need guidance" (Appendix E: page 4). Interestingly, top managers (i.e. the *company representatives* group) are excited to telecommute once or twice a week when asked during the interview if they would

want to telecommute. In their explanation it is found that certain tasks would be better done off site as it demands concentration and less interruption. This statement is supported by the participants' responses below.

Participant 2 (C2): "Yes (Smiles)! I will definitely like it" (Appendix E: page 10). Participant 3 (C3): "Yes. Some of the things that I do don't require me to be in the office… I think it is something we should be moving towards, not just in our company, in terms of other company as well" (Appendix E: page 14). Participant 4 (C4) said: "I would love to. I think we would actually do better working four days in a week" (Appendix E: page 20). Participant 5 (C5) said: "Of-course, it is brilliant… Once or twice a week telecommuting is perfect because I can sit back at home and perform my admin duties" (Appendix E: page 25). Participant 10 (C8) said: "Not 5 days a week but I would like the option and the flexibility of telecommuting". Participant 11 noted:

> "To some extent, part of what I do is based on telecommuting. I move here and there, communicating with the office after hours; I have a colleague that does it even more. There are certain task[s] that would be better for it to do offsite because they are focused and less interruption from calls" (Appendix E: page 45-46).

Additionally, Participant 12 of C9 said: "In a certain way I telecommute… Just that I don't get to telecommute as often as I would like to" (Appendix E: page 52).

Staff members

Similarly, staff members represented by participants 13, 14, 15, 16, 17, 18 and 19 acknowledged that telecommuting is a great idea, and they would love to telecommute twice or more a week.

According to Participant 14 (C4), "I would like it to be twice a week but unfortunately the manager prefers me to be in the office… I think telecommuting is great (smiles)" (Appendix F: pages 4 & 7). Participant 15 (C4) said: "I would love to telecommute twice a week. I love it and I think that is the way to go" (Appendix F: pages 9 & 12). Participant 16 (C4) replied: "Absolutely, I want to telecommute twice a week… I think it is a fantastic idea because I am very eco-friendly. I am one of those people. I am very pro to it" (Appendix F: pages 13 & 17). Participant 17 (C4) said: "Yes. I would love to telecommute more than once a week. We are working towards that" (Appendix F: page 24). Finally, Participant 19 (C8) argued: "I will like the idea of just working from home that would be nice. I don't believe in not taking work at home… I just believe having the proportions correct" (Appendix F: pages 28 & 30).

Thus, staff members believe they can properly manage their duties if allowed to telecommute (see appendix F).

5.8.3 Summary of findings for the Staff Readiness theme

The summary for the **Staff Readiness** theme is presented below based on the two determining categories *IT skilled* and *acceptance*. The findings below have been combined for both groups (*company representatives* and *staff members*).

- The majority of employees (eight of nine companies; 89%) have IT skills ranging from average to expert
- Generally, company officials see the younger generation to be more in line with telecommuting because they seem to be in touch with the technologies of today
- The nine companies' top managers (100%) are personally ready to telecommute. Five of the nine companies (56%) are of the opinion that the majority of staff members are also ready to telecommute. Two of the nine companies (22%) believe that not all staff are ready to telecommute. Only one of the researched companies (11%) indicated that their staff members are not ready for telecommuting
- The company representatives are excited to telecommute once or twice a week, while staff members want to telecommute two or more times a week
- Staff members are excited to telecommute and findings show that they believe they can manage their duties properly if their company allows them to telecommute. One of the staff members wants to telecommute on a Full-time basis

5.9 Tele-commutable Jobs theme

The **Tele-commutable Jobs** theme identifies jobs that are done in a typical office setting. These jobs can be done occasionally from home. The theme does not have any determining category. Below are findings from the *company representatives* and *staff members* groups.

Company representatives

One of the key factors when deciding to adopt telecommuting as a strategy is to identify jobs that are suitable for telecommuting. Each company determines its own suitability according to the job functions and business environment.

Participants in this group established that jobs such as optimisation and planning, administrative data capturing, copy editing, business analyst, system analyst, documentation, planning, investment professionals, marketing and customer service

positions can be performed from home. This is best illustrated by the responses of participants 1, 3, 5, 9 and 10 from C1, C3, C5, C7 and C8 respectively.

Participant 1 of C1 noted that telecommuting "will be quite easy with people that work with documentations, planning, and IT people". Participant 3 of C3 said: "So they do administrative data capturing kind of task... So beyond investment professionals, which I guess can do their job anywhere because they tend to consume a lot of information". Participant 5 of C5 indicated that "there is a person that specialises in marketing. This person has [a] company's phone. They market through Facebook, Twitter and Press to still keep people informed about the hotel". Participant 9 of C7 noted: "So the role which links itself to that is the business analyst and system analyst role". Participant 10 of C8 indicated that an employee "can use telecommuting to still service customers' needs even while she is at home" (Appendix E: pages 3, 12, 24, 34 & 41 respectively).

Staff members

Staff members identified positions such as sales coordinator, IT support role in audio visual and video communication, billing office manager, IT manager, contract specialist, administrative worker, finance officer, and sales and logistics as suitable positions for telecommuting. These positions are derived from staff members' job positions based on their acceptance to telecommute if given the opportunity by their organisation, and their experiences in which jobs align to telecommuting (Appendix F).

5.9.1 Summary of findings for the Tele-commutable Jobs theme

Participants identified job positions such as optimisation and planning, administrative data capturing, copy editing, business analyst, system analyst, documentation, planning, investment professionals, marketing or sales, customer service, coordinator, IT support role in audio visual and video communication, billing office manager, finance officer, logistics, IT manager and contract specialist as jobs that can be done away from the typical office setting.

The **Tele-commutable Jobs** theme has been developed based on participants' experiences, present job status and acceptance to telecommute.

5.10 Summary of Chapter Five

Chapter Five is the presentation of findings on telecommuting in the South African context, where the aim of the study is to explore reasons behind the slow adoption of telecommuting practices in South African organisations. Findings were presented in accordance to themes and linked to categories, which were then discussed under

two stakeholder group headings: *company representatives* and *staff members*. Findings for this study are summarised according to the themes in Table 5.1.

Table 5.1: Summary of findings

Policy (section 5.2)	None of the companies (100%) participating in this study has a telecommuting strategy. However, eight of the nine companies (89%) practice telecommuting as an *ad hoc* approach. Only one company (11%) is actively practicing telecommuting, although limited to only a few staff members. Seven of the nine researched companies (78%) have no future plan to strategise telecommuting. One of the nine companies (11%) plans to adopt telecommuting during a disaster period, and one company (11%) plans adopting telecommuting when their company have reached capacity. All the companies (100%) indicated that they are not ready to support a telecommuting programme because managers want to see employees in the office on a daily basis. However, telecommuting will be supported if management sees it as a workable idea. The findings show that managements are resistant to change and not ready to leave their traditional office style comfort zone of wanting staff to be present in the office. Six of the nine researched companies (67%) have no Green IT documented strategy with no future plans regarding it either. The other three companies (33%) do have a Green IT strategy based on factors such as Green IT which is part of their line of business, and being a global firm which is fully aware that *climate change* is a global trend. Changes in IT governance make strategising on Green IT difficult for companies: it also excludes Green IT from the high priority issue list of companies. Two companies have both Green IT and green strategies.
Practice (section 5.3)	100% of the researched companies process documents electronically and print on both side of the paper. They all encourage less printing. Technically, it was found that a one page document can be signed digitally (or electronically) by five people around the world in ten minutes. 'Follow me print' is a terminology derived to manage printing activities such as documents print only when papers are in the tray, delete after 24 hours if not printed, and machines turn off if not in use. Printer cartridges are refilled to reduce the costs of buying new ones every time a cartridge is empty. Old computers, screens, and printed papers which are no longer useful are sent to a recycling company. Printing machines are reduced as a greening effect, so printers are shared. Two of the companies (22%) save their data on a virtual server, central server, or in the 'cloud'. Findings show that one of the companies (11%) purchases computers in the lower power usage range (e.g. Energy Star logo). Other types of non-IT related green practices include cutting down on electricity and water usage, planting trees, and green buildings. One of the companies (C5) noted that they do have green strategy (e.g. reduced electricity and water usage) because their business partners require of them to present their green certificates during business tenders, and those with green certificates win contracts for their organisations. Finally, only one staff member practices Full-time telecommuting.

Technology (section 5.4)	Companies use video or telephone conferencing to conduct meetings with clients and colleagues from other branches or provinces (geographical distance telecommuting). Mobile phones and emails are used in performing tasks from home after normal working hours (tele-overtime) by top management officials from company two (C2) and staff members use web-access and emails which are world-wide tools to link with partners. Company representatives and staff members use 3G network cards with 2 or 3 gigabytes data bundles to work from home occasionally, but this data bundle size is considered not reliable to deliver work over the internet. Staff members can negotiate for reliable and fast ICT facilities to enable them to telecommute efficiently. The installation of a Wi-Fi network in the hotel for the comfort of clients shows that ICT resources can be used to reduce client travel. Findings from the stakeholder groups consistently reveal that some areas in South Africa have poor and unreliable bandwidth or internet connectivity. As a result, it is believed that internet accessibility and connectivity need to be available in all areas, reliable, fast, and of global standard for telecommuting to grow. The stakeholders group noted that the products Microsoft Lync and Rally are good ICT management tools, enabling the understanding of work progress and deliverables of team members. Companies (eight of the nine researched companies: 89%) do have the ICT technology to implement telecommuting, but they have not adopted it.
Attitude and Perceptions (section 5.5)	**The attitudes and perceptions of company representatives towards telecommuting:** It has been found that the attitude of companies towards telecommuting lies in the allocation of jobs to contract workers who are not employed by the company, tele-overtime where top management officials work from home after normal working hours, geographical distance telecommuting where employees communicate with colleagues in other provinces, and allowing telecommuting during winter and when employees call in sick. Findings show that a physically challenged person telecommutes on certain days of the week. This has been made possible (unofficially) by his manager. Some companies (eight of nine; 89%) consider ICT resources expensive for telecommuting to be adopted because some companies have a large number of workers who will need ICT resources to telecommute. A low fee structure for internet bandwidth is needed in South Africa for telecommuting to be fully adopted. Telecommuting is considered as a financial rather than an environmental strategy. Telecommuting is difficult to implement because of the lack of support from management teams. Companies are more focused on the issues that give them the most value in terms of their score card than to eco-friendly activities such as telecommuting. Employees are needed in the office to be monitored and to ensure that they meet strict business deadlines as well as familiarising themselves with unstable business methodologies. Management perceives that customers want to see their partners face-to-face, as customers find it difficult communicating online. Some companies (four of nine; 44%) believe that telecommuting could lead to a lack of physical interaction between professionals, as it was noted that face-to-face meetings allow individuals with many tasks to carry out their duties easily by having colleagues around.

	Some companies (two of nine; 22%) believe telecommuting is more appropriate for large organisations to adopt as they believe that their company and the number of staff are too small to benefit from a telecommuting programme. Office space could be saved through telecommuting but companies are already committed to long term rental agreements, and telecommuting would not necessarily be seen as a benefit in terms of space savings. External influences such as government support and economic factors such as poor roads may encourage the adoption of telecommuting into the strategy of companies. Companies want to see staff members take the initiative and request to telecommute because of the benefits tied to it. It is considered that the adoption rate of telecommuting could be higher when young people open up their own business which will allow them work from home. Some companies (five of nine; 56%) believe telecommuting could reduce traffic congestion, reduce time spent in commuting to and from office, and relieve people of travel-related stress. Some companies (five of nine companies; 56%) believe telecommuting could give staff members the opportunity to have quality time with their families. As a result, telecommuting is considered as an initiative that leads to better well rounded employees who are happy because of increased flexibility gained. Furthermore, the flexibility obtained from telecommuting is considered a factor that could make employees stay longer and remain loyal to their organisation. Some companies (five of nine companies; 56%) believe telecommuting is an initiative that could lead to significant cost savings for companies. Some companies (four of nine companies; 44%) believe telecommuting could increase job productivity and high quality output. Task delivery time in doing same type of work is shorter if one telecommutes. It is believed that telecommuting could make staff more responsible, reduce arriving late at the office, and is a means of developing the ICT and management skills of staff. Company representatives believe telecommuting could give companies access to skilled workers, thereby allowing them to hire employees from anywhere in the world, and provide a long service day to customers. **Staff members' attitudes and perceptions towards telecommuting:** It is believed that telecommuting would be best suited for managers as they can better control issues both in their organisation and clients. It is believed that one's work description, the company's type of business, and manager and employee decisions can drive the adoption of telecommuting. Staff members noted that some managers need to change (have a mind shift) their negative perceptions about telecommuting; some managers are already telecommuting, but it could be a big gap for those who are not yet telecommuting. It is believed that a paperless company could reduce the number of times people commute to the office. Staff members believe that family structures could drive the adoption of telecommuting, especially if there are no distractions. Staff members noted that their home does not always have the same required infrastructure as at the office. Staff members are excited about telecommuting as they believe that

	telecommuting could reduce two to four hours of time related to travelling to and from work as well as lessen overall traffic congestion, save the environment, and eliminate traffic related stress. Staff members spend two to four hours daily commuting to and from office. Telecommuting is seen as an initiative that could reduce stress caused by distractions from co-workers such as starting all over with duties when distracted, office politics, and the need to obtain permission from superiors to take care of personal issues.
Governance (section 5.6)	**Company representatives' opinions on governing telecommuting:** Findings show that the telecommuter's manager must be someone who allows the employee to self-manage his/her activity. The telecommuter's manager needs to be a strong matured leader with high EQ and cannot be autocratic. The management style for telecommuters needs to be output driven. A clearly defined target must be set for telecommuters, and managers need to follow up on this target, and enquire whether extra resources are needed. Both managers and telecommuters need to undergo training on the technology/application to be used to enable them 'fix' their own IT issues, and they need to work in teams for sustainable telecommuting. A successful telecommuting programme has to be founded in the policy structure and recruitment practices of the organisation. An employee's competence should be relied upon before he/she is allowed to telecommute. Potential telecommuters need to consistently show their ability to work independently, be able to self-manage, and plan, and display strong accountability, and time management skills. The employee needs to be self-motivated, focused, IT literate, a graduate, and needs to have positive attitude towards telecommuting as there is indication that high rates of illiteracy exist in South Africa. Findings show that management needs to make ICT resources available for telecommuting staff members in order to maintain sustainability. **Staff member's opinions on governing telecommuting** Staff members believe that external influences such as government or regulatory bodies could assist in managing telecommuting. It is suggested to occasionally conduct meetings with telecommuters to ensure that 'things are on track'. Staff members believe that job history and the duration of previous positions should be looked at before telecommuting is allowed.
Emotional Intelligence (section 5.7)	Good communication skills are needed to maintain and make telecommuting work. Trust is not inherent to a company's management style; it is therefore considered that telecommuters should be trustworthy and disciplined, and a trustworthy relationship needs to exist between both parties (manager and telecommuter) for sustainable telecommuting.
Staff Readiness (section 5.8)	The majority of employees (eight of nine companies; 89%) have average to expert IT skills. Generally, company officials see the younger generation to be more in line with telecommuting because they seem to be in touch with the technologies of today. The nine companies' top managers (100%) are personally ready to telecommute. Five of the nine companies (56%) believe that the majority of staff members are also ready to telecommute. Two of the nine companies (22%) noted that some staff members are ready to telecommute while

	some staff are not. Only one of the researched companies (11%) indicated that their staff members are not ready for telecommuting. The company representatives are excited to telecommute once or twice a week, while staff members want to telecommute two or more times a week. Staff members are excited to telecommute and findings show that they believe they can manage their duties properly if their company allows them to telecommute. One of the staff members wants to telecommute on a Full-time basis.
Tele-commutable Jobs **(section 5.9)**	Participants identified job positions such as optimisation and planning, administrative data capturing, copy editing, business analyst, system analyst, documentation, planning, investment professionals, marketing or sales, customer service, coordinator, IT support role in audio visual and video communication, billing office manager, finance officer, logistics, IT manager, and contract specialist as jobs that can be done away from the typical office setting. This **Tele-commutable Jobs** theme has been developed based on participants' experiences, present job status, and acceptance to telecommute.

The following chapter (Chapter Six) discusses the research findings in the light of existing works to define the contribution of this research to the body of knowledge.

CHAPTER SIX: DISCUSSION OF FINDINGS

6.1 Introduction

The previous chapter presented findings from stakeholders comprising key *company representatives* and *staff members* from a multiple-case study on the slow adoption of telecommuting in South African organisations, highlighting challenges and opportunities of telecommuting adoption. Findings were presented based on themes that emerged from the data. Eight main themes were identified: Policy; Practice; Technology; Attitude and Perceptions; Governance; Emotional Intelligence; Staff Readiness; and Tele-commutable Jobs. These themes structure the discussion in this chapter. Chapter Six examines and authenticates the findings by comparing them to related findings from previous research studies. The interpretation of findings using literature helps clarify findings on the subject matter.

The research problem identified for this study is focused on the slow uptake of telecommuting in South Africa. Despite the well documented benefits of telecommuting it appears that South African businesses are still not building telecommuting into their strategies.

The main research question is:

What are the organisational reasons for the slow adoption of telecommuting in South Africa?

The research sub-questions are:

1. How does the organisation perceive telecommuting?
2. How can the organisation adopt telecommuting as part of their ICT/business strategy?
3. What potential benefits can accrue to a business implementing telecommuting?
4. How ready are staff members for telecommuting?

The discussion of findings is guided by the study's central aim which is to explore the reasons behind the slow adoption of telecommuting practice in South African organisations and under the umbrella of Green IT. The procedure followed was to identify perceptions of organisations towards telecommuting, understand factors able to drive the adoption of telecommuting into the business strategy, understand the benefits organisations think can be accrued to them if telecommuting is adopted, and determine whether staff members are ready for telecommuting programmes.

The study also serves as a means of creating awareness to organisations on the environmental benefits associated with telecommuting.

6.2 Discussion on policy

The **Policy** theme is adapted from the G-readiness Model described in section 2.5.1.1. Corporate policy or strategy focuses on the governance of companies, defining the activities in which the companies are engaged (Brown, Beekes & Verhoeven, 2011:98). Strategy includes vision, mission, strategic plans, goals and objectives taken in the context of organisational culture (Rees & Smith, 2014:13). Olson (2008:23) notes that this culture includes the establishment of environmental awareness and proactive behaviour of an employee's routine activities.

6.2.1 Telecommuting strategy and future plan

In this study, telecommuting falls under the second and third order effects of IT on the environment as described in sections 2.3.1.2 and 2.3.1.3, which consist of using IT to improve the efficiency in economic and business processes in businesses which are key sources of greenhouse gas emissions (e.g. in transportation). This happens when the extensive use of ICTs results in changes in the structure of the economy and lifestyles (Dedrick, 2010:174).

Findings from the study reveal that all nine researched companies (100%) have no telecommuting strategy, while seven of these companies (78%) have no future plan to strategise telecommuting (sections 5.2.1.1 & 5.2.1.2). Interestingly, literature on telecommuting in the South African context is limited (Mungly & Singh, 2010:10; Baard & Thomas, 2010:9; Grobler & De Bruyn, 2011:63). This suggests that most South African organisations are not convinced or even aware of the benefits of telecommuting for their businesses and to the environment (sections 2.4.5.1 & 2.4.5.2).

Only two companies (22%) have plans to adopt telecommuting. One of the companies (C3) noted that telecommuting would be adopted during a disaster period. Pearce II (2009:18) describes this view as one of the benefits of telecommuting and notes that businesses which implement telecommuting will be able to realise some continuity in their services and production during a disaster because of the efforts of their telecommuters. However, since none of the participating companies have a telecommuting strategy, it will be difficult for C3 to establish some continuity in their services because they may find it difficult choosing the appropriate staff to telecommute during a disaster period. Secondly, company C6 plans adopting telecommuting when their company premises can no longer

accommodate staff members (section 5.2.1.2). The findings from both companies indicate a long term approach to telecommuting adoption with regard to the call from international bodies such as the International Transport Forum on the need to reduce carbon dioxide emissions from vehicles.

Despite having no telecommuting strategy, all of the researched companies practice telecommuting. Eight of nine companies (89%) practice telecommuting on an *ad hoc* basis, which is usually driven from a personal circumstance perspective and not as a company's drive to adopt such a strategy. The ninth company, labelled C4, practices telecommuting formally but has no strategy for it (sections 5.2.1.1). Company C4 is an IT global firm selling, installing and servicing IT devices that enable telecommuting. As such, C4 has no reason not to telecommute.

6.2.2 Green IT strategy

This study is defined within the Green IT research field (section 2.3). According to Molla *et al.* (2014:130), Green IT includes the beliefs and actions of management/IT professionals in minimising pollution, improving product stewardship and contributing to sustainable development. However, findings reveal a disturbing situation in the sense that management officials do not perceive Green IT as a means of sustainable development. Six of the nine researched companies (67%) have no documented Green IT strategy and do not have any future plans obtaining such a strategy. In their explanation these companies noted that Green IT does not fall within their area of special interest or on their high priority issues list in terms of operational activities/governance; Green IT is thus not of real benefit to their company. Only one company appreciates Green IT as a way of building a better world (eco-friendly) although this concept is difficult to adopt due to changes in IT governance (sections 5.2 & 5.2.1.3). This view is endorsed by Jenkin *et al*. (2011:17) who state that despite increasing environmental issues, many people, including business leaders, generally think of environmental issues as disconnected from their everyday business lives and behavioural patterns.

Only three of the companies (33%) have a Green IT strategy based on factors where Green IT is their line of business, meaning they make money through selling, installing and servicing IT products such as video conferencing facilities, managing printing services and having companies invest in Green IT (section 5.2.1.3). This shows that Green IT was probably not included in the strategy of some of these companies being researched as most managers/firms label sustainable development as a one-dimensional approach of economic benefit instead of a multi-dimensional opportunity that comprises economic, social and environmental

sustainability (triple bottom line). This one-dimensional approach leaves organisations unprepared in dealing with sustainability in a strategic way (Hart & Milstein, 2003:56). Two (C1 & C4) of the three companies with a Green IT strategy are global firms, but only company C4 is aware of the global trend (climate change) that causes damage to the environment, water resources, infrastructure and human health (section 2.2.1), meaning that only one company adopted Green IT based on environmental effectiveness motives and beliefs rather than economic gain.

6.3 Discussion on practice

Practice can be defined as a process, procedure or rule followed by a company in pursuing its goals. Practice in this study is adapted from the G-readiness Model (Molla *et al.,* 2011:75) and describes the actual implementation and realisation of environmental sustainability thoughts in purchasing, using and disposing IT resources.

Findings reveal that all the researched companies (100%) process documents electronically. A one page document can be signed digitally by five people around the world in ten minutes. All the companies encourage less printing as well as printing on both sides of the paper. For example, 'follow me print' is a terminology developed by one of the companies (C1) that has a Green IT strategy as a means of managing printing activities in such a way that documents print only when there is paper in the tray, delete after 24 hours if not printed, and machines turn off if not in use. Ansari, Ashraf, Malik and Grunfeld (2010:380) found that as a means of the green initiative, companies are carrying out practices such as adopting double-sided printing and eliminating unnecessary printing. Additionally, some of the companies' practices include: (i) purchasing computers in the lower power usage range (e.g. Energy Star logo); (ii) reducing printing machines as a greening effect, meaning printers are shared; (iii) old computers and screens are being sent to a recycling company; and (iv) refilling printer cartridges to reduce costs instead of buying new ones when a cartridge is empty. Ruark (2015:5) asserts that printer ink cartridges are costly and money can be saved by recycling old printer ink and toner cartridges as it will not contribute to landfill waste. Ruark notes that local office supply stores offer discount credits when used printer cartridges are recycled, and if the cartridge is refilled it will more or less be half the price of a new one.

The companies save data in the 'cloud'. Lee, Jeong and Jang (2014:1013) explain that green cloud computing is important in a world with limited energy resources and an ever rising demand for more computational power. Interestingly, these findings on business practices are viewed as Green IT practices since they fall under

Murugesan's (2008:27) definition of using, purchasing and disposing ICT devices efficiently and effectively with a reduced or no effect on the environment. However, some companies, specifically those without a Green IT strategy, perform the processes mentioned above because of the economic benefits and not necessarily as a greening effect.

6.4 Discussion on technology

Technology in this context denotes ICT and can be described as the use of computers, telephones, tablets and telecommunication devices to send, receive, save and edit information. Technology in this section therefore describes information technology systems or resources needed to enhance sustainable telecommuting in organisations.

ICT resources used by the companies for telecommuting include computers, mobile phones, video or telephone conferencing, emails and 3G, WI-FI networks and broadband internet connection (section 5.4). Findings show that people are dissatisfied with the speed and reliability of broadband bandwidth/internet connection in South Africa when it comes to adopting telecommuting because connectivity speeds oscillates between very slow (poor) and relatively fast (section 5.4.1). For sustainable telecommuting, potential telecommuters need broadband internet connection in their homes as some software packages need high speed internet access (a slow internet connection will be extremely frustrating and decrease productivity). Broadband internet simply means high speed internet access that allows massive numbers of messages to be communicated at once (section 2.4.3.1). A company representative, Participant 4, observed the reason for poor and unreliable internet connectivity in South Africa to be attributed to the non-global infrastructures Telkom, MTN and Vodacom are using. Even if a company installs the best technology, the internet connection would still be poor as the ISP companies own the largest market.

Furthermore, staff members from C4 were dissatisfied with the volume of data allocated to them. For example, staff members revealed that they personally purchase an ADSL modem or sufficient data to carry out their jobs efficiently when telecommuting as 3G cards with 2 to 3 gigabytes data bundles—provided by their company—are not sufficient to deliver work over the internet.

The reliability of an internet connection depends on the type of connection (broadband or fixed-line) a user has. Grzybowski, Nitsche, Verboven and Wiethaus (2014:41) note that broadband technologies consist of five types, namely Digital

Subscriber Line (DSL), Fixed Wireless Access (or WiFi), cable modem, mobile broadband and fibre (commonly referred to as FTTH). It is therefore important that companies choose the correct type of broadband and issue a sufficient data size subscription to a telecommuter in order to overcome a poor internet connection. The infrastructures of some ISP companies in South Africa could actually be below global standard. This leaves participants with doubt that there will be a reliable line of communication to perform business processes if telecommuting is adopted. A reliable and fast internet connection needs to be in all areas for telecommuting to grow.

Staff members might also connect to the internet to assess their company's data or talk to fellow staff members or customers. Each of these connections forms a different link on the internet, so if a staff member is talking to a customer, the quality of the link will determine the reliability of the communication. If this is a generic internet connectivity scenario, the type of ICT infrastructure used will also be a limiting factor. The telecommunicating staff member's computer needs to be modern and capable of processing new applications as well as large volumes of data; it should have a microphone and video camera mounted. The staff member also needs a smart phone for easy communication. Therefore, from a technological point of view, all parties that will be involved in communication need reliable technology.

6.4.1 ICT readiness

Technological readiness in today's world describes the agility in which a company or an economy adopts current technologies to improve productivity, specifically on its capacity to enforce ICTs in production processes and day-to-day activities for better efficiency and facilitating innovation for competiveness. ICTs have developed to become "general-purpose technology" in that it plays a significant role in industry enabling infrastructure (Schwab & Sala-i-Martín, 2014:7). As a result of this, ICT access and usage are enabling factors of a company and country's general technological readiness.

Eight of the nine researched companies (89%) have the ICT infrastructure to implement telecommuting because their networks are already shared and exchange services where staff members can log on to their company's services from home. One such service is VPN which allows a staff member to securely sign in from anywhere (remotely) onto office computers and services, and it enables online teamwork with co-workers, from document sharing, editing and instant messaging to video conferencing (Kshetri 2010:49; Mungly & Singh, 2010:10; Smith, 2013:64). Additionally, the companies also have Microsoft Lync technology, an ICT

management tool now known as Skype for Business. It provides instant messaging (IM), audio and video calls for meetings, and it enables remote meetings. It has availability presence information as well as sharing abilities (sections 5.4.1 & 5.4.2). These technologies are good for telecommuting programmes as an employee can logon to a company's server securely with their credentials and perform duties from home. Yet, the companies have not adopted telecommuting.

On a positive note, only one company (11%) noted that the technology to support staff members for successful telecommuting is not available. From the information it shows that South African organisations are technologically ready for ICT adoption. According to the 2014 World Competitiveness Report, South Africa obtained and overall rating of 56 out of the 144 countries included in the project. This can be considered as a good rating as South Africa is the highest ranked country in Sub-Saharan Africa and its result in terms of the availability of latest technology is 39% (Schwab & Sala-i-Martín, 2014). It is important to note that the ICT readiness is with regard to the infrastructure of the companies and not necessarily their ability to provide ICT resources to staff members for telecommuting.

6.5 Discussion on attitude and perceptions

Attitude denotes lasting negative or positive feelings about something or a subject. *Perception* is a person's primary form of reasoning with the world around him/her. Therefore, this **Attitude and Perceptions** theme is adapted from the G-readiness Model (section 2.5.1.1). The theme describes approaches, perceptions, beliefs and values people in the organisation have towards the role of ICT and environmental sustainability.

The next section discusses the **Attitude and Perceptions** theme and is broken down into these three categories: (i) Attitude towards telecommuting; (ii) perception on adopting telecommuting into ICT/business strategy; and (iii) benefits of telecommuting in the South African context.

6.5.1 Attitude towards telecommuting

In the 1960s, practices such as overtime, temporary, part-time and shift work have now changed to activities such as compressed work week, flexitime, virtual working and telecommuting. These practices originated from the development of ICTs, cost-cutting followed by companies, and women entering labour market (Grobler & De Bruyn, 2011:64). Attitudes regarding the practices of telecommuting in companies researched include the following:

a) *Geographical distance telecommuting:* staff members communicate with other workers or customers in different locations from the office using ICT resources.

b) *Allocation of jobs to "contract workers"*: Participant 3 called it "home user programme". Workers occasionally perform specific tasks remotely but they are not directly employed by the company. Grobler and De Bruyn (2011:65) describe this as virtual working, where teams of contracted people link together in virtual space, and disperse once the project is completed; new teams might be formed for other customers. This shows that a company can employ a worker without necessarily having an office as they can carry out their tasks remotely. This way a company can enable a contract worker without using any office space.

c) *During winters and when staff members call in sick:* in winter the roads may be in a bad condition or staff might fall ill which could prevent them from going to the office; it does however not necessarily prevent them from working. For instance, if a staff member has a broken leg and the office building is not disability friendly, the person might not be able to get to the workplace, but telecommute could still be an option. The findings of Perez *et al.* (2002:776) show that telecommuters worked productively while they were ill, and if they could not have worked from home, they would have taken sick leave on some occasions. Telecommuting during winter is viewed as definite benefit. Allen, Golden and Shockley (2015:57) assert that telecommuting may offer societal benefits by providing business continuity in the face of weather events, emergencies and even influenza outbreaks that can disturb business and government operations.

d) *Tele-overtime:* in top management, officials work from home after their daily normal work hours using emails, phone calls and video conferencing. A full-time staff member (Participant 19) noted that his company offered him "tele-overtime" in order to reduce the hours spent in the office daily. As a result, he no longer stays late at the office during the week and he does not go to office on weekends anymore. The word *tele-overtime* was developed during in-depth interviews with these companies. What has been in use generally for many years is *overtime* where employees work extra time in the office beyond ordinary working hours (Lepak & Gowan, 2010:128-129). What is important to note is that telecommuting is used to reduce the number of hours an employee spends in the office as opposed to the normal practice of overtime.

e) *Physically challenged persons telecommuting:* a physically challenged person is informally allowed by his manager to telecommute on certain days of the week. Fuhr and Pociask (2011:44) note that telecommuting will possibly increase job opportunities and quality of life for the physically challenged and elderly given that this group of people find it difficult commuting to and from work every day.

f) *Full-time telecommuting:* a staff member works from home on a permanent basis according to an arrangement with his/her manager.

Despite the different types of telecommuting being practiced in these companies, it is important to note that just a few employees participate in any of the options stated in (c) to (f) of section 6.5.1. For example, only one staff member is a *full-time telecommuter*. Only in a situation of "geographical distance" does the practice of telecommuting appear to increase. These findings show that telecommuting is not an aim or goal for companies; telecommuting is allowed to happen tactically rather than including it formally in a business plan. For instance, a strategic decision might be taken that everybody will telecommute in five years' time using available technology, but as a tactical decision only one employee might be allowed to telecommute because of specific circumstances detected—as in the case of the physically challenged person. A new management style will have to be considered that should include telecommuting as part of the company's business aim.

6.5.2 Perception on adopting telecommuting into ICT/business strategy

The key reason for establishing Green IT in organisations is to reduce the carbon footprint. About 4.7% of global electrical energy was consumed by ICT in 2012, releasing roughly 2% of the CO_2 emissions into the atmosphere (Gelenbe & Caseau, 2015:1). From this standpoint, ICT appears to be contributing to a small amount of the overall climate change issue compared to the road transport sector (Figure 2.1). But, much of the 98% of the CO_2 emissions caused by other industries are potentially addressed by the use of Green IT such as telecommuting (Dedrick, 2010:175).

From gathered information, telecommuting (and Green ICT in general) is considered a financial strategy rather than an environmental strategy because businesses are essentially cost-driven. Eight of the nine researched companies (89%) consider ICT resources expensive for telecommuting to be adopted because some companies have large numbers of workers for whom telecommuting equipment such as laptops, tablets and internet subscription may have to be purchased (section 5.5.2). However, Grobler and De Bruyn's (2011:75) study within a South African context

indicates that there are no true barriers found in considering telecommuting implementation because of advances and cost reductions in telecommunication and information technologies. Molla (2008:659) has long noted that environmental compliance is viewed as an extra cost of running a business and managers are often scared that such initiatives may negatively affect the business competitiveness. As a result of this, a low fee structure for internet bandwidth and ICT resources are needed in South Africa for telecommuting to be fully adopted.

The companies (100%) are not ready to support telecommuting programmes because managers want to see employees in the office on a daily basis (section 5.2.1.2) due to the culture of some companies, the type of business, and the old school culture of the management team (managers want to observe and see staff in the office daily instead of managing job output). However, telecommuting could be supported if management see it as a workable business proposition. Lack of support from management teams is most commonly cited as being a challenge of telecommuting adoption (Lister & Harnish, 2011:7); as the saying goes: out of sight is out of control. Ford and Butts (1991:21) assert that a company could "fear" that a telecommuter may do other jobs with company resources, put personal projects as first priority, or even hand jobs to another person which may decrease employers' control over delicate business information. This suggests that the perception of people can both mar the adoption of telecommuting and make it a possibility. As a result, management or some managers need to change (have a mind shift) their negative perceptions about telecommuting; some managers (in C4) are already telecommuting, but it could be a big gap for those who are not yet telecommuting.

Raghuram and Fang (2013:523) note that the intensity of telecommuting can be described as managers telecommuting and subordinates seeing that they have a strong influence. Such influence could be improving the effectiveness or efficiency of companies' bottom-line, which refers to a competiveness motive of establishing Green IT in companies (section 2.3.2.3). Findings show that telecommuting will be best suited for managers. Consequently, managers can better guide their subordinates on how well to manage job responsibilities when telecommuting. This can further increase the adoption rate of telecommuting because managers will be open, with positive attitudes towards telecommuting as they can stimulate performance between telecommuters irrespective of their absence from the typical office.

Some companies (four of nine; 44%) believe that telecommuting could lead to lack of physical interaction between professionals. Face-to-face meetings are viewed as

a means whereby individuals with many tasks carry out their duties easily by having colleagues around. This view is commonly found in telecommuting literature and is described as isolation among employees (Wilton *et al.*, 2011:279; Madlock 2012:3; Nyaanga, 2012:12). This finding falls under the challenges of telecommuting. The company representatives are of the opinion that employees are needed in the office in order for them to be monitored and to ensure that they meet strict business deadlines and familiarise themselves with unstable business methodologies. They point out that visibility is needed in a business environment based on activities and processes that happen in different business sectors. As a result, management perceives that customers want to see their partners face-to-face as customers find it difficult communicating online (section 5.5.2). For example, two companies (C2 & C3) dealing with clients' personal information such as income, identification numbers and salaries believe that their activities/processes need to be done in the office as a security measure to gain the trust of customers on information captured. This shows that telecommuting adoption into a company's strategy also lies in the company's ability to encourage and convince its customers to communicate more online and whether customers are happy with telecommuting.

Some companies (two of nine; 22%) believe telecommuting is more appropriate for large organisations to adopt (section 5.5.2) as they believe their company and the number of staff are too small to benefit from telecommuting programmes. Grobler and De Bruyn (2011:72) emphasise that the extent to which any kind of telecommuting practice is employed by companies, depends on whether their company is big, medium or small. The authors note that telecommuting will be used more in companies where staff numbers are high, and bigger companies would be more inclined towards telecommuting than smaller companies. For example, big companies use more transport, therefore the gains from telecommuting on *inter alia* the environment are bigger. On the other hand, it is important that the adoption mandate is applied to all companies. However, telecommuting adoption may start first at government sectors as described in the developed nations (section 2.4.1.1), to bigger companies, and later extended to smaller companies. In so doing, small companies may learn from bigger companies.

External influences, e.g. government support, and economic factors, e.g. poor roads, are considered as elements that may encourage the adoption of telecommuting into the strategy of companies (section 5.5.2). This view falls under the "legitimation motive" of adopting Green IT or green practices into business strategy (section 2.3.2.2). The general view of the legitimation motive is that companies take part in Green IT or green practices when they are faced with

regulatory authorities such as governments, social pressures or agency directives (Chen *et al.,* 2009:7; Molla & Abareshi, 2012:95). Handy and Mokhtarian (1996:227) have long stated that the future of telecommuting depends on government policies to encourage and facilitate telecommuting. Government policies can provide successful examples of telecommuting, education and incentives for companies adopting telecommuting. Such policies may not only increase companies' readiness to adopt telecommuting, it may also increase telecommuting sustainability.

Finally, the findings that follow were observed from the data but are not mentioned prominently in telecommuting literature.

From the literature review, Egwali and Imouokhome (2013:751) describe a paperless company as the idealised office where paper is absent as information can be stored, annotated, indexed, processed, searched, retrieved and transferred electronically to another user. Hattingh (2001:3) explains that the purpose of a paperless company is to eliminate paper documents as information carrier and work only with electronic documents. From information gathered, paperless companies could reduce the number of times people commute to the office (section 5.5.2). This means that almost all documents will be stored in company's server where staff can easily access and work with the documents remotely. A paperless company move could encourage telecommuting.

Office space could be saved through telecommuting but some companies are already committed to long term rental agreements and telecommuting would not necessarily be seen as a benefit in terms of saving space. Space saving has been identified as one of the potential benefits of telecommuting. This submits that a company may have planned for a certain number of staff to utilise the office space for one or more years, maybe for three years. So, if suddenly half of the workforce is not in the office because of telecommuting implementation, it means the company will be paying for space they are not utilising. Such a company can benefit from telecommuting in a case were the present office space can no longer accommodate a larger number of staff members - the company can enable *contract workers* to perform jobs remotely rather than acquiring more office space as described in section 6.5.1. Therefore, companies under long term rental agreement could still derive the benefit telecommuting offers in saving office space.

Staff members interviewed mentioned that their home does not always have the same needed infrastructure as at the office. For example, load shedding is seen as a factor that could mar the adoption of telecommuting as staff homes are not always

equipped with power infrastructure (section 5.5.2). Load shedding is described as a state where selected electrical loads in a building or neighbourhood are reduced at different times of the day in order to sustain the power system stability due to power demand being more than power generation. This happens when there is a request from the electrical utility to reduce a certain percentage of the electrical load (Scott, 2007:30; Margaret, Rao & Ganeshprasad, 2015:1149). When there is load-shedding and the internet of those staff members telecommuting goes down, they could either stop working or get into a vehicle and go to the office to work. The act may negatively influence other employees' productivity when they see a staff member entering the office at an odd time such as 11:00am, or undermine the aim of reducing carbon emissions from vehicles. On the other hand, there is advantage to load shedding even though it is considered as a factor that could mar the adoption of telecommuting. A telecommuter can study the time frames within which load shedding occurs in his or her neighbourhood and deliver jobs that are urgent before the load shedding, after which the telecommuter can take care of personal needs. South Africa usually has about two hours load shedding in a given neighbourhood.

It has been taken into consideration that the adoption rate of telecommuting could be higher when young people open up their own business which will allow them to work from home. This submits that newer companies could be quick at adopting telecommuting whereas older companies may find it difficult to adopt telecommuting because it is new. This confirms participants' view previously about management belonging to old school culture where management by observation is prominent, that is, the typical office style. So, if young people open up their own business it becomes the new age culture where telecommuting is allowed. Additionally, companies want to see staff members take the initiative and request to telecommute because of the benefits associated with it.

In summary, findings discussed here touched on some reasons why telecommuting is slow as well as some factors that could drive the adoption of telecommuting. The next section presents a discussion on benefits of telecommuting.

6.5.3 Benefits of telecommuting in a South African context

Due to the understanding that ICT adoption for environmental sustainability is also motivated by the economic profits associated with it, participants were asked to identify benefits their company will get when adopting telecommuting. The findings support internationally recognised benefits of telecommuting such as indicated below.

i) Reduction in time spent travelling to and from office

In particular, five of the companies (56%) see that there could be reduced travelling time to work as staff members spend two to four hours daily commuting to and from office. This view aligns with the works of Helminen and Ristimäki (2007:341) and Quoquab, Seong and Malik (2013:68). Helminen and Ristimäki (2007:341) note that telecommuting (by 12,000 persons) reduced the total amount of commuting kilometres by 0.7%, which means about 1.35 million kilometres saved per week in Finland. Pearce II (2009:19) reports that a study by the US government shows that when 20,000 federal employees telecommuted, two million travelling miles, 102,000 jerry cans of petrol and 81,600 pounds of carbon dioxide emissions were saved each week. This finding is important because it shows the environmental benefits of telecommuting. Reducing the time staff members spend commuting to and from work reduces the carbon dioxide emissions from vehicles.

Furthermore, Participant 9 noted that traffic congestion is even worse in Johannesburg—commuters get 'stuck' on major roads and end up going late to the office or back home. As a result, participants believe telecommuting could lead to better well-rounded employees who are happy due to reduced time in travelling to the office, increased flexibility, and more quality time with families. Telecommuting may be HR's tool for rewarding and retaining staff in order to develop and maintain competitive personnel.

ii) Decrease in psychological stress (traffic and office related stress)

Participants noted that the typical office gives rise to stress founded on distraction from co-workers, office politics and having to obtain permission from superiors to take care of personal issues (section 5.5.3). Fuhr and Pociask (2011:43) state likewise that telecommuters have a distraction free environment and are less involved in office politics. Subsequently, telecommuters generally have less stress. Fuhr and Pociask explain that telecommuting is offered "to enhance employee effectiveness and positively impact the quality of life of workers by minimising the stress, fatigue, time and cost associated with commuting to and from work". Crandall and Gao (2005:30) note that office distractions can hinder smooth completion of tasks or any assignment involving long periods of attentiveness. Telecommuting may be loaded with flexibility which in turn helps reduce stress. Subsequently, employees could stay longer and remain loyal to their organisation because they could believe that their firm cares for their personal circumstances.

iii) Increase in job productivity and good quality output

Four of the companies (44%) noted that telecommuting could increase job productivity, produce good quality output, and allow employees to meet up with business deadlines (section 5.5.3). Productivity increase is prominent in telecommuting literature (Perez *et al.*, 2002:776; Morgan, 2004:350; Pearce II, 2009:17; Johns & Gratton, 2013:5). Morgan (2004:355) asserts that telecommuting increased the productivity of flexible workers by 10 to 20 percent. Pearce II (2009:17) reports that Compaq Computer Corporation, IBM Canada, Hewlett-Packard and US West have reported productivity increases of 15 to 50 percent resulting from telecommuting programmes.

Furthermore, two staff members (participants 16 & 19) noted that task delivery time when doing the same kind of tasks is shorter when one telecommutes. For example, Participant 16 gave an instance where she needed to work from home undisturbed due to a huge report that needed to be done. At 2 pm the report was completed and the participant said it would normally take her the entire day to deliver such a task at the office. However, Sikes *et al*. (2011:23) report that job delivery time must be motivated by calls and emails. The findings show that an employee who is motivated to telecommuting will deliver good quality tasks timeously even without reminders from superiors on the delivery time.

Mixed views exist with regard to individuals' family structure being a factor that can mar the adoption of telecommuting. It is believe that the interruptions one might experience when working at home could be more than what it is in the office, for example interruption from children, spouse, visitors and pets. Telecommuters' productivity could thus be undermined whereas in this case, findings show an increased productivity with telecommuting as task delivery time is shorter. These findings may have been influenced by people who do not have dependants or family residing with them. However, telecommuting seems to have increased productivity and quality time with family for participants who do not have dependants at home and for participants who are disciplined.

iv) Significant cost savings for both employees and companies

Five of the companies (56%) believe that the adoption of telecommuting could lead to significant cost savings for employees and companies. These savings include reduced cost in renting large office space and/or parking space, buying office equipment, servicing lunch, and in transportation activities such as buying fuel and car maintenance (section 5.5.3). This view have long been reported on in telecommuting literature (Ford & Butts 1991:20; Kepczyk 1999:16; Lister & Harnish

2011:8; Fuhr & Pociask 2011:43). Kepczyk (1999:16) asserts that telecommuting arrangements appeal to employees as it reduces or eliminates the cost of commuting and decreases personal expenses such as lunches, automotive and laundry expenses. For example, one of the company representatives, Participant 9, noted that his client tested telecommuting by allowing 20 ICT staff members to work from home for a month; some of them saved a thousand rand on petrol and car maintenance.

The less people drive out on the roads, the more people, companies and the government save money. The more people drive on the roads, the more government needs to fix bad roads. Telecommuting could thus offer significant cost savings to employees, companies and government.

v) Access to skilled workers

Findings show that telecommuting gives companies the access to hire skilled workers from anywhere in the world. This view is similar to Illegems and Verbeke's (2004:321) report which says businesses are discovering that virtual work arrangements grant them access to hiring professional workers who are not interested in coping with the typical office setting. O'Brien and Hayden (2008:220) explains that professional workers (disabled, elderly or nursing mothers) who do not want to join or want to leave the workforce will be "attracted and retained" by companies who telecommute. O'Brien and Hayden further maintain that telecommuting lowers staff turnover and leads to a stable workforce.

A study conducted in the USA by Allen, Golden and Shockley (2015:57) found that working from home could be a feasible opportunity for persons who have environmental sensitivities, mobility impairments, episodic symptoms, fatigue conditions and/or chronic pain. Telecommuting could act as a way of reasonable accommodation under the ADA in which employers with 15 or more employees are encouraged to offer accommodation for applicants who have disabilities and are qualified.

Finally, the following findings—not prominently mentioned in the literature—emerged from the data. Firstly, it is found that staff members may experience more responsibility when telecommuting as they will be accountable for their actions and job output. The extent to which telecommuters feel accountable and in control of their duties could be attributed to the autonomy experienced. Hackman and Oldham (1976:258) describes autonomy towards experienced responsibility as the "degree to which the job provides substantial freedom, independence, and discretion to the

individual in scheduling the work and in determining the procedures to be used in carrying it out". Thus, telecommuting is seen as a means in which staff members' management and ICT skills could be developed.

In summary, findings report that telecommuting offers benefits to companies, employees and to the environment.

6.6 Discussion on governance

The meaning of the word *governance* in this section is adapted from the G-readiness Model (section 2.5.1.1). The **Governance** theme describes the administration of a telecommuting initiative and is carefully connected to the **Policy** theme in terms of defining how telecommuting should be managed when adopted as part of a company's ICT strategy.

It was found that people and telecommuting programmes need to be well managed in order to accomplish sustainability in telecommuting. Consideration was given to management styles that best suit telecommuters as they are often out of the office.

Three of the companies (33%) maintain that the management style for telecommuters needs to be "output driven" or based on "results". A result-driven management style is not keen on time spent on task in contrast to someone who is concerned about clocking in and out of the office. It is a management style that ensures results are produced from the required task (new age thinking) and allows a telecommuter to self-manage his activities. Olson (1982:83) has long noted that remote work management is based on results, timeliness and the quality of completed work rather than "over the shoulder" observation. Participants noted that in order to achieve this type of management style, the telecommuter's manager needs to be a strong, matured leader and cannot be autocratic, meaning that the manager needs to set clearly defined targets for staff (telecommuters), follow up on these tasks and enquire whether extra resources are needed to complete the tasks. A study by Baard and Thomas (2010:8) shows that participants' productivity increased because they were given clear guidelines on what to do and regular feedback to ensure that all queries were speedily resolved while telecommuting. Baard and Thomas maintain that telecommuters are still entitled to institutional factors affording staff members direction and purpose in the organisation. HR Focus (2011:4) concludes by noting that expecting too little from a telecommuter might cause resentment between staff in the office and expecting too much might cause stress for the telecommuter.

Six of the companies (67%) are of the opinion that potential telecommuters should have skills such self-management, planning, strong accountability and time management skills, and attributes which include being a self-starter, focused, ICT literate and having a good attitude towards telecommuting. Also important are a potential commuter's history of jobs completed, duration of the position and the fact that the company can rely on his/her competence before he/she would be allowed to telecommute (section 5.6.2). These telecommuter traits have been noted by various authors including Turetken *et al.* (2011:58), HR Focus (2011:2) and Smith (2013:65).

Turetken *et al.* (2011:58) note that telecommuters with longer work experience will report higher telecommuting performance, productivity and satisfaction with the telecommuting programme. According to Henquinet (2001:120), the selection of telecommuters are related to that of other workers with the exception that the focus is on self-management skills such as capacity to organise work schedules, establish priorities, meet deadlines and self-assess performance. It may be beneficial, therefore, for telecommuters to undergo training on some of these specific self-management skills; and a higher level of ICT literacy could be necessary due to lack of readily available ICT support when working from home.

Having a higher education qualification might make for better telecommuting. Participant 1 from C1 believes that the more educated an employee is, the more he/she is likely to succeed as a telecommuter. Participant 1 considered that graduates take up responsibility as that is part of what they are taught in school. The perception that a telecommuter should be a graduate in order to telecommute is not prominent in telecommuting literature. This finding could mean that telecommuters must have the ability to read and write as telecommuting tasks are mostly done through writing and reading of information transmitted over the internet. So this submits that management needs to ensure potential telecommuters have the competence to read and write before allowing them to telecommute.

For sustainable telecommuting, participants noted that both managers and telecommuters need to undergo training on the technology/application to be used. According to Madlock (2013:207), when managers undergo training periodically their ability in communicating task-related information to telecommuters via ICT will improve because telecommuters need managers who are task-oriented as their communication would be more task-focused. Training may also be focused on developing the ICT skills of potential telecommuters on products to be used in order

to enable them to fix their own ICT faults; one person's telecommuting problem might be low priority for IT staff who have many IT faults to repair in the office.

Participants furthermore argued that managers and telecommuters need to work in teams for sustainable telecommuting. Training—for example how to use collaboration technologies—can impact on team building. Brown, Dennis and Venkatesh (2010:11) describe collaboration technology as a technology supporting two or more persons to work together at different times and places. Maruping and Magni (2015:2) explain that collaboration technologies are installed to support teamwork, and organisations now use teams to accomplish their operations. In effect, different members' tasks will seem entwined in that the capability of a team member to complete a task is dependent on the activities of other team members. For instance, the Microsoft Lync technology is a collaboration tool which allows one to see when team members log on and off, when members have meetings scheduled in their calendar, when one is busy with a phone call, and tells when team members are away from their computers. Collaboration technologies are social in nature, and their use for task accomplishment can benefit the entire team and the telecommuting project.

From gathered information, a successful telecommuting project has to be founded on a policy structure and recruitment practices of an organisation**.** Governing a project can also mean having a corporate policy that defines the activities to be engaged and plans on resource allocation as management needs to make ICT resources available for telecommuting staff members for sustainability. The HR Focus (2011:3) asserts in support that a telecommuting policy should outline positions suitable for telecommuting, positions that will be difficult or impossible to hold through telecommuting, and a description of the general responsibilities of the telecommuter. In doing so, potential telecommuters will be aware of what is expected of them and if the telecommuter is not delivering as agreed upon, management may call the staff back to the office. Equally, telecommuters should be free to return to the office if not comfortable with a telecommuting arrangement.

6.7 Emotional intelligence and telecommuting

Emotional intelligence is the ability for a person to be aware of his own and other people's emotions, to differentiate between different moods and appropriately label them, and use emotional information to direct thinking and behaviour. Emotional intelligence has four components, namely self-awareness, motivation, empathy and social skills (Goleman, 1998:88). These components are classified as attributes telecommuters should have.

Participants noted that good communication skills are needed to maintain and make telecommuting work (section 5.7.1). Good communication skills here is likened to "social skills" of emotional intelligence which is the ability to manage relationships and develop connections in order to be efficient in leading change and building teams (Goleman, 1998:88). Turetken *et al*. (2011:58) assert that good communication skills of telecommuters will result in increased telecommuting performance, productivity and a better overall telecommuting experience.

Participants recognised that trust is not inherent to their company's management style. They consider telecommuters to be trustworthy, self-motivated and disciplined and that a trustworthy relationship needs to exist between both parties (manager and telecommuter) for sustainable telecommuting (section 5.7.2). To have a trustworthy relationship implies that the manager and telecommuter must rely on each other to accomplish a task. There needs to be an understanding between them (manager and telecommuter) so that the expectation for telecommuting is the deliverable. This also means that teamwork has to exist between them. Without a trustworthy relationship, teamwork will suffer which may then lead to failure of the telecommuting programme.

Literature agrees with the notion that a telecommuter must be disciplined (Mokhtarian & Salomon, 1997:42; Baard & Thomas, 2010:4; Turetken *et al.*, 2011:58; Jones, 2013:46; Smith, 2013:65). Mokhtarian and Salomon (1997:42) explain that disciplined staff members can set clear boundaries between work and personal life and they do not require a physical office setting and formal structure in order to accomplish their work duties. Discipline is likened to the self-motivation and self-awareness components of emotional intelligence at work (Goleman, 1998:88), where *self-motivation* is described as the desire of telecommuters to perform work beyond reasons such as money or statues, and the tendency to persistently pursue goals with energy. *Self-awareness* implies that a telecommuter needs to have the ability to understand and identify his/her drives, moods, feelings and how they affect others and his organisation. Self-aware people also have self-confidence. Therefore, telecommuters' emotional intelligence is important for a successful telecommuting project.

6.8 Discussion on staff readiness

In order to understand user acceptance to adopt technology for a purpose, Davis (1989:319) points out the importance of developing key theoretical constructs of user acceptance in the Information Systems field. Two concepts were basically looked at*:* ICT skills of staff members and acceptance to telecommute. The findings

align with some features in the TAM and UTAUT model as described in section 2.5.1.1.

Staff readiness submits that company representatives and staff members have the required ICT skills and they believe that working from home with the use of ICT will increase their job performance (productivity) within organisational context.

The majority of employees (eight of nine companies, 89%) have average to expert ICT skills (section 5.8.1). This shows that employees have sufficient ICT skills to telecommute except for those who do factory or menial jobs whose ICT skills are limited to mobile devices or telephone. This view supports the feature "perceived ease of use" in TAM's model. Perceived ease of use refers to the "degree to which the prospective user expects the target system to be free of effort" (Davis *et al.,* 1989:985). This implies that telecommuting will be free of effort since workers are already equipped with ICT skills and this could lead to sustainable telecommuting. Furthermore, ICT skills fall under the attributes of a telecommuter as described under the **Governance** theme (section 6.6), although staff members with average ICT skills may need training in order to maintain their own telecommuting infrastructure.

Five of the company representatives (56%) confirmed that the vast majority of employees are ready and would be happy to telecommute if given the chance. Similarly, staff members acknowledged happily that telecommuting is a great idea and they would love to telecommute twice or more a week. Even top managers personally (CEO, HR and IT) from the nine companies (100%) are ready to telecommute once or twice a week (section 5.8.2). This view aligns with Davis (1989:319) view on the need to develop a construct in the IS field on user acceptance to use ICT for a purpose (such as to telecommute). Baard and Thomas (2010:8), in a study with a South African context, have confirmed staff members' acceptance to telecommute. Staff acceptance to telecommute could be because they have the necessary ICT skills as Davis *et al.* (1989:1000) have long noted that the key barrier to user acceptance of technology is the lack of user friendliness towards current systems. Furthermore, staff members' acceptance to telecommute could also be because of a love for the environment or due to the benefits of telecommuting such as the reduced stress that will be gained from commuting to and from work. Staff readiness to telecommute can also be tied to their willingness to negotiate for reliable and fast ICT facilities to enable them to telecommute efficiently as previously noted. Therefore, acceptance to telecommute shows that staff members are motivated. Sikes *et al.* (2011) maintains that being motivated

simply means a staff member has a natural love for telecommuting and would be able to succeed in telecommuting.

However, two companies (22%) felt some staff members would be happy to telecommute while some would not, basically due to their social life as they want to get out of their home. Only one company (11%) noted that staff members are not ready to telecommute. This can be considered as employees who need guidance in their jobs.

Finally, staff members believe they can properly manage their duties if allowed to telecommute. This view aligns with the "perceived usefulness" feature in TAM's model, which refers to "prospective user's subjective probability that using a specific application system will increase his or her job performance within an organisational context" (Davis *et al.,* 1989:985). The view further aligns with the "performance expectancy" feature from the UTAUT model, which refers to the "degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh *et al.*, 2003:447). Applying this meaning to the context of this study, *staff readiness* submits that participants believe telecommuting will increase job performance within an organisational context as they can properly manage their duties. This shows that there can be an increase in productivity, which is one of the benefits of telecommuting.

6.9 Discussion on tele-commutable jobs

Findings show that not all jobs align with telecommuting; some jobs need visibility in the office environment because of their nature or processes happening in the office. Literature agrees with this view, as Handy and Mokhtarian (1996:229) note that information workers are more tuned to tasks that may be done away from the traditional office. Information jobs align with the creation, manipulation, processing or distribution of information. The jobs listed below have been developed as a result of participant experiences, present job status, participant acceptance to telecommute and confirmation that they can comfortably manage their duties from home if allowed to telecommute:

- Optimisation/planning
- Administrative data capturing
- Copy editing
- Business analyst, system analyst, IT support role in audio visual and video communication/IT manager
- Documentation/coordinating
- Investment professionals

- Marketing/customer service
- Billing office manager and contract specialist

These professions represent jobs that can be done from home with the use of ICT resources (section 2.4.4).

6.10 Validating the research findings

The study follows an inductive approach, and Eisenhardt (1989:533) highlights that theoretical induction is the "intimate connection with empirical reality that permits the development of a testable, relevant, and valid theory". This research leads to emergent findings that agree with a combination of prior established research frameworks and provides valid findings that follow Eisenhardt's procedure of theory building when using case study research. These guided procedures are:

- *Getting started*: defining research questions possibly with prior construct, providing a better foundation for validating constructs
- *Selecting cases*: cases were selected based on specified population types, theoretical flexibility and focus on external validity in order to fill, replicate and extent concepts
- *Crafting instruments and protocols*: multiple data collection methods and cases strengthen the foundation of theory to ensure triangulation of evidence, thereby forming a synergistic view of perspectives
- *Entering field*: allows researchers to take advantage of emergent themes and unique case features
- *Analysing data*: cross case design enables researchers to see data through multiple views, and in-depth familiarity with data and constructs of the theory are gained
- *Shaping hypothesis/assumptions*: recognises logic across cases through iterative detail of constructs by establishing reasons that define, extend, confirm and validate theory
- *Enfolding literature*: comparing constructs with similar and conflicting literature sharpens the definition of constructs, increases the theoretical level and raises generalisability
- *Reaching closure*: attaining possible theoretical saturation, the process should come to an end when contribution becomes marginal

6.11 Conceptualising Green IT and telecommuting

According to Saldana (2009:11-12), "the development of an original theory is not always a necessary outcome for qualitative inquiry, but acknowledge that pre-

existing theories drive the entire research enterprise, whether you are aware of them or not".

In order to conceptualise Green IT and telecommuting, insights were taken from elements found in literature and interview questions answered. Emergent findings such as emotional intelligence, staff readiness and tele-commutable jobs have been added to the G-readiness Model of Molla *et al.* (2011:84) to produce an extended G-readiness Model (Figure 6.1). This positions the emergent drivers of telecommuting in an organisational context. The newly added constructs are shown in the white boxes (Figure 6.1).

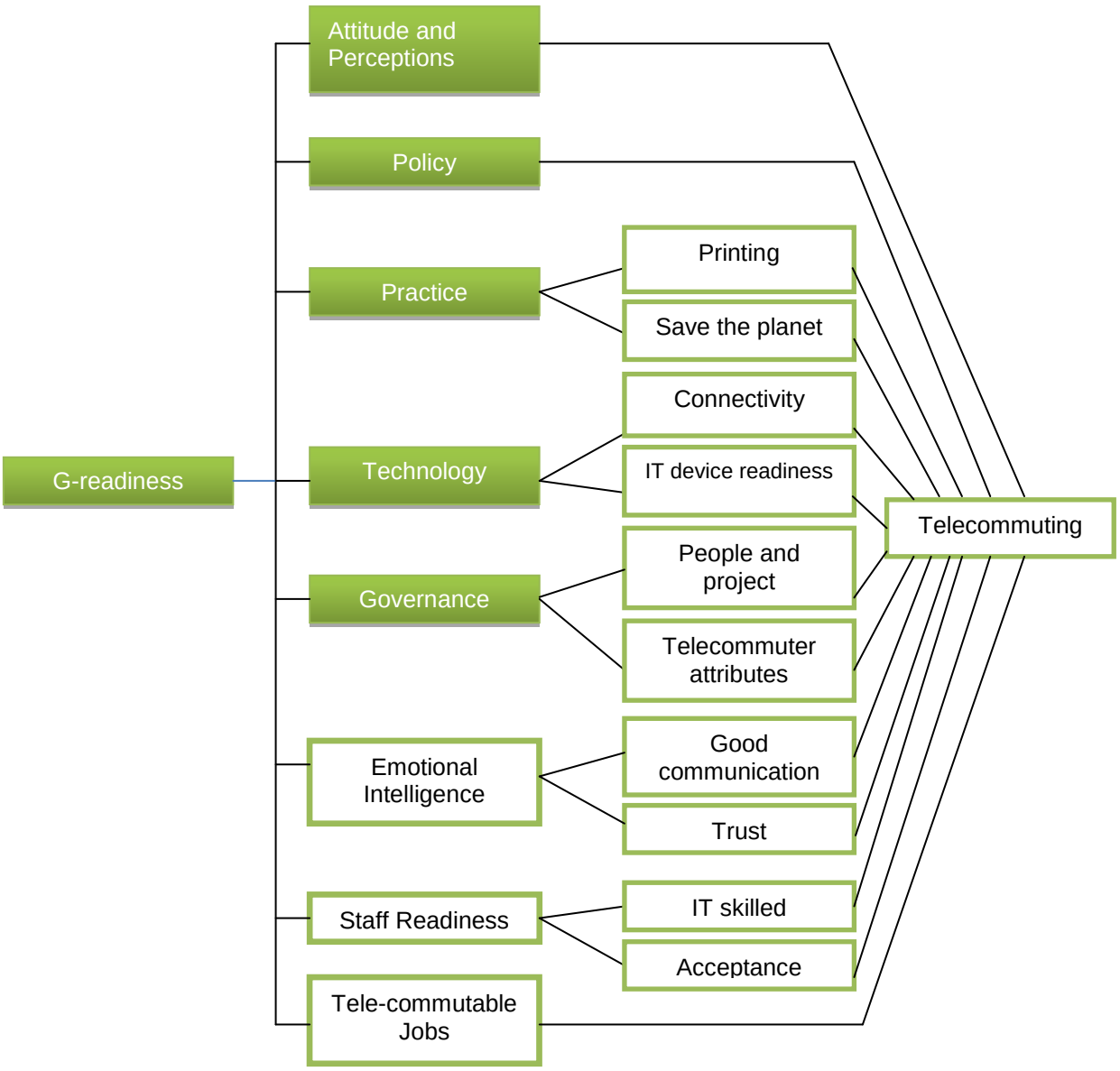


Figure 6.1: Conceptual Model for this study
(Adapted from Molla et al., 2011:84)

- The concept of the constructs **G-readiness**, **Policy**, **Practice**, **Technology** and **Governance** were adapted from the G-readiness Model literature (section 2.5.1.1) and insights from interviews analysis
- The concept of **Attitude and Perceptions** was constructed using ideas from the G-readiness Model (section 2.5.1.1), and participants' opinions. This construct identifies telecommuting in organisational context
- The concept of **Emotional Intelligence** was constructed using insights from interviews analysis and four components of emotional intelligence (Goleman, 1998:319)
- The concept of **Staff Readiness** was constructed using insights from interview analysis, the TAM and the UTAUT model respectively (section 2.5.1.1)
- The concept of **Tele-Commutable Jobs** was constructed using insights from the interviews analysis and literature

Table 6.1: Summary of themes

Themes (e.g. constructs)	Definitions	References
G-readiness	Refers to organisations' Green IT and telecommuting ability as established via the combination of attitude and perceptions, policy, practice, technology, governance, emotional intelligence, staff readiness, and tele-commutable jobs. This aids the sustainability of telecommuting in order to reduce vehicle emissions related to commuting to and from office, supply chain emissions, and waste and water use as well as improve energy efficiency in order to generate a sustainable environment.	(Molla & Licker, 2005; Molla *et al*., 2011)
Attitude and Perceptions	Refers to perceptions, beliefs and values people in the organisation have towards the role of ICT and environmental sustainability.	(Molla *et al.*, 2011)
Policy	Environmental frameworks and standards a company sets to guide the purchasing, using and disposing of ICT resources. Establishment of proactive behaviour of an employee's routine activities in relation to reducing emissions from commuting to and from work and in non-IT green practices.	(Elkington 2004; Olson 2008; Molla *et al*. 2011; Kumar & Sarma 2013)
Practice	Actual implementation and realisation of environmental sustainability thoughts in purchasing, using and disposing of ICT and non-IT related resources.	(Molla *et al.*, 2011)
Technology	Information Technology systems or resources needed to enhance sustainable telecommuting in an organisation.	(Richardson *et al*., 1998; Cameron & Webster, 2005; LeClair, 2008; Pearce II, 2009; Molla *et al.*, 2011; Ye, 2012)

Themes (e.g. constructs)	Definitions	References
Governance	Refers to the management of telecommuting initiatives, the allocation of resources and standards for measuring impacts.	(Bélanger, 1999; Lautsch & Kossek, 2011; Molla *et al*., 2011; Turetken *et al*., 2011; Brenner, 2013; Raghuram & Fang, 2013)
Emotional Intelligence	The ability for a person to be aware of his/her own and other people's emotions, to differentiate between different moods and appropriately label them and use emotional information to direct thinking and behaviour. Therefore, potential telecommuters need to be motivated, disciplined and need to have social skills.	(Goleman, 1998)
Staff Readiness	Submits that users need to be excited and accept to telecommute, be able to manage jobs properly and be productive in organisational context. Additionally, staff members need to be competent as demonstrated via the combination of attitude towards telecommuting, ICT skills and emotional intelligence for sustainable telecommuting.	(Davis *et al.*, 1989; Venkatesh *et al.*, 2003)
Tele-commutable Jobs	Means that information jobs align to jobs that can be conducted away from a typical office setting.	(Handy & Mokhtarian, 1996)

6.12 Summary of Chapter Six

Chapter Six discussed the themes that emerged from the findings, and discussed and answered the research questions with the aid of prior established literature. The emergent themes are shown in white boxes in Figure 6.1 and the summary of the themes are presented in Table 6.1.

Findings show that telecommuting needs to be strategically planned for. If this is done, it could help companies embrace the triple bottom line (economic, social and environmental aspects) instead of the usual one-dimensional economic approach that firms develop for their business. The findings revealed factors that can drive the adoption of telecommuting, and this were represented with three existing frameworks to ensure verifiability and validity of the findings from the research.

The next chapter (Chapter Seven) is the final chapter of this research study. It concludes the research by addressing the main aim of the study which is to identify the reasons behind the slow adoption of telecommuting. It also calls to mind the entire process.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS

7.1 Introduction

During strategy development, organisations need to focus on the economic, social and environmental sustainability aspects of TBL. Several authors, including Dyllick and Hockerts (2002:132) and Chou and Chou (2012:448), from Green IT literature have adopted TBL as they believe that companies can engage in activities that positively impact the environment, society and in lasting economic growth. There are factors contributing to TBL that are often not publicised, one of which is telecommuting. Telecommuting does not sound newsworthy in comparison with "handing out blankets at the traffic light to homeless people", but telecommuting is an important contributor to environmental sustainability.

The research problem engaged in this study was that the uptake of telecommuting in South Africa is slow. Despite the well documented benefits of telecommuting, it appears that South African businesses are still not building telecommuting into their strategies. This has wide ranging implications, from a lack of compliance to the Clean Air Act and corporate governance in terms of King III reporting as well as leading to missed business opportunities such as reduced travelling costs for staff members and reduced office space requirements.

In an attempt to understand the reasons for the slow adoption of telecommuting, this study explored the organisational perceptions towards telecommuting. Findings point to challenging elements and opportunities of telecommuting adoption. The gained understandings do not resolve the problem, but it contributes to the resolution by discovering problems that need to be resolved by management (and government). The study's aim and objectives were achieved by using a multiple-case design. Semi-structured interviews and a literature review were the sources of data collection. Participants were purposefully chosen and included IT and HR managers, telecommuters and non-telecommuters.

Chapter seven concludes this study by presenting answers to the main and research sub-questions stated at the beginning of the study (section 1.5). A recommendation to assist in the adoption of telecommuting is presented based on the knowledge gained from the study. Furthermore, the chapter addresses the research contributions and limitations and recommends further research topics.

7.2 Answers to research sub-questions

Presented below are answers to the research sub-questions (section 1.5.2).

Research sub-question 1: How does the organisation perceive telecommuting?

The findings show three main perceptions arising from the selected companies. These findings are:

i) Telecommuting has potential benefits to the environment and society, and holds economic gain for companies and employees.
ii) There are still technical, business and social challenges to overcome such as unreliable internet connectivity and a lack of management support.
iii) Adoption of telecommuting can be driven by many different forces, for example compliance and customer and staff demands.

Research sub-question 2: How can the organisation adopt telecommuting as part of their ICT/business strategy?

The answers below address this particular sub-question:

i) Companies should negotiate for faster, cheaper and more reliable Internet connectivity, both for the company premises and for the homes of telecommuting staff because slow internet connection will be frustrating and decrease productivity.
ii) Companies can promote a paperless work environment, thereby ensuring that workers have access to all of their information and document sources needed to telecommute.
iii) Companies can educate their management in terms of telecommuting to reverse any negative attitudes towards it. Managers can get reskilled if necessary in terms of managing telecommuting staff.
iv) Management can encourage staff members to take the initiative in terms of their own use of telecommuting.
v) Managers can adopt a more trusting style of management in terms of managing job output rather than ‘bums on seats’.
vi) Organisations can review job descriptions (where applicable) to include the possibility of telecommuting.
vii) Young people are most amenable to working electronically and management should consider enabling this group of workers first.
viii) A telecommuting programme may be added as part of company policy (either in HR, IT or both).
ix) Companies can promote telecommuting to their customers.

x) External influences such as government support may encourage or drive the adoption of telecommuting into the company's strategy.

Research sub-question 3: What potential benefits can accrue to a business implementing telecommuting?

The benefits of telecommuting identified by participants are:

i) Reduction in time (two to four hours) spent travelling to and from the office and client premises.
ii) Decrease in psychological stress, both traffic and office related.
iii) Increase in productivity.
iv) Significant cost savings for companies and staff.
v) Increased access to externally skilled workers.
vi) Increased work-related flexibility for staff members.
vii) Increase in empowering staff members in terms of their management and ICT skills.

Research sub-question 4: How ready are staff members for telecommuting?

Staff members are largely ready to adopt telecommuting as the findings show that:

i) The necessary ICT skills are available (from both operational and support perspectives).
ii) There is a willingness to personally subscribe for reliable and fast ICT facilities to telecommute efficiently.
iii) Staff members are prepared to accept telecommuting to some degree.
iv) Staff members affirm they can properly manage their duties if given the chance to telecommute.

The next section presents a list of reasons why the adoption of telecommuting is slow in South Africa, and this answers the research main question (section 1.5.1) as well as fulfils the aim of the study which is to explore the reasons behind the slow adoption of telecommuting practice in South African organisations.

7.3 Answers to the main research question

The main research question is as follows: **What are the organisational reasons for the slow adoption of telecommuting in South Africa?**

Slow implementation of telecommuting can now be attributed to the following causes:

i) Although there are known benefits for telecommuting, there are still many technical, business and social challenges impeding its implementation. As yet, there are very few compelling external driving forces making telecommuting a “must have”. This is only likely to change if there are external forces driving company policy such as legislation, “green chain” compliance and customer demands.

ii) Telecommuting (and Green ICT) is considered to be under financial rather than environmental strategy. ICT resources enabling telecommuting—or example computers and internet bandwidth—are considered expensive. This impacts budgeting, especially when supporting a large number of staff to telecommute**.**

iii) Some ISP company infrastructures in South Africa may be below global standard, meaning people will experience unreliable internet connection. This leaves participants with doubt that there will be a reliable line of communication to perform processes if telecommuting is adopted**.**

iv) Companies are still driven by the “single bottom line” concept of economic well-being. Telecommuting, as part of Green ICT, falls more into the realms of environmental well-being of the triple bottom line.

v) Management’s lacks of support due to negative perceptions (such as fear of loss of control and lack of physical interaction between professionals) towards telecommuting are some of the reasons why telecommuting is slow.

vi) Some companies are in the situation that they are already committed to a long term rental agreement, so it is believed that if telecommuting is adopted, the company will be paying for office space they are not utilising.

vii) Telecommuting is considered to be more appropriate for big organisations to adopt because big companies would have large numbers of staff to benefit from a telecommuting programme.

viii) There are long term future plans towards adopting telecommuting as part of ICT/business strategy. These future plans include adopting telecommuting during disaster periods and when a company premise is fully occupied by workers.

From an organisational point of view, regarding reasons for the slow adoption of telecommuting, traditional management and leadership styles (e.g. seeing workers, seeing what they do and not trusting workers to manage themselves) are preventing the changes necessary to promote telecommuting in organisations. Not every job is

suitable for telecommuting (e.g. factory floor workers), making it hard to build a strategy for telecommuting that is seen to be “fair for all”.

7.4 The place of telecommuting and Green IT

It is important to understand the place or particular position of telecommuting and Green IT practices found in this study. These concepts of telecommuting and Green IT strategy are important in terms of summarising the kind of telecommuting practices found in the researched companies. Figure 7.1 is a proposed framework classifying the situation of telecommuting and Green IT practices.

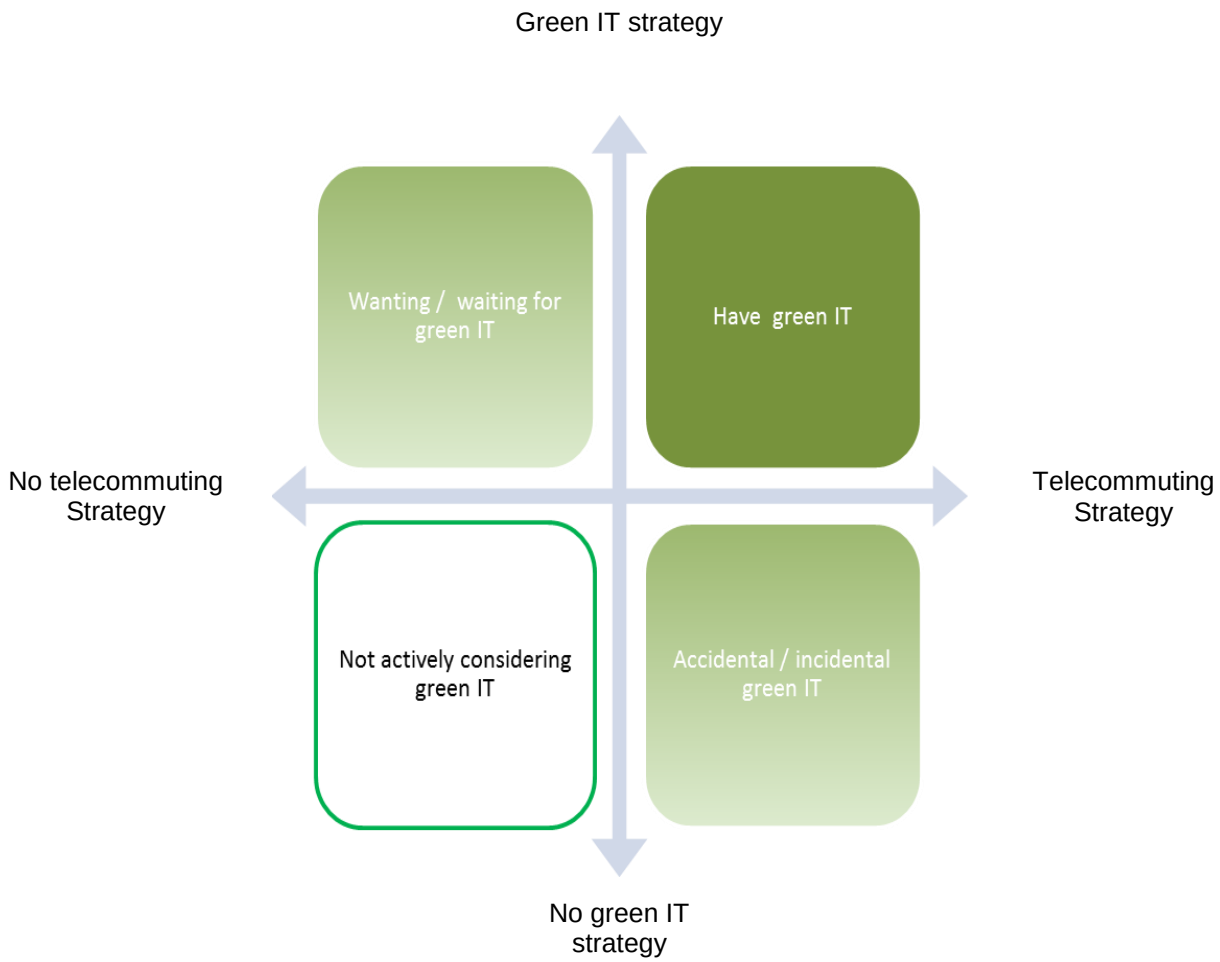


Figure 7.1: Telecommuting and Green IT classification framework

Each quadrant in the framework shows a different scenario in terms of telecommuting and Green IT practices:

- *Have Green IT:* None of the researched companies have a Green IT and telecommuting strategy combined. However, one company (i.e. C4) practices telecommuting often due to their ability to have strategised Green

IT and the fact that Green IT is their line of business. Thus, strategising Green IT actually promotes telecommuting

- *Incidental Green IT:* 100% of the companies have no telecommuting strategy. Telecommuting is not an aim or goal for these companies but tactically they allow it to happen, usually from personal circumstance perspective rather than it being a formal business plan. Furthermore, 78% of the companies have no Green IT strategy, but they do have activities that align with Green IT
- *Not actively considering Green IT:* The majority of the companies have no future plans strategising telecommuting (78%) and Green IT (67%)
- *Wanting Green IT:* Only three of the nine researched companies (33%) have strategised Green IT and only two (22%) companies have future plans to strategise telecommuting (section 6.2)

For a company to be classified into the "Have Green IT" quadrant, that company needs to build telecommuting and Green IT into their strategy. Thus, it can be seen from the description of Figure 7.1 that telecommuting and Green IT practices from selected companies fall under the quadrants "Incidental Green IT", "Not actively considering Green IT" and "Wanting Green IT". Generally, telecommuting is not an aim of the selected companies, nor is green ICT in general.

7.5 Recommendations

To improve the adoption of telecommuting and Green IT by South African organisations some concerns and issues need be addressed. The recommendations focus on raising awareness of staff members, companies and government on adopting telecommuting. It covers the importance of strategic planning, management support, emotional intelligence for managers and staff members, government involvement, and creating and redesigning tele-commutable jobs.

7.5.1 Strategic planning

The challenges listed in section 7.3 have led to the slow adoption of telecommuting in South Africa. For an obvious change in the behaviour of staff commuting to and from the office and for companies to move into the "Have Green IT" quadrant as described in Figure 7.1, telecommuting needs to be strategised as part of companies' ICT/business goals and objectives. Telecommuting programmes need to be part of a company's policy structures. Studies have long shown the importance of strategic planning in producing greater sustainability in an organisation. Strategic planning is beneficial because it targets goals within a longstanding framework by

shaping the future of an organisation and the environment at large. Planning strategically proposes change and standardisation at the same time and assists in decision making (section 2.2.5.1), for example, a company may create a strategy for “virtual offices”. This would promote the concept of working outside the standard office environment and could be justified by the saving of office space.

There is a need to move to sustainable development that will not only be based on using ICT for business processes, but one that also targets to reduce the vehicle kilometre travelled and time wasting on traffic. Such developments may reduce travelling time and result into a reduction of petrol consumption, thus leading to a reduction in GHG emissions and air pollutants from private vehicles.

It is recommended that telecommuting is adopted and used only between one and two days per week because of the negative perceptions that telecommuting could lead to loss of control over staff members and lack of physical interaction with colleagues. Further to this, findings from top managers’ individual readiness to telecommute pointed to one to two days per week. Thus, one or two days telecommuting in a week would be good for staff to still have interaction with people or colleagues and build working relationships. This can be achieved by companies setting up a “rotation schedule” that will allow specific team members (staff) to telecommute on certain days of the week when their colleague will be in the office providing support.

There are companies whose staff cannot telecommute because they need people physically in the office, whereas some staff members in other companies can (due to their kind of job and readiness to telecommute). For instance, if 100 people telecommute daily from the companies who can, it can make a difference to 100 people who commute to the office daily by lessening road traffic.

7.5.2 Management support

Management support is important as it influences the successful adoption of new ICT. Management support enables smooth incorporation of new ICT within the business processes. Company owners and managers need to participate in educative programmes, seminars and workshops aimed at educating them on innovative methods and ideas of using ICT for economic gains as well as social and environmental sustainability. Owners and managers of companies need to support their knowledge by receiving innovative training which will enable them to appropriately assess and adopt telecommuting programmes and appreciate technological innovations.

Because of the features of telecommuting it is essential to consider the need for specific managerial approaches or HRM practices. Managers need to undergo training to improve their emotional capacity in terms of developing social skills which will enable them to develop connections, communicate well with telecommuters and manage the relationships in order to lead change and build sustainable telecommuting teams. This will develop into a trustworthy relationship with potential telecommuters. Managers need to show commitment to telecommuting programmes by adapting, interpreting and implementing nascent organisational policies concerning telecommuting arrangements. Managers need to have an open, positive attitude towards telecommuting and learn how to supervise, communicate and stimulate performance between telecommuters irrespective of their absence from the typical office. They need to trust their employees in terms of managing job output (result). Emotional intelligence may aid managers in developing trustworthy relationships with their employees which can lead to sustainable telecommuting.

Successful examples of telecommuting should be drawn from more developed nations on how telecommuting programmes are used for Work-Life Balance and as a sustainable transportation demand management (TDM) choice to improve air quality and reduce road congestion (section 2.4.1.1). Moreover, Company 4 (C4) indicates that their international offices in Asia and Europe telecommute. This company can gain insights from their international office or colleagues on how telecommuting programmes are practiced.

7.5.3 Job redesign

HR needs to undertake job redesign and create jobs where appropriate to accommodate telecommuting. This must be done taking into account the emotional intelligence perspectives of both the telecommuters and their managers. There is a need to outline jobs not conducive to telecommuting, and it is important to provide a description of the general responsibilities of a telecommuter.

Ideally, staff members should take up the initiative and request to telecommute because of the benefits telecommuting offers them. However, such staff members will need to demonstrate they have the necessary emotional intelligence to be disciplined, responsible and motivated about telecommuting, have good communication skills and consistently show the ability to work independently. Staff members who are not ready to telecommute will need training to further develop their emotional intelligence so they are able to manage their life and tasks at home. This will convince management that the work will be done, which will in turn motivate

management to provide the needed infrastructure to enable successful telecommuting.

7.5.4 Telecommuting infrastructure

Many of the enabling telecommuting technologies are available on the market. Technologies such as broadband internet connections and collaborative technologies (e.g. Microsoft Lync) are important as they keep people connected and enable the sharing and dissemination of documents. Similarly, telecommuters' performance can be managed using existing products to check on their productivity and deliverables with this kind of work programme. The use of collaborative technology for telecommuting programmes can assist telecommuters to overcome the lack of context and absence from informal communication.

There is a need for 24/7 redundancy services (at the office and in telecommuters' homes) so that people can telecommute anytime and anywhere. Due to Eskom's interruptions—specifically load shedding—UPS (Uninterruptible Power Supply) will be necessary to enable telecommuting at any time. Furthermore, a telecommuter needs to study the load shedding time schedules in his/her neighbourhood and deliver urgent tasks before load shedding commences.

7.5.5 Government involvement

Government involvement, as the findings suggest and as described in the developed world (section 2.4.1.1), is needed. Creating educational and awareness policies would encourage the adoption of telecommuting into the public and private sectors. The awareness may be in the form of text messages or televised commercials showing successful examples and potential benefits of telecommuting. Government may provide benefits to any company implementing telecommuting. By doing so, companies are getting a direct financial benefit which could possibly reduce their expenses. Government should link telecommuting policies to policies involving environmental issues, thus partially satisfying the international calls for environmental awareness. Government should also encourage ISP companies to strengthen their communication lines to global standards in order to satisfy businesses seeking high speed internet connectivity for their staff to perform job processes from home.

It is recommended that telecommuting adoption first start from government sectors as implemented by some of the developed nations (section 2.4.1.1). Once proven to work in a specific environment, telecommuting can be rolled out to bigger companies and later extended to smaller companies. This way smaller companies

who consider telecommuting programmes best suited for bigger companies, or companies who are waiting (for people, other companies or the government) to adopt telecommuting as described in Figure 7.1, would see successful examples from the government.

Telecommuting can be part of a risk mitigation strategy that enables companies ensure the continuation of important services during disasters.

7.6 Research contributions

The sub-sections below discuss the theoretical and practical contributions of this research.

7.6.1 Theoretical contribution

The study's theoretical contribution is to the telecommuting literature, and this falls within the Green IT research field which consists of the second and third order effects of ICT on the environment. It includes using ICT to improve the efficiency within economic and business processes, for example businesses that are key sources of greenhouse gas emissions as in transportation, and this happens when an extensive use of ICTs results in changes in the structure of the economy and lifestyles (Dedrick, 2010:174). Findings resulted in the conceptualisation of extending the G-readiness Model of Molla *et al*. (2011:84) which was used as the basis of proposing a guideline to assist companies adopting telecommuting.

Analytical frameworks were developed during the course of this study for considering telecommuting adoption (Figure 6.1) and defining the place of telecommuting and Green IT in South Africa (Figure 7.1). These frameworks could assist in assessing and defining the place of telecommuting and Green IT in a South African context. The frameworks may be used in other cities for the same purpose.

7.6.2 Practical contribution (framework to guide organisations for telecommuting)

Knowledge was gained that telecommuting could potentially increase productivity in organisational context, increase job satisfaction among staff, improve communication with customers, and reduce travelling time and GHG emissions emanating from traditional commuting.

Furthermore, the study could provide decision makers, policy makers and management with information that may add towards reducing carbon dioxide emissions from vehicles. This study may also assist organisations in realising their triple bottom line (economic, social and environmental sustainability). The study's

conceptual model (Figure 6.1) is a proposed guide for organisations to adopt and assess telecommuting for sustainability in South Africa.

The study confirms the need for telecommuting in South African organisations based on staff members' readiness to telecommute and benefits of telecommuting such as reduced stress, both traffic and office related. This need is not yet met because of a lack of management support and telecommuting strategy.

Society in general could benefit from telecommuting by making small contributions that can assist in protecting the environment from climate change. Telecommuting could make life less demanding or stressful because of its flexibility, thereby creating the right to an environment that is not harmful to health and well-being. Telecommuting adoption could help companies realise Elkington's (2004:1) triple bottom line which represents the economic, social and environmental sustainability and enables companies to comply with the Clean Air Act law of protecting the environment.

7.7 Research limitations

This study was limited to nine companies from four different sectors (IT firm, insurance, investment management company, hospitality industry and higher institution), and they include big, small, multinational and local companies. The companies are all from the Western Cape Province, South Africa, and generalisation is therefore limited. In total, 19 officials participated in the study. A larger sample would probably have produced more widespread reasons for the slow adoption of telecommuting in South African organisations.

This study focused on exploring the reasons behind the slow adoption of telecommuting. It did not measure the amount of carbon dioxide emissions from vehicles saved from one of the companies who actively practice telecommuting. It also did not measure the amount of carbon dioxide that would be saved if telecommuting is adopted by companies.

Importantly, attention was not given to possible demographic variables such as age and gender with regard to questions posed to participants.

7.8 Recommendations for further research

Bearing in mind some of the limitations of this research, future research could widen and complete the accounted information below:

i) Future research should focus on a larger sample size, especially from government parastatals (public sector) both in the Western Cape and other

provinces in South Africa to further produce more widespread reasons for the slow adoption of telecommuting and ascertain the readiness of staff to telecommute. There is a need for research to be conducted in the public sector as most telecommuting literature seems to focus on studies from the private sector.

ii) Research needs to be done linking telecommuting acceptance to demographic variables such as age and gender.

iii) Research needs to be done linking telecommuting adoption and company descriptors such as market sector and size.

iv) Case studies detailing the adoption of telecommuting would give insight into some of the practical implications of the subject.

v) Quantitative research could be undertaken to assess the extent to which the factors behind the slow adoption of telecommuting affect telecommuting adoption.

vi) Further research should be conducted to find out how staff members' emotional intelligence can be developed in order to telecommute.

7.9 Recalling on the researcher's journey

According to Patton (1999:1198), the researcher is the instrument through which data is collected in a qualitative inquiry. Therefore, a qualitative study needs to comprise information about the researcher, bringing into account his capabilities, training, perspective, values and worries as each may affect the output or quality of the end result. Additionally, Patton advises that a true account of the research journey be given, bringing into mind the topic development, limitations and background.

With a computer science training background and other professional experience, carrying out this research was still challenging in terms of the detail of work expected as well as the allocated time frame. The study being a qualitative approach, every detail of the research process (including data collection from relevant documents, literature, semi-structured interviews and the content analysis) needed to be stated in a way that conforms to the requirements of a full research Master's degree.

The idea for this study was developed on the perception of cloud computing which of course is a subset of green computing. The researcher studied the advantages of cloud computing and linked it to the South African environment after having read an article published by the CSIR that vehicle kilometres travelled (VKT) need to become less in order to lessen carbon dioxide emissions from vehicles in South

Africa. Further study showed that South Africa, being a member of the Kyoto protocol (an association creating awareness on combating climate change), encourages any practices, processes or ideas that will control, reduce or prevent anthropogenic emissions of greenhouse gases. Thus, the telecommuting idea was born.

Not all companies approached to participate in the study did, as some would categorically say “no” whilst others would promise to give their consent but never did (over 20 companies were approached). The fieldwork was adventurous and a learning period; having conversations with top executives was inspiring.

Figure 7.2 is a flowchart summarising the study process. The oval shapes in the flowchart indicate the beginning and end of the project, the rectangle shapes indicate the process, and the diamond shape indicates decision points.

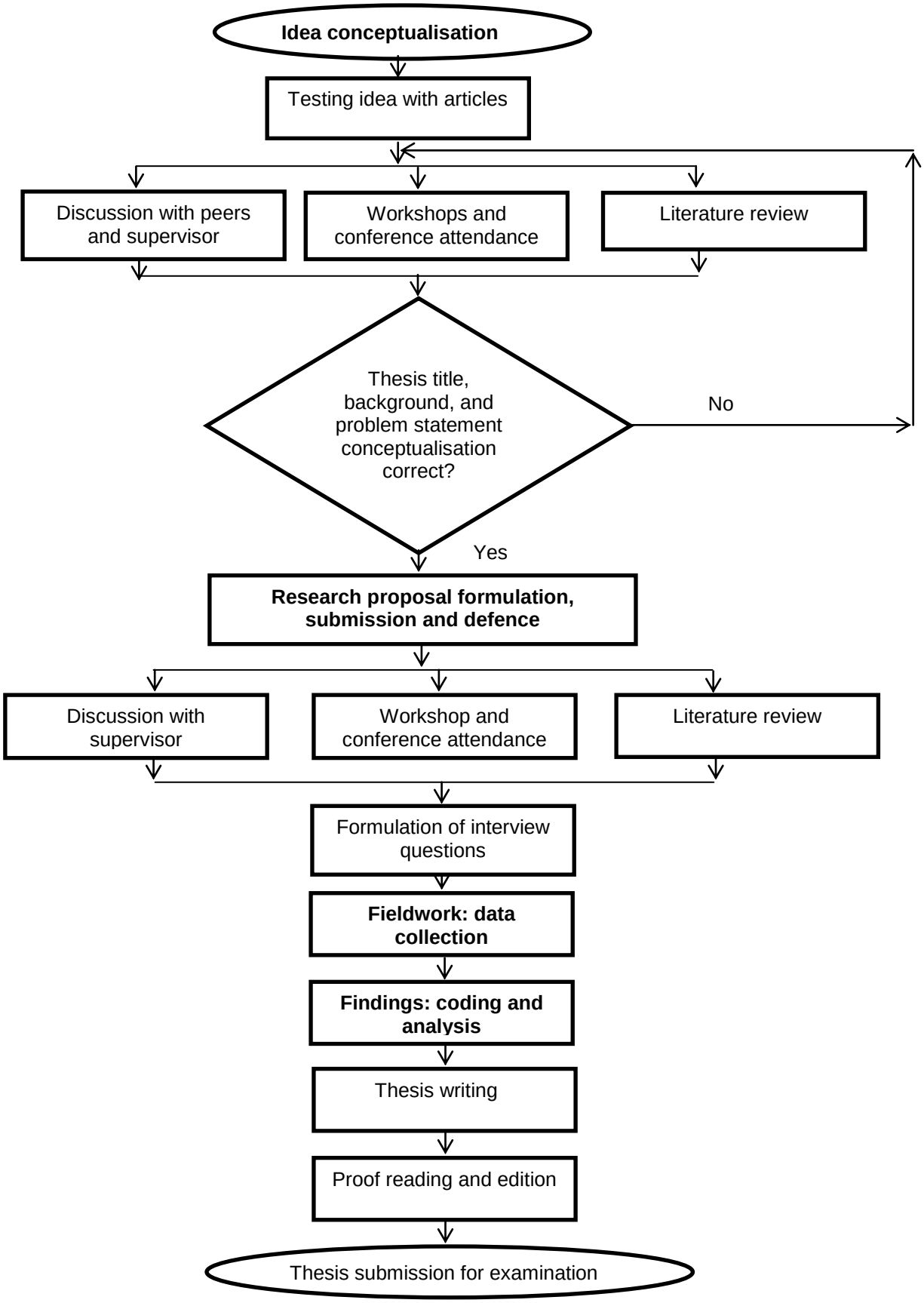


Figure 7.2: Flow chart of researcher's journey

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Appendix A: Introductory letter for data collection

Introductory letter for the collection of research data

Joy Nwakego Okoli is registered for the MTech (IT) degree at CPUT using student number 213073579. In order to meet the requirements of the university's Higher Degrees Committee (HDC) the student must get consent to collect data from organisations which they have identified as potential sources of data. The thesis is titled: "The slow adoption of telecommuting in South Africa".

The aim: This study seeks to identify the reason behind the slow adoption of telecommuting practice in South African organisations. To accomplish this, the study will identify perceptions organisations have towards telecommuting, understand factors that can drive the adoption of telecommuting into business strategy, understand benefits organisations think can accrue to them if telecommuting is adopted. This will be done from a variety of viewpoints.
The supervisor(s) for this research are:

Supervisor:
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In this case the student will use semi-structured interviews to collect data. Semi-structured interviews are those where the interviewee will be asked initially precise questions and later broad questions. The interviews should take about 30 minutes to complete.

If you agree to this, you are requested to complete the attached form (an electronic version will be made available to you if you so desire) and print it on your organisation's letterhead. For further clarification on this matter please contact either the supervisor(s) identified above, or the Faculty Research Ethics Committee secretary (Ms V Naidoo) at 021 469 1012 or naidoove@cput.ac.za.

Regards,
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Appendix B: List of participants and objectives

Participants were selected from the population IT/HR managers, telecommuters, and non-telecommuters.

Participants	Rank	Objectives	Status
1	Chief Executive Officer	To obtain insight into their perception of telecommuting and its adoption of business strategy.	Achieved
2	Branch Manager	To obtain insight into their perception of telecommuting and its adoption of business strategy.	Achieved
3	IT Manager	To obtain insight into their perception on telecommuting and whether they are ready IT-wise to adopt it.	Achieved
4	HR Manager	To obtain insight into their perception on telecommuting and its adoption of business strategy.	Achieved
5	Marketing Officer	To obtain insight into their perception on telecommuting and its adoption of business strategy.	Achieved
6	HR Manager	To obtain good insight into their perception of telecommuting and its adoption of business strategy.	Achieved
7	IT Manager	To obtain insight into their perception on telecommuting and whether they are ready IT-wise to adopt it.	Achieved
8	Finance Manager	To obtain insight into their perception on telecommuting in general.	Achieved
9	Chief Information Officer, and a Programme Manager role	To obtain insight into their perception on telecommuting and whether they are ready IT-wise to adopt it.	Achieved
10	HR Manager	To obtain insight into their perception towards telecommuting and its adoption into business strategy.	Achieved
11	IT manager	To obtain insight into their perception on telecommuting and whether they are ready IT-wise to adopt it.	Achieved

Participants	Rank	Objectives	Status
12	IT Manager	To obtain insight into their perception towards telecommuting and whether they are ready IT-wise to adopt it.	Achieved
13	Contract Specialist	To obtain insight from tele-commuters and non-telecommuters and determine if staff members are ready to telecommute.	Achieved
14	Sales Coordinator	To determine staff members' readiness to telecommute and their perception towards it.	Achieved
15	IT Engineer	To obtain insight from tele-commuters and non-telecommuters and determine if staff members are ready to telecommute.	Achieved
16	Billing Office Manager	To determine if staff members are ready to telecommute, and to obtain insight from telecommuters and non-telecommuters.	Achieved
17	IT Manager	To obtain insight into their perception on telecommuting, and whether they are ready IT-wise to adopt it.	Achieved
18	Marketing Coordinator	To determine if staff members are ready to telecommute, and to obtain insight from telecommuters and non-telecommuters.	Achieved
19	Planner	To determine if staff members are ready to telecommute.	Achieved

Appendix C: Interview schedule for company representatives

Semi-structured questions

Interview Question (IQ)

Main Research Question	**What are the organisational reasons for the slow adoption of telecommuting in South Africa?**
Research sub-question 1	**How does the organisation perceive telecommuting?**
IQ1.1: Do you have a Green IT strategy? If no, why not? **Response:**	
IQ1.2: What green strategies do you have? If none, why not? **Response:**	
IQ1.3: What future strategic plan do you have for Green IT? If none, why not? **Response:**	
IQ1.4: Do you have a telecommuting strategy? If yes, please explain? If no, why not? **Response:**	
IQ1.5: What future strategic plans do you have for telecommuting? If none, why not? **Response:**	
Research sub-question 2	**How can the organisation adopt telecommuting as part of their ICT/business strategy?**
IQ2.1: In your opinion, what are the factors that can drive the adoption of telecommuting into your organisation's business strategy? **Response:**	
IQ2.2: What management style is best suited for telecommuters since they are out of sight half of the time? **Response:**	
IQ2.3: What qualities or skillset should an employee have before he/she can be allowed to telecommute? **Response:**	
IQ2.4: How ready is your firm for telecommuting in terms of management support, technological infrastructure and the staff? **Response:**	

Research sub-question 3	What potential benefits can accrue to a business implementing telecommuting?
IQ3.1: What benefits do you think your company can get if telecommuting is adopted? **Response:**	
Research sub-question 4	**How ready are staff members for telecommuting?**
IQ4.1: Do you telecommute? If yes, how did you start telecommuting? If no, would you want to telecommute if given the chance? Why yes, why not? **Response:**	
IQ4.2: How skilful are the staff members in terms of ICT usage? **Response:**	
IQ4.3: What impact will IT skilled employees have on telecommuting? **Response:**	
Generally, what would you say your perception is towards telecommuting? **Response:**	

Appendix D: Interview schedule for staff members

Semi-structured questions

Interview Question (IQ)

IQ1: Do you telecommute? If yes, how did you start telecommuting? If no, would you want to telecommute if given the chance? If yes, explain. If no, why not? **Response:**
IQ2: Do you think you will be able to manage yourself with your input, and manage your time when telecommuting? If yes, what job do you do? If no, why not? **Response:**
IQ3: In your opinion, what are the factors that can drive the adoption of telecommuting into your organisation's business strategy? **Response:**
IQ4: Do you see that management will need to change in a company like this for telecommuting to be strategised? **Response:**
IQ5: What management style do you think would be good for telecommuters? **Response:**
IQ6: What qualities or skillset should an employee have before he/she can be allowed to telecommute? **Response:**
IQ7: What benefits do you think your company can get if telecommuting is adopted? **Response:**
Generally, what would you say is your perception is towards telecommuting? **Response:**

Appendix E: Transcription for company representative

Participant 1

Rank: Chief Executive Officer

Company: C1

Research sub-question 1	**How does the organisation perceive telecommuting?**

IQ1.1: Do you have a Green IT strategy?

Response:

Yes we do have an IT strategy. We are in the business of managing print services. We take over printers, faxes, copiers, and paper of big organisations for instance Old Mutual Finance. We maintain it, it becomes ours and we bring down the cost of printing. Our strategy is to reduce printing and to do that through digitisation. What you call telecommuting, I call it *dynamic workplace* because you can work from anywhere at any time. Our strategy is to enable people [to] share documents without printing them. We sign documents digitally, distribute them digitally, and we do everything digitally. Technically, [a] one page document can be signed by 5 people across the world in ten minutes, without printing it. So if big organisations could reduce paper and printing, it would be greener.

So we buy generic cartridges because it is half the price because it is made of plastic. We make sure that people print on both sides of the paper and not one-sided. We ensure that people print less, and we report on that. If they print less, the third largest industry in the world in terms of water usage is paper manufacturing companies like Sappi. So we are encouraging our clients to find ways of not using papers. That way it will reduce the amount of water consumption of paper companies, and this will make the world greener. Again, our machines turn themselves off if we don't use them.

There is a terminology we call 'follow me print'. You send out for printing, walk to any machine, put in your paper, it will print. But if you forget to put in your paper or log in, after twenty four hours, the document sent out for printing will be deleted. That way, papers will not be loosed [sic].

Further question: Is there a documented strategy for this, you called it dynamic workplace of the future?

Response:

Document, No! Dynamic workplace is a result of the technology that is available, so people can now work anytime, anywhere. It means one is never offline, working from anywhere.

Appendix F: Transcription for staff members

Participant 13

Rank: Contract Specialist

IQ1: Do you telecommute?

Response:

Em.. I will be from February 2015.

Further question: Interesting

Response:

I just got a new position in Johannesburg so they work remotely via office. I will be working for Johannesburg office from home here in Cape Town.

Further question: For how long? Is it on [a] Full-time basis?

Response:

Till I quite (smiles). Yes!

Further question: That's quite interesting. Why are you excited about it?

Response:

I will be saving lots of petrol, saving petrol money and saving lots of money in maintaining my car, and saving lots of time in traffic.

IQ2: Do you think you will be able to manage yourself with your input and manage your time?

Response:

Definitely, yes! People will not be coming to your desk chatting (distraction), and you will not have negative colleagues around you. That's a problem for me at this stage so that would be quite nice.

Appendix G: Categories and themes arrangement

The table below presents categories and themes from both groups *company representatives* and *staff members*. Concatenation and aggregation of the codes formed categories.

Table 1: Company representatives (number of staff in this group: 14)

Question No.	Codes (phrases)	Categories	Themes	Number of companies
Q1.1 Q1.2 Q1.3 Q1.4 Q1.5 Q2.1	Companies that have Green IT strategy	ICT/Business goals and objective	Policy	3
	Companies without Green IT strategy	ICT/Business goals and objective	Policy	6
	No future strategic plan for Green IT	ICT/Business goals and objective	Policy	6
	No telecommuting strategy	ICT/Business goals and objective	Policy	9
	No future plans to adopt telecommuting as a strategy	ICT/Business goals and objective	Policy	7
	Companies with future plan to strategise telecommuting	ICT/Business goals and objective	Policy	2
	Management not ready to support telecommuting program	ICT/Business goals and objective	Policy	9
	Companies with other green strategies	Business goals and objective	Policy	5
	Companies without other green strategies	Business goals and objective	Policy	3
Q1.1 Q1.2	Processing of documents digitally	Printing	Practice	9
	Printing on both sides of paper	Printing	Practice	9
	'Follow me print'	Printing	Practice	1
	Cut down on electricity and water usage	Save the planet	Practice	2
	Green building	Save the planet	Practice	1
	Planting of trees and treatment of waste water	Save the planet	Practice	2
Q2.1 Q2.4	ICT resources for telecommuting (computers, video/telephone conferencing, cell phones and emails, 3G card, Wi-Fi network)	Connectivity	Technology	4
	Internet connectivity must be of global standard, accessible, fast, and reliable	Connectivity	Technology	4
	ICT management tool	Connectivity	Technology	2

	Technology infrastructure readiness	IT device readiness	Technology	8
	Not technologically ready	IT device readiness	Technology	1
	Staff / Information jobs (documentation, planning, IT, administrative task, financial consultant, group schemes advisers, contract workers, administrative data capturing, investment professionals, copy editors, IT staff, business analyst and systems analyst role, sales people and customer helpline person)	Tele-commutable jobs	Tele-commutable Jobs	7
Q1.5 **Q2.1** **Q2.4** **Q3.1**	Telecommuting practices ("Tele-overtime", contract workers, geographical distance telecommuting)	Attitude towards telecommuting	Attitude & Perception	9
	Management not ready to support telecommuting	Perception on adoption	Attitude & Perception	9
	Cheap internet bandwidth and ICT resources are needed	Perception on adoption	Attitude & Perception	8
	Poor road infrastructure	Perception on adoption	Attitude & Perception	1
	Staff members need to request to telecommute	Perception on adoption	Attitude & Perception	2
	Creation of new business by young people	Perception on adoption	Attitude & Perception	1
	If staff members were to travel for hours to the office	Perception on adoption	Attitude & Perception	1
	External influences such as governmental support and business partners	Perception on adoption	Attitude & Perception	2
	Less traffic congestion and reduced time in travelling	Perceptions on benefits	Attitude & Perception	5
	Reduction of carbon emissions	Perceptions on benefits	Attitude & Perception	1
	Quality time with family (increased flexibility)	Perceptions on benefits	Attitude & Perception	6
	Significant cost savings	Perceptions on benefits	Attitude & Perception	5
	Increased productivity	Perceptions on benefits	Attitude & Perception	4
	Access to skilled workers	Perceptions on benefits	Attitude & Perception	1
Q2.2 **Q2.3**	Managerial attributes (e.g. mature manager, strong leader, high EQ, and allow staff to self-manage)	People and project management	Governance	2

	Result or output-driven (New Age) thinking	People and project management	Governance	3
	Set clear targets each day or every week	People and project management	Governance	2
	Training and working in teams	People and project management	Governance	2
	A policy structure for telecommuting	People and project management	Governance	2
	Allocation of ICT resources	People and project management	Governance	2
	Employee's competency must be relied upon	Telecommuter attributes	Governance	3
	Ability to work independently	Telecommuter attributes	Governance	3
	Managerial attributes (self-starter, self-management skills, planning, strong accountability, time management, self-motivated, focused, IT literate, a graduate)	Telecommuter attributes	Governance	6
Q2.3	Good communication (good delegator)	Good communication skills	Emotional Intelligence	4
	Trust	Trust issues	Emotional Intelligence	3
	Must be disciplined	Trust issues	Emotional Intelligence	5
Q2.4 **Q4.1** **Q4.2** **Q4.3**	Employees have ICT skills (average and expert)	IT skilled	Staff Readiness	8
	Being IT skilled is an advantage to telecommuting	IT skilled	Staff Readiness	8
	Younger generation are more IT skilled	IT skilled	Staff Readiness	1
	People can be trained in IT	IT skilled	Staff Readiness	1
	Staff members are ready to telecommute	Acceptance	Staff Readiness	5
	Some staff are ready to telecommute while some are not	Acceptance	Staff Readiness	2
	Staff not ready to telecommuting	Acceptance	Staff Readiness	1
	Top managers personally want to telecommute	Acceptance	Staff Readiness	9

Table 2: Staff members (number of staff in this group: 5)

Question No.	Codes (phrases)	Categories	Themes	Number of staff members
Q3	Unreliable internet connection (internet needs to be reliable)	Connectivity	Technology	2
	ICT management tool	Connectivity	Technology	1
	ICT resources for telecommuting (computers, video/telephone conferencing, cell phones and emails, 3G card, Wi-Fi network)	Connectivity	Technology	3
	Availability of the right technology (such as Internet connectivity has to be of global standard, accessible, fast, and reliable)	IT device readiness	Technology	3
Q1 **Q2** **Q4**	Staff members' jobs (contract specialist, sales coordinator, IT support role in audio visual and video communication, billing office manager, IT manager, marketing coordinator, planner)	Tele-commutable jobs	Tele-commutable Jobs	7
Q2 **Q3** **Q4**	Telecommuting practices (tele-overtime)	Attitude towards telecommuting	Attitude & Perception	1
	Full-time telecommuter	Attitude towards telecommuting	Attitude & Perception	1
	Job description, company's business or culture	Perception on adoption	Attitude & Perception	2
	External influence such as the government and business partners	Perception on adoption	Attitude & Perception	2
	Family structure or dynamics	Perception on adoption	Attitude & Perception	3
	Power infrastructure	Perception on adoption	Attitude & Perception	1
	People's perception		Attitude & Perception	3
	Managers need to change (management support)	Perception on adoption	Attitude & Perception	5
Q7	Less traffic congestion, reduced time in travelling, and reduction of carbon emissions	Perceptions on benefits	Attitude & Perception	3
	Increased productivity	Perceptions on benefits	Attitude & Perception	6
	Reduction in psychological stress	Perceptions on benefits	Attitude & Perception	2
	Significant cost savings	Perceptions on benefits	Attitude & Perception	4
	Increased flexibility	Perceptions on benefits	Attitude & Perception	3

Q5 **Q6**	External influences such as government	People and project management	Governance	1
	Result driven: quality and deliverables	People and project management	Governance	4
	Training	People and project management	Governance	1
	History of jobs completed	People and project management	Governance	1
	Managerial attributes (maturity, accountability, commitment, dedication)	Telecommuter attributes	Governance	4
Q6	Good communication	Good communication skills	Emotional Intelligence	5
	Trust	Trust issues	Emotional Intelligence	4
Q1 **Q2**	Staff members want to telecommute	Acceptance	Staff Readiness	7
	Staff can manage their duties telecommuting	Acceptance	Staff Readiness	7