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GORDON INSTITUTE
OF BUSINESS SCIENCE

University of Pretoria

MINDSETS REQUIRED FOR IMPLEMENTING A VIRTUAL WORKPLACE

by

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A research project submitted to the Gordon Institute of Business Science, University of Pretoria, in partial fulfilment of the requirements for the degree of Master of Business Administration

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ABSTRACT

The research centres on the theme that, even though there are various drivers for a more virtual workplace, ranging from organisational, workforce and technology to environmental issues, it seems that progress in adopting virtual work on both individual and organisational level, is still low. The purpose of the research is to determine if there are specific mindsets required to make the implementation of a virtual workplace more successful, with the aim of making recommendations to organisations, managers, teams and individuals for improved implementation strategies.

The research defined the target population as a large South African Information and Communication Technology (ICT) company, and its customers. A combination of quantitative and qualitative methods was used. Data relating to needs, perceptions, practicality and readiness concerning the virtual workplace was collected on three levels, namely individual, team and organisational level. The quantitative research covered the objectives relating to the individual level through questionnaires which were sent out in the form of online surveys. The qualitative research covered the organisational level research through individual interviews with the IT/HR managers, while the team level research was covered through focus group interviews.

The study found that various mindsets and needs do exist, and on an individual level the mindsets and needs are not restricted to specific generations. This could be of significance to HR and IT managers in general, who may need to take a wider target group into consideration when designing policies and standards for the organisation. Secondly the organisation itself emerged as an

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entity with a minds lividuals working for the organisation. To implement a virtual workplace would, therefore, require an overarching strategy and organisational change interventions to ensure that all the facets of a virtual workplace are addressed in a balanced way.

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University.

_____ _____

Karen Luyt **Date**

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CHAPTER 1

1 INTRODUCTION TO RESEARCH PROBLEM

1.1 TITLE AND SCOPE

The title of the research project is: “Mindsets required for implementing a virtual workplace”.

The definitions listed below apply, and will be explored in more detail in the literature review presented in Chapter 2.

- Mindsets of individuals, teams, managers and organisations will be explored. Mindsets relate to attitudes, outlooks, ways of thinking and approaches[1] manifesting in the behaviour of individuals and groups.
- This research will combine the definitions of telework, telecommuting, mobile work, worker mobility, e-workplaces and high-performance workplaces into the all-encompassing term of the **“**virtual workplace**”**, which aims to take into account the flexibility of time (including schedule and proportion), and location inherent in all of these concepts, and made possible by technology as a key driver (Igbaria and Tan,1998; Siha and Monroe, 2006; Hloma and Ortlepp, 2006; Schweitzer and Duxbury, 2006; Thatcher and Zhu, 2006; Fiering and Kirwin, 2006).

Although the Information and Communications Technology (ICT) industry previously had the most jobs relating knowledge workers, who would be more suited to the flexibility provided by a virtual workplace and its technology

[1] Synonyms for “mindset” were obtained in the Thesaurus of Microsoft Office Word 2003.

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(Schweitzer and Du 5), with the new wave of technologies accelerating the information age as well as globalisation, knowledge workers have become more prolific (Donaldson and Weiss, 1998; Harvey, Novicevic and Garrison, 2005; Friedman, 2006). More recently, knowledge workers can also be found in industries which traditionally precluded this type of work, such as manufacturing and mining. It would, therefore, be appropriate to include other industries as part of the research.

The remainder of this chapter is dedicated to describing the overall research problem and setting the research objectives. It also serves to motivate why the research is important.

1.2 RESEARCH PROBLEM

A substantial amount of research and investigation has been conducted on the topics of telecommuting, telework, mobile work and the virtual workplace, with references starting as early as 1979 (McCloskey and Igbaria, 1998; Siha and Monroe, 2006). However, it seems the uptake of teleworking has not been as forthcoming as expected with a general reluctance to implement any one of the virtual workplace strategies more broadly within organisations (Schweitzer and Duxbury, 2006; Siha and Monroe, 2006). This is in spite of the advancement of technology which is changing both the nature of work and the nature of relationships within in the work environment (Loogma, Umarik and Vilu, 2004; Diamond and Lafferty, 2000; Jones, 2006).

In market research conducted by global research company Simpson Carpenter on behalf of Nokia Enterprise solutions, it was found that a visionary disparity

exists between the [illegible] the workforce, and the decision-maker's involvement in setting a mobile strategy. It seemed as through the decision-makers underestimated the perceived impact and use of mobile technology by the employees (Nokia, 2006). Further to this research, Clear and Dickson (2005, p. 230), found that it was "attitudes to telework and management style", rather than the availability of ICT which were holding back the adoption of telework in small enterprises. Julian Liebenberg, divisional executive at Business Connexion Communications (Computer Business Review, 2007) makes the statement that "the biggest barrier to adoption of mobile and wireless technologies is neither cost nor technological know-how, but conservative attitudes towards people management." Gartner (IT Online, 2007) is refers to the next-generation "digital native" who will demand to make the choices for technology, workplace, tools and methods of collaboration. This is in contrast with organisations traditionally deciding on the technology, services and work style required for their employees. Froggatt (2001, p. 6) also states in her book "Work Naked", that "the obstacles (to work from home) are usually mind-sets and traditional corporate norms that we need to challenge ourselves, or re-examine".

From the above, a common theme concerning employees, managers and organisations, their attitude towards work and technology and also their inclination for embracing new work and life-styles, becomes apparent. The question now arises as to how the attitudes and mindsets that would promote the implementation of a virtual workplace strategy could be defined. Is it possible that the reluctance to implement a virtual workplace strategy could be explained by the generational gap between the decision-makers and the work

force in organisati[illegible]e mindsets lead to the definition of a more successful strategy for implementing virtual workplaces by taking the attitudes of different generations into consideration?

1.3 RESEARCH OBJECTIVES

The fundamental question this research intends to answer is: "*Are there specific mindsets that would be more supportive of a virtual workplace strategy in organisations, and if so what are they?"*

The main objectives of the research are set out below.

- Objective 1 is to determine the attitudes, perceptions, needs and behaviours of individuals regarding the desirability of a virtual workplace and whether there is any variation in attitude between individuals based on generational differences.
- Objective 2 is to determine the perceptions of individuals about their manager's attitudes and behaviours regarding the implementation of a virtual workplace, and if there is any difference in attitude based on generational differences between the two groups (managers vsemployees). The objective is also to determine if managers who fall in the younger age group are more likely to support the implementation of the virtual workplace, than older managers.
- Objective 3 is to determine the mindsets required by virtual teams in order to support positive outcomes of work and project deliverables in a virtual workplace.
- Objective 4 is to determine the need, readiness and practicality of implementing a virtual workplace from an organisational point of view.

A secondary objective is to determine how many individuals already engage in virtual work, and also compare their profiles to the profiles of individuals who telework, as found in studies conducted in America and Canada (Froggatt, 2001; Schweitzer and Duxbury, 2006), as well as the Tobin study (1994) in South Africa. The fifth objective relating to the secondary level is set out below.

- Objective 5a is to determine how many individuals are currently engaging in virtual work.
- Objective 5b is to determine the profile of individuals that engage in virtual work, and if this compares with the profiles of individuals who telework, as found in the Canadian and American studies as well as the Tobin study

1.4 RESEARCH MOTIVATION

The research investigating the virtual workplace is currently more relevant than ever. From a technological point of view, wireless technology, mobile devices and the convergence of telecommunications technology are the dominant driving forces (IT Web, 2005) that are changing the modern-day workplace. Coupled with this, is the fact that the younger generations, referred to by Codrington and Grant-Marshall (2004) as Xers and Millennials, and by Gartner (IT Online, 2007) as “digital natives”, have grown up with technology around them, thereby giving them a mindset whereby they are expecting to use this technology in a collaborative and flexible workplace environment. Gartner also predicts (Clark, 2006, p.1) that “by 2009, 70% of knowledge work will occur in locations where workers will depend on wireless and remote-access infrastructure that is outside the enterprise’s direct control”.

From an organisati (HR) managers need to understand the different generations and their approach to work and work/life balance (Codrington and Grant-Marshall, 2004; Prentice, 2007) in order to define relevant recruitment and retention strategies to ensure the future success in their Organisations. For example, by allowing workers to choose the best time, location and technologies required for work, key talent may be retained and productivity of workers can be increased (Froggatt, 2001; Joice and Verive, 2006). Chief Information Officers (CIOs) and Information Technology (IT) managers need to consider IT strategies which will accommodate these new virtual workplaces and ultimately accommodate and exploit the benefits of the more mobile work styles (Jones, 2006; Logan, 2003).

From an environmental point of view, US companies were forced in 1990 by the Clean Air Act to reduce the number of their employees who were commuting by 20%. Telecommuting (i.e. working from home) was seen as a means to achieve this reduction in air pollution (Siha and Monroe, 2006). In South Africa, even though numbers of registered vehicles are increasing annually - 6.65% in 2005 (RTMC, 2006) and a further 7.20% in 2006 (RTMC, 2007) - there is no government policy enforcing similar actions in South African organisations. The increasing number of vehicles on the road is causing not only additional pollution, but adding to traffic congestion, thereby making it more and more difficult to commute efficiently to central office locations every morning, or to satellite offices to attend meetings and other work-related activities during the day. Many hours of potentially productive time are lost in traffic per day. By implementing a virtual workplace strategy, some of these hours lost during commuting could be “recovered” (Froggatt, 2001), while at the same time a

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small contribution d traffic could be made (Siha and Monroe, 2006).

From a National perspective, there is a drive from Government to support Digital Communities. “The key to the concept of a Digital community is based on the ubiquitous broadband delivered to the entire community via a mixture of wireless and fixed line connectivity” (BMI-TechKnowledge, 2006, p. 10). This implies that communities will be “virtually” connected with Government, and will apply for services online. To this end, the Government budgeted in 2007 for various IT mega projects such as e-Passport, the Electronic Document System (eDMS) and “Who am I online” (Kaplan, 2007). In addition to this, the national initiative to support previously disadvantaged individuals by granting them preferential employment can be supported by a virtual workplace strategy. People with disabilities can more easily become economically active by working from home, where there may potentially be more physical provision to accommodate their disabilities (Nunes, 2005; Hewitt, 2007; Brownson, 2004).

Finally, in the global economy, teams are distributed across countries and continents (Jones, 2006). It is important to ensure that South Africans are ready to face the challenges posed by this type of mobility and virtual workplace requirement.

1.5 STRUCTURE OF THE REPORT

The rest of the document is laid out according to the scientific research method. Chapter 2 contains the literature review which evaluates research previously undertaken and establishes how the phenomenon of the virtual workplace and

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related mindsets ar search works. Chapter 3 restates the objectives of the research as testable propositions as well as research questions to be answered. The five objectives are translated into 10 propositions, which are further translated into a total of six hypotheses and 23 research questions. Chapter 4 describes the research methodology that was followed in order to obtain the empirical data. Chapter 5 presents the results of the research using descriptive statistics and linear regression for the quantitative component, and content analysis for the qualitative component. Chapter 6 evaluates and discusses the results in relation to the literature review, objectives, hypotheses and questions. Special attention is devoted to the interrelationship of the data as obtained through the different methodologies. Chapter 7 presents the final conclusion, recommendations and areas for further research. The appendices include additional information in support of the rest of the document, starting with a list of abbreviations and terms in Appendix A.

CHAPTER 2

2 LITERATURE REVIEW

2.1 INTRODUCTION

The aim of the literature review is to elucidate how the term “virtual workplace” can encompass terms such as telecommuting, mobile work, worker mobility, e-workplaces and high-performance workplace. The review will search for definitions and descriptions of the mindsets required by individuals, teams, managers and organisations to support the virtual workplace, so that these can be tested against the sample group of the population.

This chapter will first explore definitions connected with the virtual workplace, and then look at the concept of mindsets. It will also define the profiles of individuals who telework as found in the American and Canadian studies (Schweitzer and Duxbury, 2006). Lastly, the mindsets will be mapped to a model of management disciplines as defined by Siha and Monroe (2006).

2.2 VIRTUAL WORKPLACE

2.2.1 Introduction to the Virtual Workplace

This subsection will define various terms relating to the concept of virtual work, so that an all encompassing definition can be created for the virtual workplace, which will be used to create the context for this research. Once this has been defined, the technology supporting the virtual workplace will be listed. As indicated in paragraph 1.4. Research Motivation, mobile devices and

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technologies are a[illegible]e modern workplace by creating the connectivity requirements of a virtual workplace (IT Web, 2005). It is therefore important to take cognisance of which technologies have had a major impact on accelerating the virtual workplace, and also which technologies would more likely be used by the individuals who prefer to engage in virtual work.

2.2.2 Definitions

The first term to be defined relates to telework, also referred to as telecommuting or more recently as e-work. According to Duxbury and Higgins (2002) as quoted by Schweitzer and Duxbury (2006, p. 105), telework is defined as "an alternative work arrangement whereby employees regularly spend at least part of their work hours away from the traditional office location." Schweitzer and Duxbury identify "substitutors" (traditional teleworkers who substitute time at the office, for time working from home) and "supplementors" (overtime teleworkers). Further in the study of Schweitzer and Duxbury (2006), the concept of "guerrilla telework" was also identified. This type of work is characterised by the fact that employees and their direct managers have made an informal arrangement to telework although their company policy does not formally make provision for this. The difference between the location of "home" and "other site" was also identified in this study. Another definition for telecommuting is given by Baruch in 2001 in the literature review by Thatcher and Zhu (2006, p. 1078), namely that telecommuting is a "mode of work in which employees perform all or part of their work outside the employing organisation's physical boundaries, operating and communicating mainly through information technology". The concepts of alternative location, with

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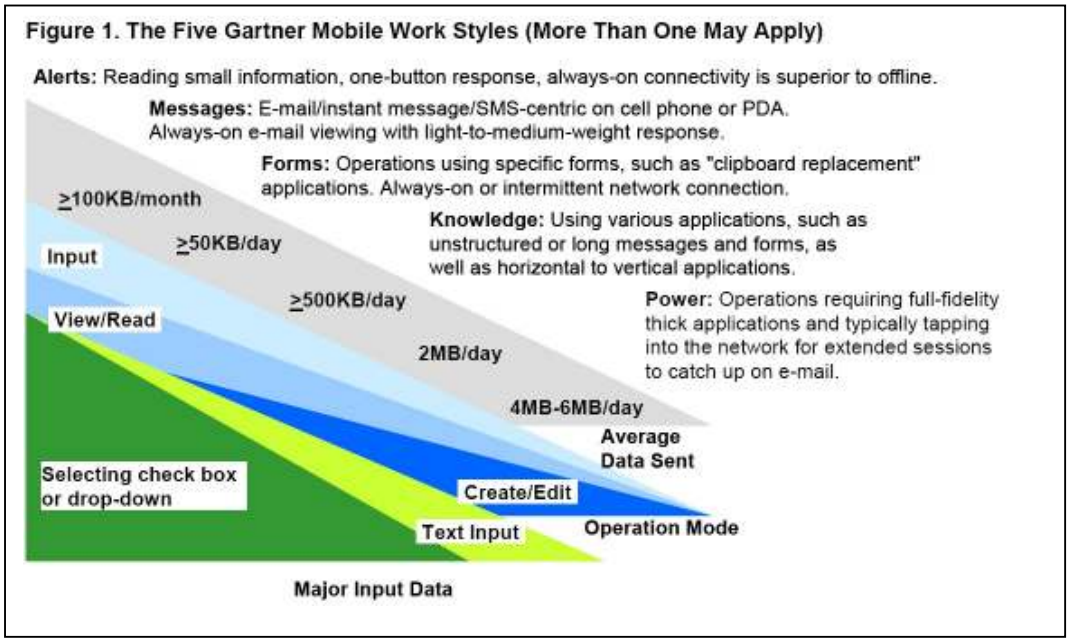
home being the pr xible hours of work and access through the right technology, are key to these definitions.

The term, High-Performance Workplace (HPW), has also received a great deal of attention, especially in work compiled by Gartner. As part of the Gartner research, the authors Austin, Burton, Jones, Harris, Andrews, Knox, Holincheck, Hostmann, and Smith (2007), define the HPW as an integration of various technologies, especially those associated with collaboration and communication, knowledge management (such as search engines, content analytics, e-learning), portals as well as hardware and software based productivity tools. It integrates technology, process, practice and management to ensure that all people in the value chain (including suppliers and distributors) are as productive and effective as possible.

The term mobile worker or workforce mobility can be defined as the "Organisational capability for workers to operate from any location, be it at home, an office, while travelling, etc." (Igbaria and Tan, 1998, p. 394). This indicates that work can be performed independent from a location, as also stated by Tobin (1994). Fiering and Kirwin (2006) define workers as mobile workers according to the fact that they use multiple locations, use a general-purpose mobile computing device, and subscribe to a particular style of mobile work. They expand on the type of teleworkers identified by Schweitzer and Duxbury (2006), and define "travelling workers" (working "on-the-fly" and mostly outside the traditional office location), "day extenders" (typically overtime workers), "campus workers" (spending most of the time at a fixed office location) and "teleworkers" (spending most of the time at a home office, or other

remote fixed locatic define five Gartner work styles based on the type of connectivity and level of work performed by the mobile worker. This is shown in the diagram below.

Figure 2-1: The five Gartner mobile work styles



These five mobile work styles, as defined by Gartner, have a close link to the definition of a knowledge worker provided by Peter Drucker in Schweitzer and Duxbury (2006, p. 112), namely that "(Knowledge workers are) highly skilled employees whose work is complex, cyclical in nature and involves processing and using information to make decisions."

Virtual teams may or may not have physically met each other, and are formed on an ad hoc basis to work on and deliver a product, using technology as main tool for collaboration, connectivity and communication. The team only exists for the duration of delivering the product (Knoll and Jarvenpaa, 1998). For the purpose of this study, a far more loose definition of a virtual team will be used,

namely any team w te from each other for at least part of the duration of creating a defined deliverable.

The next level up from a virtual team, is a virtual organisation. A virtual organisation has been defined by Palmer (1998) as “a temporary network of companies coming together in response to a market opportunity”. Grantham (2000) uses Hollywood as a metaphor to describe these types of companies. The units of the business only stay together long enough to produce a predefined product, and thereafter disband. This is a very narrow definition, and, in using this, most organisations will fall outside the classification. However, many organisations will entertain some components of virtual teams and mobile workers. This research will focus on what companies included in the research have in place in terms of technology, policies and procedures to accommodate virtual teams and mobile workers in a virtual workplace setting. The organisation still remains the business and social framework to pull the resources together, although it may no longer be the preferred location of work.

If the organisation is no longer the preferred location of work, how is this new “virtual workplace” then defined? Igbaria and Tan (1998, p. 394) define the virtual workplace as “all the components that are part of a workplace culture, based on the logical rather than the physical”. Taking this definition and all the other concepts as defined above into consideration, the virtual workplace, for the purpose of this research, will be defined as a workplace where the time and location can be chosen and technology will be the key enabler for connectivity and collaboration. Time will be chosen in terms of a schedule (“when” work is performed) and proportion (“how many hours” are spent working virtual).

Location can vary , i satellite office location (this could also be a customer site), home and any other non-traditional working place where technology enables connectivity (for example a coffee shop with wireless connection). Using this definition, the matrix below will be used to classify individuals in the sample. Main campus workers and site campus workers will not be deemed to be virtual workers for the purpose of the data analysis, as they normally do not have a choice over their location. The terms "working virtually" and "virtual worker", when used in the context of this research, will indicate individuals who engage in the act of virtual work.

Table 2-1: Summary of the classification of virtual workers

LOCATION	*(Schedule)* ***TIME*** *(Proportion)*	**IN OFFICE HOURS**	**AFTER HOURS**	**ANY HOURS**
Fixed Location: Main Office	**100%**	Main Campus Worker	Main Campus Worker - Overtime	Not defined
Fixed Location: Satellite or Client	**95-100%**	Site Campus Worker	Site Campus Worker - Overtime	Not defined
Variable Location: Satellite / Client	**<95%**	**Site Worker: Substitutor**	**Site Worker: Supplementor**	**Site Worker: Both**
Fixed Location: Home	**95-100%**	**Teleworker: Substitutor**	**Teleworker: Supplementor**	**Teleworker: Both**
Variable Location: Home	**<95%**	**Teleworker: Substitutor**	**Teleworker: Supplementor**	**Teleworker: Both**
Non-Traditional Work Location(s)	**<95% per location**	**Travelling Worker: Substitutor**	**Travelling Worker: Supplementor**	**Travelling worker: Both**
Legend:	**Virtual Worker**		Non Virtual Worker	

2.2.3 Technology

Technology has changed dramatically over the past few decades with the greatest breakthrough being in the availability of broadband and wireless technologies to individuals. The term "broadband" is used to describe always-

online (as opposed to dial-up connections) to broadband connections (implying data rates of 300 - 1,000 kilobits per second) (Austin and Bradley, 2005). This rate has increased to between 512 kilobits and 8 Megabits in the last year. Broadband connections make it possible to transmit large amounts of data at acceptable rates, making remote work more feasible than the 1970s and 1980s, when only dial-up connections where available. Broadband has also supported the convergence of technology, allowing video, voice and data to be transmitted over the same connection. The term “wireless” refers to interconnectivity via the radio-frequency spectrum, a popular implementation being the GSM cellular networks. This has enabled individuals to connect to a network without using a physical connection.

The following table places technology in perspective on a timeline of four paradigms as defined by Scientific American in 1991 (The Internet Time Group, 2007). The fifth paradigm (*Web/Wireless) has been constructed based on terminology found in various references (Fiering and Kirwin, 2006; Jones, 2006; Grantham, 2000; Simpson, Ingelbrecht, Redman, Milanesi, Pittet, Liew, Hart, Chapman, Wood, Song, Johnson, Zwar and Dulaney, 2005).

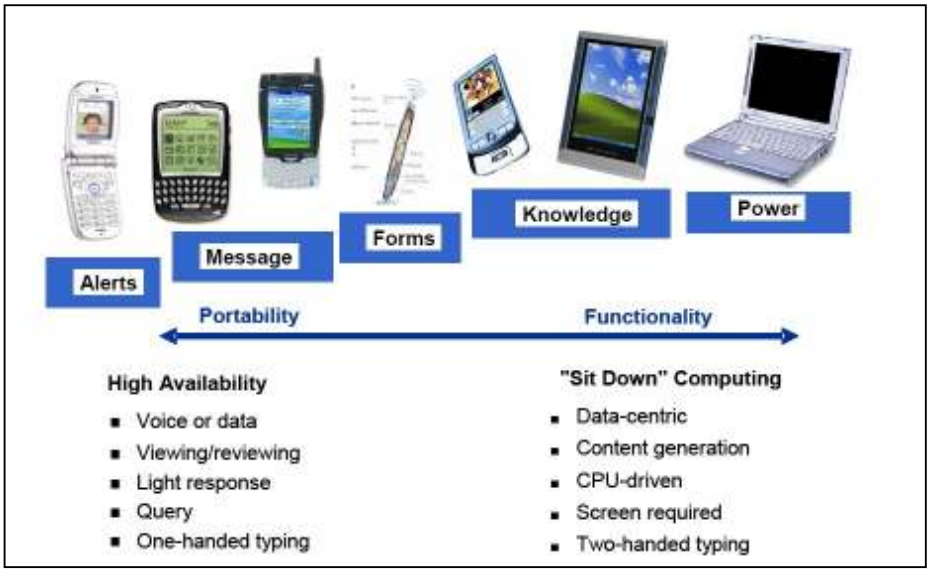
Table 2-2: The five pa

	Batch	Time-Sharing	Desktop	Network	*Web/Wireless
Decade	1960s	1970s	1980s	1990s	*2000s*
Technology	medium-scale integration	large-scale integration	very large scale	ultra large scale	*multi-scale convergence*
Location	computer room	terminal room	desktop	mobile	*Virtual*
Users	Experts	Specialists	Individuals	Groups	*Communities*
User Status	Subservience	Dependence	Independence	Freedom	*Balance, Flexibility*
Data	Alphanumeric	Text, vector	Fonts, graphs	Script, voice	*Video, Multi-media*
Objective	Calculate	Access	Present	Communicate	*Collaborate*
User activity	Punch & try (submit)	Remember & type (interact)	See & point (drive)	Ask & tell (delegate)	*Create & Communicate*
Operation	Process	Edit	Layout	Orchestrate	*Interact, Share*
Interconnect	Peripherals	Terminals	Desktops	Palmtops	*Multi-functional devices*
Applications	Custom	Standard	Generic	Components	*Portals*
Languages	COBOL, FORTRAN	PL/1, BASIC	PASCL, C	Object oriented	*Markup languages e.g. HTML, XML, MML*

2.2.3.1 Mobile devices

Mobile devices are essential to support the fifth paradigm of computing.

Figure 2-2: Mobile devices for each type of mobile worker (Fiering and Kirwin, 2006)



The definitions for [illegible] to the above categories of mobile worker are listed below (Simpson *et al.*, 2005).

- Basic or enhanced cell phones (for alerts). Basic phones are mainly used for voice communication and messaging services. Enhanced phones will have added features such as cameras, music and video players and may support web access.
- Smartphones (for messaging). The distinction between a basic phone and a smartphone is that the latter normally uses an open-market operating system (e.g. Symbian, Microsoft Windows Mobile, Palm OS and Linux) and has both online and offline capabilities. Smartphones also have standard readers for documents and spreadsheets loaded.
- Dedicated or special purpose devices (for forms). These include barcode scanners in warehouses to count inventory.
- PDA-phones (Personal Digital Assistant) or tablet PCs (for Knowledge Work). A PDA normally has full suite of “Office” programs on the device, with enhanced connectivity, touch screens for navigation and serves as a general organiser. Tablet PCs are hybrids between PDA and full Notebooks.
- Laptop / Notebook (for power work). Full computer system designed for portability and replicates the functionality of a standard desktop computer.

Even though the facsimile machine (fax) and telephone are not specifically mobile devices, they will be included as part of the research question on the use of devices while engaging in virtual work, as they were essential in flexible work as researched by Tobin (1994).

2.2.3.2 Mobile technologies

Mobile devices can be used across various mobile technologies or architectures (IT Web, 2005). One technology is via radio frequency such as WiFi[2]* used for internet "hotspots" and wireless local area network applications. The limitation of this technology is that it is area-bound (Computer Business Review, 2007). iBurst is another example of a proprietary wireless technology making use of a WiMAX* spectrum. The other type of architecture uses cellular networks as the carrier, including GPRS* (original service) and its enhanced EDGE* service. Later technologies include 3G* and its enhanced HSDPA* service. 3G and HSDPA are also classified as "broadband". The advantage of these technologies is that they can be accessed wherever there is a cellular signal, and a 3G end terminal device. The advantage is that the service will fall back to EDGE or GPRS if the signal is not strong enough.

In addition to the mobile technologies, other remote access technologies in South Africa include the current Telkom infrastructure (copper lines or fibre optics) such as ISDN* and the more recent technology called ADSL*, the latter of which falls under the "broadband" classification. Proprietary networks normally also include corporate intranets and extranets which previously were only accessible via a direct dial-up connection (e.g. ISDN). Application portals enable access to these networks via the internet.

The list of devices and technologies identified in these paragraphs will be used to determine whether the individual engages in virtual work, or has the potential to do virtual work.

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[2] *Full definitions are given in Appendix A - ABBREVIATIONS AND ACRONYMS.

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2.2.3.3 Software application technologies

Two trends identified by Gartner are that the "Primary role of IT (is) shifting from Transaction and Process Control to supporting social interactions". Also, "A key area of technology and behavioural evolution is related to mobility. Staff are increasingly unlikely to be tied to their desks." (Austin *et al.*, 2007, p. 4-5). Organisations will therefore need to make more provision for these phenomena by changing the software and systems in order to support social interactions and mobility, as well as being able to manage and communicate with remote employees. This software includes: portals (e.g. Citrix); messaging software (e.g. Skype, MSN messenger or Office Communicator); collaboration support (e.g. Live Communication Server); enhanced information access systems (e.g. Sharepoint); content management systems (e.g. LiveLink); and social software (e.g. MySpace and Facebook). The type of software used in organisations will give an indication of the readiness of the organisation in terms of the virtual workplace implementation.

2.3 MINDSETS

2.3.1 Introduction

According to Wikipedia (2007), "A mindset … refers to a set of assumptions, methods or notations held by one or more people or groups of people which is so established that it creates a powerful incentive within these people or groups to continue to adopt or accept prior behaviours, choices, or tools." Another definition given by Answers.Com (2007) describes a mindset as "a fixed mental attitude or disposition that predetermines a person's responses to and interpretations of situations". These two definitions support the fact that

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mindsets are deter [illegible] erience, and seem to be difficult to change, and therefore have a very strong influence on an individual or group's decision making process.

One theory that supports these definitions is that of generational theory. The paragraphs below will focus on this theory, and how mindsets of different generations can be matched with that of a virtual workplace strategy.

2.3.2 Generational Theory

Generational theory was developed by William Strauss and Neil Howe, who documented the theory in 1991 in the book "Generations, the history of America's future, 1584 to 2069" (Wyld, 1996, p. 38). They took the history of the United States and related this to an individual's age and location in history. They found a recurring pattern of "secular crises" (defined as threats to national survival and reordering of public life). The recurring patterns emerge due to the interaction between a generation's lifecycle type and its age location among the events in time. Due to the recurring patterns, it is possible to predict recurring themes in future generations. Their initial book was followed by "The Fourth Turning", "13th Gen: Abort, Ignore, Retry, Fail?" and "Millennials Rising" (Codrington and Grant-Marshall, 2004, p. 16).

These "turnings" are now each described, as condensed from Strauss and Howe (1997) and Embree (2007), with additional notes from Codrington and Grant-Marshall (2004), starting with the Silents, who are deemed to be the fourth turning of the previous cycle. In this turning, the adaptive political regime was transformed in a trial by fire. This generation felt that they were "born too late" to do great deeds, hence they were sensitive, had an external locus of

control, and were also conservative and worked hard, being thankful to the "institution" for giving them a job. They had been taught the ethics of prudence as part of their war experiences. In contrast to this, the Boomers, as the first turning in the new cycle, were idealists: They lived in an era of prosperity and civic growth. This turning is synonymous with spring which signifies spiritual awakening, with generations of this era often coming across as rebels. This was the "double-income" syndrome generation. The second turning brought in the Xers. Seen as reactive and nomadic, they live under a political regime which faces spiritual challenge from the rising generation. This turning is characterised by a marked transformation of societal values, usually with strong "youth" movement" emphasis. Reactives see themselves as "abandoned" and having to "raise themselves", therefore they become hard-headed realists focused on material survival. They feel that the Institution has stolen their parents, and therefore rebel against it. However, they are living "in the shadow" of the strong-willed Boomers, who do not seem to want to let go of being in charge. The third turning brings the Millenials, also referred to as the Civics or Heroics. This is an era of self-absorption and civic decay. This generation is shaped by secular crises, thus the heroic, rationalistic and world-saving focus emerges. The prediction is that they will emerge as the new leaders of the future to take over from the Boomers.

Table 2-3: The four turnings (Strauss and Howe, 1997; Embree, 2007)

Turning	Name	Season	Generational Archetypes	More colloquial Archetype
Fourth	Crisis	Winter	Adaptive / Artistic	Silent
First	High	Spring	Idealist / Prophetic	Boomer
Second	Awakening	Summer	Reactive /Nomadic	Xer
Third	Unravelling	Autumn	Civic / Herioc	Millennial
Fourth	Crisis	Winter	Adaptive / Artistic	No consensus yet in literature

After the Millenials . ı Turning. The theory is that history will be at the point of repeating itself, and that one can expect traits in this generation, which are similar to those found in the Silent generation.

Since the writing of the books by Strauss and Howe, their theories have been applied on a variety of management and social sciences. An example of such an application is found in the book “Mind the Gap” (Codrington and Grant-Marshall, 2004), who state that the era in which a person is born has a lasting influence on their value system. The time-framework of the generations will be taken from Codrington and Grant-Marshall (2004, p. 18), for South Africa specifically, namely: GI (born in 1900s-1929s); Silent (born in 1930s-1949s), Boomer (born in 1950s-1969s); Xers (born in 1970-1989s); and Millennial (born in 1990s-2005s). Some of these characteristics associated with the generations, are given in the table below (Codrington and Grant-Marshall, 2004; Embree, 2007).

Table 2-4: Generation

	GI	Silent	Boomer	Xer	Millennial
Generic birth date in…	**1900-1920**	**1920-1940**	**1940-1960**	**1960-1980**	**1980-2000**
SA birth date in…	**1900-1929**	**1930-1949**	**1950-1969**	**1970-1989**	**1990-2005**
Attitudes	We must all agree, all work in the same way and all look the same	Pay your dues, work hard. Feel "born too late" to do great deeds; end up as maintainers, with emphasis on system and tolerance	If you have it, flash it. Rebel, often violently, against what they perceive as a sterile or hollow society	"Whatever…", enigmatic, React against excesses of idealism, become tough, amoral, pragmatic survivors or entrepreneurs	Let's make the world a better place; React against excesses of hedonism and survivalist, emphasise teamwork and collaboration
At Work	I am grateful to have a job; Industrial era	I work hard, because it is my duty to do so; militaristic approach;	Work is self-fulfilling and makes me feel important; workaholics;	I work to fund my lifestyle; laid-back and informal;	My work helps me to change the world;
Economy	Industrial Era - Make and Sell		Information economy - listen and serve;	Emotion economy - intimacy and mass customisation	
Likes	Firm leadership and doing your civic duty	Security, Stability	Shopping, ostentation, winning, leading, vision	Sharing, being individualistic, being with friends, change	Shopping, labels, family, friends, the environment, technology
Dislikes	Wimps, wingers and slackers	Debt, borrowing, upstart young people	Paying off debts, ageing	Bossiness, corporate culture	Dishonesty, unbalanced lifestyles, ostentation

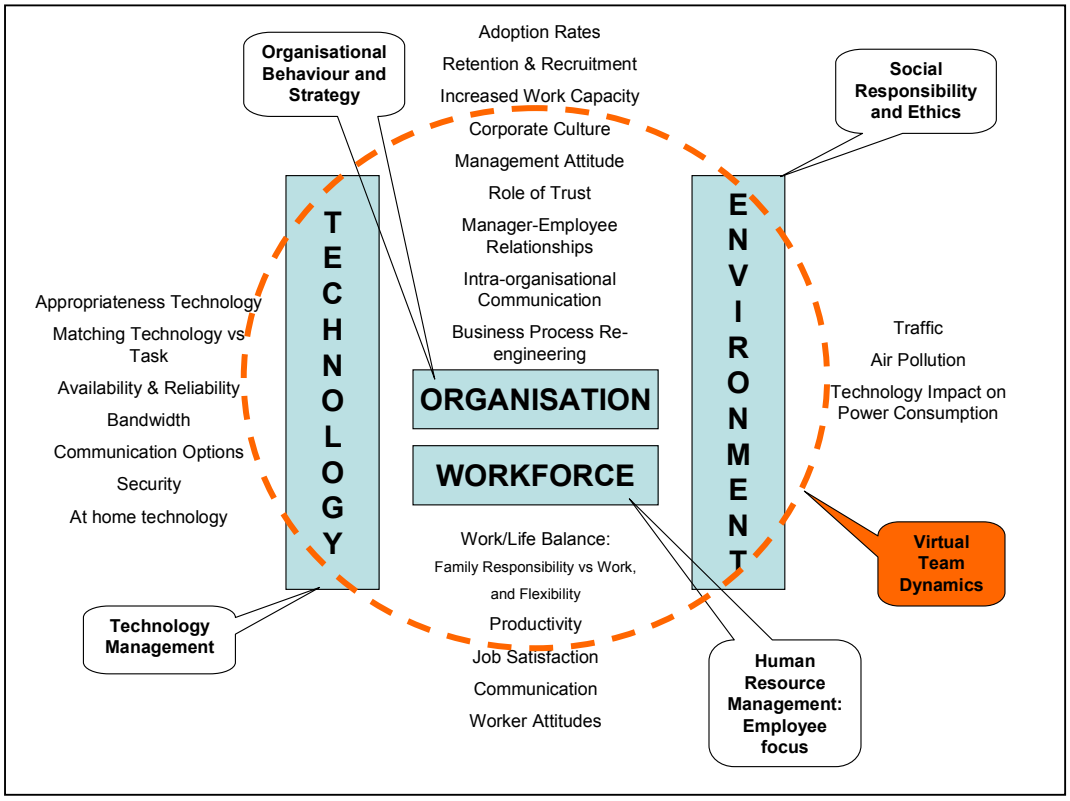
2.4 MAPPING MINDSETS AND VIRTUAL WORKPLACES

2.4.1 Model for Mindset Mapping

Siha and Monroe (2006), based on their comprehensive study of literature, have divided the issues around telecommuting into four major issue areas relating to management disciplines, namely: organisation behaviour and strategy; social responsibility and ethics; technology management; and lastly human resource management. The issue areas and subareas identified in their literature study are included in the figure below, and are explained in more detail in the rest of the subsection. Relevant topics and mindsets relating to the virtual workplace,

which need to be ked to this model. The dynamics required for virtual teams can also be overlapped with this model.

Figure 2-3: Management disciplines and telecommuting issues



2.4.2 Technological Issues

With the rapid evolution of technology, people will have to adapt more rapidly and learn more quickly how to utilise the benefits of the latest devices. Gartner describes the future worker as seeking extreme individualisation (Morello and Burton, 2006), including being able to select his/her own computing devices, rather than being prescribed what to use, and also being powered by knowledge, information sources and large, interactive social networks. It seems that the Xers and Millennials are more inclined towards utilising technology and recognising its benefits than the older Boomer and Silent generations

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(Codrington and generation also takes connectivity for granted, and expects a collaborative workplace that does not necessarily have to be at a central office location (Baum, 2004).

An important question to ask is whether organisations are ready to implement virtual workplace strategies to support these new styles of mobile workers. This question, and questions related to the technologies identified in the literature review, need to be answered by the CIO or IT manager. His/her mindset may also determine the extent to which the technologies supporting the virtual workplace are adopted in organisations. The technologies adopted and implemented in an organisation will also determine the tools available for virtual teams to support team collaboration, socialisation and communication.

2.4.3 Environmental Issues

The environmental issues which relate to topics such as pollution caused by commuters (Siha and Monroe, 2006), will not be explored in depth as part of this research, other than to mention that Codrington and Grant-Marshall (2004, p. 56) indicate that Millennials “(like) the environment” and define their attitude as “Let’s make the world a better place”. The Millennials may therefore support the environmental advantages that a virtual workplace could offer to a larger extent, including, a paperless office (saving trees), fewer vehicles on the road (less reliance on oil) and less pollution (better quality air). The individual survey will therefore only include one general question which will try to establish if one of the reasons for the individual to work virtual would be environmentally motivated.

2.4.4 Workforce issues

The first subarea under the workforce issue area relates to the topic of flexibility and balancing of family responsibility versus work, also known as work/life balance. Work/Life balance is indicated as a benefit of teleworking in various articles (Schweitzer and Duxbury, 2006; Siha and Monroe, 2006). This is due to the added flexibility of being able to work, for example, at home, thereby saving on commuting time. Being able to work non-standard hours is also mentioned. Work/life balance is also an important concept for Millennials (Codrington and Grant-Marshall, 2004) and will accordingly receive some weight in the research. This topic, however, needs to be viewed in relation to the individual's family structure, as research has shown that the flexibility in "caring for young children or elderly family members while working from home" is often mentioned in relation to the work/life balance requirement and is not necessarily linked to the age-group (Siha and Monroe, 2006, p. 464).

Another human resource management issue around the virtual workplace, and especially important for virtual teams, is performance management. Productivity increase can only be measured if the work units delivered can be measured (Siha and Monroe, 2006). In their case study, Hloma and Ortlepp (2006) also identify that the setting of clear targets and regular monitoring of key performance indicators, are very important to the successful management of the virtual workplace. Performance agreements for the virtual workplace need to be defined in a way that is compatible with the way that the different generations see work and how this is delivered and measured (Codrington and Grant-Marshal, 2004).

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Being able to defir . s very closely related to the type of work that can be performed remotely. The type of work often relates to that of a knowledge worker, i.e., where no physical product is manufactured, and communication, information and data are of more importance (Schweitzer and Duxbury, 2006). One question relating to this is whether the role and tasks performed by a manager can also be done remotely.

Over and above the type of work that can be performed remotely, certain types of people (or personalities) will be more suited to a remote working situation than others, especially with regards to the potential isolation that an individual could experience at home. Thatcher and Zhu (2006) refer to this as "self-verification". Employees with a lower need for self-verification and external guidance will be more successful in a virtual work environment that is more isolated from other employees. Personality types and related theories will not be tested in relation to mindsets, as these fall outside the scope of this research. However, mindsets and worker attitudes in general do form part of the research, and will be included.

2.4.5 Organisational Issues

Where the workforce issues focus more on the employee, organisational issues focus on the area of behaviour and strategy at corporate level. One of the key issues in business today, is to gain a competitive advantage. In order to gain a competitive advantage, suitably skilled resources need to be attracted and retained - corporate competence and resources are defined as one of the key components of strategy by Andrews (1999). The Canadian study also found that due to demographic changes (ageing population, and lower birth rates), the pool of potential new candidates seems to be shrinking (Schweitzer and

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Duxbury, 2006). Th[illegible] o imposing new ways of work on to the organisation, and places a high demand on suitably skilled IT staff (Loogma *et al*., 2004). Would the Xers and Millennials be the most suited to fill the new, high-tech opportunities? If this is the case, what would be the best strategy to attract and retain them?

Another corporate phenomenon which receives attention in the literature regarding the virtual workplace is corporate culture. In their article, Thatcher and Zhu (2006) explore how telecommuting reduces the traditional mechanisms of coordination and control, as well as interaction with co-workers and managers, thereby weakening "the transmission and maintenance" of the corporate culture. They explore alternative options of aligning the goals of the employee with the goals of the company, in order to retain the loyalty and productivity of the individual for the organisation. They suggest alternatives that include worker membership in professional communities, and they advocate the concept of "boundaryless" career paths. This style of work would suite the Xers, who do not like corporate culture and the Millennials who are more willing to engage in multiple career paths (Codrington and Grant-Marshall, 2004). This distinction can be confirmed in the research.

Linked to corporate culture, is the trust established between managers and their employees. This was found to be a topic that was frequently mentioned in the literature study by Siha and Monroe (2006), and identified as one of the eight principles for implementing a successful virtual workplace by Froggatt (2001). Trust will therefore be a key element to explore in the research questions, on individual, organisational and team levels.

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2.4.6 Virtual Team Dynamics

Virtual teams and their dynamics span the management disciplines and issue areas displayed in Figure 2-3. Individuals in these teams would work in more isolated circumstances from the traditional work environment and subsequently from their team mates. In this context, Knoll and Jarvenpaa (1998) conducted a study where students, located across countries and universities, and not having met each other beforehand, were instructed to produce a combined deliverable. The study found that virtual collaboration, electronic socialisation and virtual communication skills, as well as the extent to which procedures, guidelines and rules were agreed between the team members, became important for the successful completion of the deliverables.

As found in the study by Knoll and Jarvenpaa (1998), and confirmed in the studies of Harvey *et al.* (2005), as well as those of Donaldson and Weiss (1998), when collaborating, teams need to manage conflict effectively, agree on procedures and processes connected to deliverables, and synchronise their timing, especially as work time becomes more distributed. They also need to learn new electronic socialisation skills to ensure that group norms are set, participation is ensured and the sense of teamwork and interdependence, defined by Knoll and Jarvenpaa (1998) as the term “teamness”, is maintained.

As per the definitions provided by Knoll and Jarvenpaa (1998), group norms can be implicit or explicit, and would include expectations held by team members regarding correct and incorrect behaviour to be exhibited. Equal participation is needed for the sharing of learning, and the ability to influence. Participation also creates a sense of belonging. “Teamness” relates to the communication of

feelings, sensory ir , tities in written or verbal communication. It relates to the sense of cohesion and interdependence amongst team members.

On the communication side, team members need to ensure that they communicate the intended meaning of their messages, a large portion of which could be influenced by language, culture and the type of technology used. The new conventions and etiquette (also referred to as netiquette when it relates to online communication) are especially important to consider during both electronic communication and socialisation. Team members need to learn to cope with the new style of communication, in particular where some users exhibit less emotional restraint when communicating electronically.

All these items are now grouped as objective categories and subcategories in the table below.

Table 2-5: Team objective categories and subcategories

Objective Category	Objective Subcategory
Factor: Collaboration	Collective Action
	Conflict Management
	Performance Measures
	Process / Rules
	Timing / Schedules
Factor: Communication	Language / Understanding
	Technology
Factor: Socialisation	Face-to-Face component
	"Teamness"
	Group Norms
	Participation
Mindset	Executive Support
	Mindsets: Manager
	Mindsets: Supportive
	Mindsets: Restrictive
Need	Barriers
	Drivers

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Many of the factors ual teams, also apply to conventional teams. This is echoed by Daniels, Lamond and Standen (2000, p. 7) when they state, "…many of the principles of good management are as applicable to teleworking as they are to the traditional work arrangements." However, the virtual environment adds an additional layer of complexity that needs to be considered (Harvey *et al*., 2005). The importance and application of the factors identified above will be tested with teams engaging in virtual work.

2.5 TELEWORKER PROFILES / DEMOGRAPHICS

Objective 5 of the study aims to review the number of individuals who are currently classified as working virtually, and also whether their profiles correspond in any way to those of individuals teleworking in America and Canada. The studies and results shown below will be used to compare against the local results achieved.

Telework America Survey 2000, mentioned by both in Froggatt (2001) as well as Schweitzer and Duxbury (2006) gives the characteristics of teleworkers as being predominantly male (65% male; 35% female). The average age of teleworkers is 40, with most of them having a college education (82%) (i.e., older and more experienced/educated). According to Schweitzer and Duxbury (2006), in Finland, teleworkers were also predominantly male, well educated and highly paid professionals, while in Canada, the split between male and female was more equal. In both the American survey and Canadian study, two-thirds of the teleworkers lived with a spouse or partner, while between one-and two-thirds lived with children under age of six. Further in the American survey, the majority (54%) are full-time employees, 13% contract workers, 24% self-

employed and 9% . rage one-way commute was 19.7 miles (32 km) while teleworkers spend 20 hours on average per week teleworking.

In the Canadian study, according to Schweitzer and Duxbury (2006), very few companies formally offer their employees opportunity to telework. Where teleworking has been formally allowed, the group could mainly be split between highly educated, experienced, full-time, professional workers, who perform their work at home during regular hours (substitutors), and part-time employees with greater years of experience who are paid to perform computer-supported clerical, administrative and professional activities at home outside of regular work hours (supplementors).

The Tobin study (1994) included two graphs that will be used to compare the potential shift in occupations and technologies used by, as Tobin defines them, “flexible” users. The first table shows technologies used by flexible workers, as per the Gallup Poll in the UK in 1991. As device usage is not mutually exclusive, the percentages reflect the usage per device for the total group of flexible workers, and therefore do not sum to 100%. The second graph shows occupational categories of mobile American users as surveyed by the International Data Corporation (IDC) in 1992 (Tobin, 1994).

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Figure 2-4: Technolog 4)

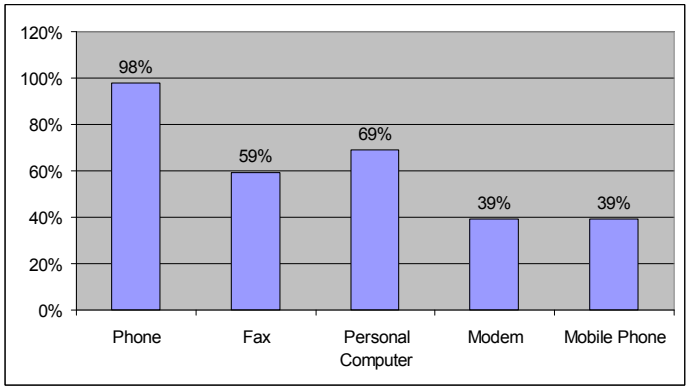
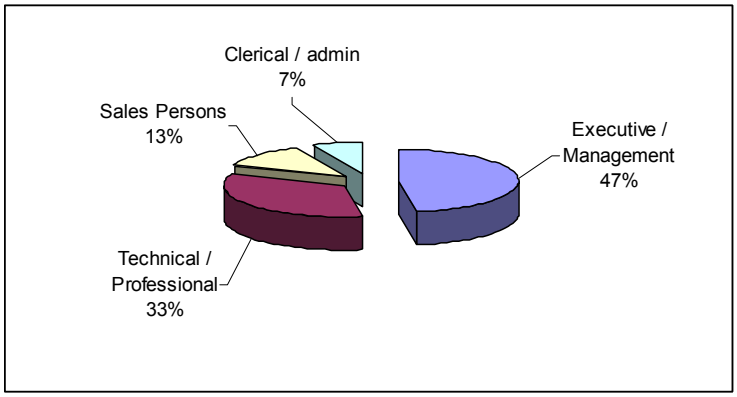


Figure 2-5: Occupational categories (Tobin, 1994)



This graph contradicts the expected outcome of this research, namely that a higher percentage of technical / professionals will be found to engage in virtual work (i.e. “being mobile”), if the assumption holds that the members of the executive / management category are normally part of the older generation. It is possible that the American results were due to the fact that the executive / managers were normally given the more expensive and cutting edge technology as a status symbol.

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2.6 CONCLUDING REMARKS ON LITERATURE REVIEW

The literature review has addressed definitions of the virtual workplace and its related technology. It has also identified generational theory as providing a basis for evaluating mindsets of individuals. These generational mindsets were related to the overall framework of management disciplines which covered the four issue areas of technology, environment, workforce and organisation (Siha and Monroe, 2006). The profile or demographical information of a virtual worker in Canadian and American studies has been included to serve as a means of comparison with South African workers. The term virtual workplace has also been shown to encompass all the stated terminology, and reveals the flexibility in mindset required to allow for the different mobility scenarios. This now forms the point of departure for formulating the hypotheses and research questions that need to be answered in order to achieve the objectives of the research.

The research will now aim to answer these questions relating to the mindsets and attitudes that have been raised as part of the literature review, in order to determine whether there are particular mindsets that would promote the successful implementation of a virtual workplace.

CHAPTER 3

3 RESEARCH PROPOSITIONS, HYPOTHESES AND QUESTIONS

3.1 INTRODUCTION

The overall research problem, “Are there specific mindsets that would be more supportive of a virtual workplace strategy in organisations, and if so what are they?” is now translated into propositions, measurable hypotheses, and research questions. Propositions have been defined for each of the objectives as identified in the first chapter. Objective 1, 2 and 5 are covered by the quantitative component of the research, and here the propositions have been translated into measurable hypotheses and research questions that will be answered by descriptive statistics. Objective 3 and 4, which are covered by the qualitative component of the research, have been translated into research questions only. These research questions will be answered by clustering of answers obtained through interviews with individuals and teams. The different issue areas of the literature review framework are also related to the hypotheses and research questions *(indicated by brackets and italics)* below.

3.2 OBJECTIVE 1: INDIVIDUALS

In order to answer objective 1, “To determine the attitudes, perceptions, needs and behaviours of individuals regarding the desirability of a virtual workplace and whether there is any variation in attitude between individuals based on

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generational differe[illegible] sitions, hypotheses and research questions have been defined.

3.2.1 Proposition 1: Needs and Attitudes concerning Virtual Work

The proposition, “On average, those individuals who do engage in virtual work are more likely to have many reasons for wanting to work virtually, have fewer reasons that prevent them from working virtually and expect to use technology in a flexible and collaborative workplace environment”, has been translated into the null hypotheses and research questions presented below.

Needs and attitudes of individuals concerning virtual work (*Workforce: Work/life balance; Flexibility*).

- Null Hypothesis (P1-NH1a): There is no significant difference in the means / medians of the different subgroups (virtual vs non-virtual) and their needs/attitudes concerning virtual work.
- Null Hypothesis (P1-NH1b): There is no significant difference in the means / medians of the different subgroups (Xer, Boomer, Silent) and their needs/attitudes concerning virtual work.

Affinity of generational groups to use certain technology (*Technology: use of technology).*

- Null Hypothesis (P1-NH2): There is no significant difference between the means / medians of the different subgroups (Xer, Boomer, Silent) and the type of devices, technology and communication methods used when working virtually (i.e., only applied to individuals where established that working virtually = “Yes”).

Reasons to increas ent working virtual.

- P1-Q1: Is there a difference between individuals who work virtually and individuals who do not work virtually, and the number of reasons given to increase the time spent working virtually?
- P1-Q2: Is there a difference between Xers, Boomers, Silents and the number of reasons given to increase the time spent working virtually?
- P1-Q3: What are the reasons given by virtual workers vs non-virtual workers to increase the time spent working virtually?
- P1-Q4: Is there a difference between individuals who work virtually and individuals who do not work virtually and the number of reasons given that prevents them from increasing the time spent working virtually?
- P1-Q5: Is there a difference between Xers, Boomers, Silents and the number of reasons given that prevent them from increasing the time spent working virtually?
- P1-Q6: What are the reasons given by virtual workers vs non-virtual workers preventing them to increase the time spent working virtually?

3.2.2 Proposition 2: Generations and Virtual Work

"On average, the Xers and Millennials are more likely to engage in virtual work and telecommuting." Differently stated, "Those individuals who do engage in virtual work are more likely to be Xers and Millennials."

The research question presented below will aim to answer this proposition.

- P2-Q1: Are there more Xers than Boomers who have been identified as working virtually? (There were no Millenials in the target population.)

3.3 OBJECTIVE 2: MANAGERS OF INDIVIDUALS

The following propositions, hypotheses and research questions will be used to cover the answers for objective 2, namely "To determine the perceptions of individuals about their management's attitudes and behaviours regarding the implementation of a virtual workplace, and whether there is any difference in attitude based on generational differences between the two groups (management vs employees). The objective is also to determine if managers who fall in the younger age group are more likely to support the implementation of the virtual workplace, than older managers".

3.3.1 Proposition 3: Managers of Virtual Workers

"The managers of those individuals who do engage in virtual work are more likely to be Xers."

The research question presented below will aim to answer this proposition.

- P3-Q1: Are the managers of those individuals who do engage in virtual work, mostly Xers?

Furthermore, the proposition can be explored by formulating the hypothesis expressed below.

- Null Hypothesis (P3-NH1): There is no significant difference between means / medians for the different subgroups (i.e., the generational groups of the managers of the individuals who are working virtual) in questions relating to the manager's attitudes as perceived by their employees. (*Generational theory*)

3.3.2 Proposition 4: Managers and Trust

"The managers who do allow their workers to work virtually have a longer relationship with the individual, and they trust the individual."

This can be translated into the hypotheses formulated below.

- Null Hypothesis (P4-NH1): There is no significant difference between the means / medians of the subgroups (virtual vs non-virtual) and the duration of time worked for the manager.
- Null Hypothesis (P4-NH2): There is no significant difference between the means / medians of the subgroups (virtual vs non-virtual) in the perceived level of trust.

3.4 OBJECTIVE 3: TEAMS

Propositions 5 and 6 and their related questions will be used to cover the answers for objective 3, "To determine the mindsets required by virtual teams in order to support positive outcomes of work and project deliverables in a virtual workplace."

3.4.1 Proposition 5: Factors, Mindsets and Needs

"There is a list of factors, mindsets and needs that can be compiled to make working in a virtual team more successful."

The research questions presented below will aim to answer this proposition set at team level (W*orkforce; Technology).*

- P5-Q1: What are the key factors required by virtual teams in order to support positive outcomes of work and project deliverables?

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- P5-Q2: How important are mindsets and attitudes regarding mobile work, collaboration and connectivity in the successes of a virtual team?
- P5-Q3: What are the attitudes, perceptions and needs of individuals regarding the applicability and desirability of working in a virtual team?

3.4.2 Proposition 6: Age Groups of Managers and Team Members

"The ages of team members in teams working virtually are more likely to fall within the Xer generation." and "The age of the managers of teams working virtually, are more likely to fall within the Xer generation."

The research questions stated below will aim to answer this proposition set at team level (*Generational theory).*

- P6-Q1: What is the average age of team members working in virtual teams?
- P6-Q1: What is the average age of the managers of team members working in virtual teams?

3.5 OBJECTIVE 4: ORGANISATIONS

The following propositions and research questions will be used to cover the answers for objective 4, "To determine the need, readiness and practicality of implementing a virtual workplace from an organisational point of view".

3.5.1 Proposition 7: Organisational Readiness

"Organisations are in general not ready for the virtual workplace, and have no strategies and policies in place to support this phenomenon."

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The research ques er this proposition set at organisational level *(Organisation, Technology)*.

- P7-Q1: What needs in organisations are driving the implementation of a virtual workplace?
- P7-Q2: Will the implementation of a virtual workplace strategy be practical for the organisation?
- P7-Q3: Are organisations in general ready to implement a virtual workplace strategy?

3.5.2 Proposition 8: Organisations and Generations

"The age group of the executives of companies where the virtual workplace is not prevalent is more likely to be that of the Boomers or Silents."

The aim of the research questions stated below is to answer this proposition set at organisational level *(Generational theory)*.

- P8-Q1: Where do the CIO and HR Manager fit into the generational map?
- P8-Q2: Where does the average executive / senior manager fit into the generational map?
- P8-Q3: Where does the average age of the employees fit into the generational map?
- P8-Q4: What is the prevalence of the virtual workplace in organisations?

3.6 OBJECTIVE 5: DEMOGRAPHICS

The following propositions and research questions will be used to cover the answers for objective 5, "to determine how many individuals are engaging in

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virtual work alread[illegible] ofile of individuals that engage in virtual work, and if this compares with the profiles of individuals who telework, as found in Canadian and American studies (Froggatt, 2001; Schweitzer and Duxbury, 2006), as well as the Tobin study (1994)."

3.6.1 Proposition 9: Extent of Virtual Work

The proposition, "The prevalence of individuals engaging in virtual work and/or wanting to engage in virtual work is much higher than generally thought" can be answered by calculating the number of people who do work virtually, and then comparing these figures with the identified studies. The research questions are stated below.

- P9-Q1: What is the percentage of individuals who do work virtually in the sample?
- P9-Q2: How many individuals who do not work virtually at the moment, have indicated that they would like to work virtually?

3.6.2 Proposition 10: Virtual Worker Demographics

"The profiles of individuals working virtually in the study population are comparable with the profiles of individuals working virtually in American and Canadian studies, as well as the Tobin study." (Froggatt, 2001; Schweitzer and Duxbury, 2006; Tobin, 1994). This proposition will be addressed by using descriptive statistics to answer the research question stated below.

- P10-Q1: What is the profile of individuals working virtually in the study population?

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3.7 CONCLUDING REMARKS ON PROPOSITIONS, HYPOTHESES AND QUESTIONS

Propositions have been created for all five of the objectives. Proposition 1 and 2 relate to objective 1, and focus on the needs and attitudes of individuals concerning virtual work, as well as how generations relate to virtual work. Three hypothesis and seven research questions will be used to test and answer these propositions. Proposition 3 and 4 relate to objective 2 and the perceived attitudes individuals have about their managers' mindsets towards virtual work. Three hypotheses and one research question will be tested to answer these propositions. Objective 3 has been translated into proposition 5 and 6, which pertain to success factors, needs and mindsets of virtual teams and the generational differences between the team members and their managers. Five research questions will be used to answer these propositions. On organisational level, objective 4 has been translated into proposition 7 and 8, which will investigate organisational readiness and generations using seven research questions only. The secondary objective, objective 5, has been translated into a total of three research questions, which will be used to answer proposition 9, the extent of virtual work, and proposition 10, virtual worker demographics. The next chapter will describe the methodologies and methods used to test the hypotheses and answer the research questions.

CHAPTER 4

4 RESEARCH METHODOLOGY

4.1 INTRODUCTION

The study used a mixed method approach for the research, employing both methodical triangulation, which implies using different methods, and data triangulation, where data is collected from different sources (Easterby-Smith, Thorpe and Lowe, 1991). From a methodological point of view, both quantitative and qualitative methodologies were used, and from a data point of view, data was collected on three levels, namely individual, team and organisation level. The methods selected included surveys on individual level, focus group interviews on team level and semi-structured interviews with CIO/IT managers and HR managers in organisations. The study was run within the population of a large Information and Communication Technology (ICT) company in South Africa, and its outsourced customers.

Triangulation was deemed necessary for this study, firstly because the surveys were distributed in one company only, and might therefore possibly give a biased or inaccurate view of the extent of the phenomena related to the virtual workplace. Two additional sources of data were provided by including interviews, which were conducted outside of the ICT company, i.e., among the outsourced customers. Secondly, when using surveys there is always a possibility that some of the finer nuances relating to the topic could be overlooked, as open-ended questions were not included in the survey. Trends that are not documented in the literature could also have been excluded by

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employing a clos[illegible]ethods of focus group interview and semi-structured interview were consequently selected as part of the qualitative component of the study to diagnose the phenomenon of the virtual workplace in greater depth. By using mixed methods, the strengths of one method are used to compensate for the weaknesses inherent in the other method. This view is supported by the theories as documented by Jankowicz (1946) and Easterby-Smith *et al.* (1991).

The remaining paragraphs in this chapter review the research methodology, the population and units of analysis for the study as a whole. The sample size, sampling method, research instruments, and the processes of data collection and analysis are then described according to the method used. Lastly, the limitations of the research are presented for the study as a whole.

4.2 RESEARCH DESIGN AND METHOD

4.2.1 Quantitative Research (Individual Level)

Quantitative research was performed for objective 1, 2 and 5 and the related propositions, hypotheses and questions on the individual level. The descriptive rather than the causal process was followed, as specific cause-and-effect variables, other than age, could not be identified clearly (Zikmund, 2003). Descriptive research using a cross-sectional design as related to the age groups in the population was performed to describe the characteristics of the population, and then to test the stated hypotheses. The result was also compared to research conducted in Canada and America (Schweitzer and Duxbury, 2006; Froggatt, 2001).

Electronic surveys were used as the method of research, and the link to the website was distributed via a personal email to the identified individuals. This was possible to achieve, as a mailing list of the total population was available, and a mail merge was used to generate the individual emails. Although the emails were personalised, confidentiality was still ensured by using a central survey website. The site http://www.freeonlinesurveys.com/ was used for this purpose.

4.2.2 Qualitative Research (Organisation and Team Level)

Qualitative or exploratory research was performed for both the team and organisation levels, consisting of objectives 3 and 4 respectively. This was done to diagnose the virtual workplace phenomenon within the organisational and team context, and to explore the issues around generations and mindsets in more depth. The aim was also to explore additional ideas connected with this phenomenon, especially in the South African context.

To answer the organisational related questions, semi-structured interviews (non-expert) were conducted with the CIO or relevant IT manager, as well as with the HR manager or director of the selected organisations. Although the CIO and HR manager are experts in their fields of work, they are not necessarily experts on the topic of the virtual workplace, therefore the semi-structured interview, rather than the expert interview was conducted (Zikmund, 2003). Doing a depth interview was also considered, but due to the lack of experience on the side of the author in conducting these type of probing interviews (Zikmund, 2003), as well as the fact some questions needed to be asked to

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support the triang hat the semi-structured interview would be more appropriate.

To answer the team related questions, focus group interviews were conducted with small teams in the population who were working virtually at that stage. The theme centred on the issue of “Mindsets for delivering in the virtual workplace” and allowed the group to discuss anything which came to mind, without the restriction of a structured set of questions that had to be answered (Zikmund, 2003).

4.3 POPULATION AND SAMPLING OVERVIEW

The target population of the research was defined as a large Information and Communication Technology (ICT) company in South Africa and its customers. This population was chosen from a convenience point of view. In addition, by selecting the ICT Company and its customers, the population would include, firstly the ICT industry, ensuring a large contingent of knowledge workers, and secondly organisations representing the mining, financial, retail and manufacturing industries. The sampling frame was set as the Johannesburg Region (JHB Region) of this ICT Company, and the customers of this region.

Five units of analysis were identified, as indicated in the diagram below. The individual is the first unit of analysis. This relates to the employee who wants to, or is working virtually (IND). The second unit of analysis is the manager of the employee who allows the employee to work virtually (MGR). The third unit of analysis is the CIO or IT manager (referred to as IT manager only for purposes of this research) and HR Director or manager (referred to as HR manager for

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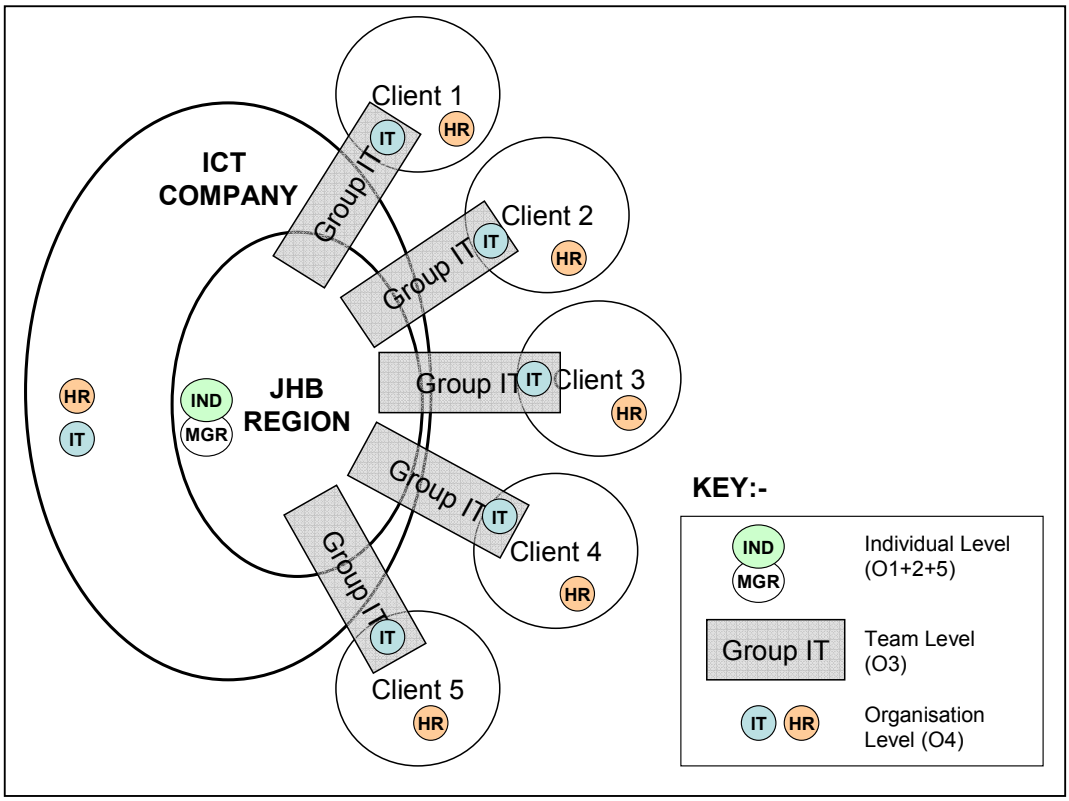
purposes of this re) and HR in the diagram). The organisation (Client 1-5) is the fourth unit of analysis, and represents the information relating to the organisation as a whole in the sample. (The ICT Company was also included as an organisational unit of analysis.) The fifth and final unit of analysis is represented by groups in the population who have formed virtual teams across departments, as represented by "Group IT" in the diagram below. ("Group IT" is normally a combination of staff from the ICT Company and its outsourced customers who provide the IT service to the business.)

Figure 4-1: Population and sampling - diagrammatic view



The sampling frame, sampling techniques and sample sizes are now tabulated and then each research method, as relating to the levels of individual, team and organisation, is described in more detail.

Table 4-1: Summary c

	Unit of Analysis		
	Individual / Manager	**Organisation**	**Team**
Method	Quantitative: Survey	Qualitative: Semi-structured interview	Qualitative: Focus group interviews
Sampling Frame	All employees from the JHB Region - total of 663 individuals	All outsourced customers of the JHB Region.	Any virtual team within a selected organisation.
Sampling Technique	Stratified disproportionate sampling.	Simple random selection for organisation. Judgemental sampling for IT and HR managers	Combination of snowball and convenience sampling.
Sample Size	461 individuals.	Six organisations, with the ICT company as the sixth organisation. A total of 11 interviews were conducted.	Seven teams

4.4 INDIVIDUAL LEVEL (QUANTITATIVE)

4.4.1 Sampling Frame, Sample Size and Sampling Technique

The sampling frame on the individual level included all employees from the JHB Region. Stratified disproportionate sampling on age was used, as linked to generational theory and age groups identified for South Africa by Codrington and Grant-Marshall (2006) and presented in Chapter 2, Table 2-4: Generational attitudes, likes and dislikes. Using stratified disproportionate sampling ensured that all generational groups from the population were represented equally. Simple random sampling of individuals was done within each stratum, using Excel's random number generation function, "Randbetween". The exception was with the highest age group which was such a small proportion of the sample, that all individuals in the population were selected to be included in the sample. The detailed sampling steps are given in Appendix B – Individual Sample Selection.

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The sample size w [illegible] n to ensure a response rate large enough for results to be generalised to the population. This resulted in a sample of 461 from a total population of 663 individuals.

Potential errors on the individual level include the fact that the generation was selected according to Codrington and Grant-Marshall's South African age groups (2006). This may imply that individuals on the extremities of ranges (also referred to as "cuspers") could be grouped incorrectly.

4.4.2 Measuring Instruments: Survey

A survey was used on the individual, quantitative level. The questions for the survey were based on the issues identified in the literature review, and were entered into a spreadsheet. Here they were classified according to the objective the question would address (e.g. Objective 1, 2 or 5), the category within the objective (e.g. needs, attitude, profile, perceptions), as well as the issue area as identified in paragraph 2.4.1 (i.e., technology, environment, workforce or organisation). Questions were also linked back to the literature as well as the relevant paragraph in the proposal. The type of question format to be used, as well as the suggested answers, was also added to each question. An extract of the working spreadsheet is given in Appendix C1 - Consistency Matrix For Questions.

Questions were then transferred and captured in the online survey tool, using http://www.freeonlinesurveys.com/, and grouped on four pages. The first page contained questions relating to the profile of the individual; the second page questions relating to the extent that the individual is working virtually; the third page contained questions around attitudes and needs regarding virtual work;

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and the fourth and [illegible] ating to the individual's manager and the individual's perception of their manager's attitude towards virtual work. As questions were transferred to the final questionnaire, duplicate questions and questions containing too much information were eliminated, and marked as "Include=No" in the spreadsheet. The list and filter functions in Excel assisted in grouping and comparing questions, and ensuring that all aspects of the objectives were covered. The final questionnaire can be found in Appendix C2 - Final Questionnaire.

A combination of lists, where more than one option could be selected, simple numeric (free format), simple yes-no, multiple choice (choose one) using both a 5-point Likert scale (where 1 = "Strongly agree" and 5 = "Strongly disagree") as well as category scale answers (e.g., when selecting an age group) were used. Open-ended questions were only included for questions with numeric answers, and on questions relating to technology lists. This made provision for some flexibility in the answers of employees, where too complex and long lists would have had to be created if all possible values had been included.

The limitation with this electronic method was that comparative scales such as ranking of answers was too tedious for individuals to answer and therefore excluded. Also, it was not possible to alter the extent of questions to be answered, based on the answer of one particular question. An advantage was that all of the questions could be set to "compulsory" and that all answers were immediately captured in a database and codified automatically.

The questionnaire it was presented to the respondents in the sample. This assisted in clarifying the wording of some questions, and the mid-value on the Likert scale was changed from “Undecided” to “Neutral”. Even though the questionnaires were tested beforehand, a problem was still experienced with one question that took the form of a matrix with a rating scale which caused respondents to abort the survey. Fortunately, this could be corrected by setting the overall question to non-compulsory, as those items not answered were assumed to be rated as 0%. This issue resulted in the loss of only six responses.

Questions which were deliberately excluded included questions on salary and marital status, as it was not an objective of the study to compare demographics to this extent. Also, more detailed questions on how the virtual work is actually performed were excluded (e.g., how is work transmitted and how often) as these were not part of the objective. The question on industry and the question on the status of policies available for working virtually in the organisation were excluded, as the surveys were only distributed within one company, and these parameters could be determined through the interviews. Should the questionnaire be distributed to more diverse target population and sample in future, these questions would have to be included. In addition, questions to verify the generational group of the individual (e.g., questions relating to general likes and dislikes associated with a particular generation) were also excluded. The purpose of the study was not to verify generational theory, but to determine the mindsets of individuals relating to a virtual workplace. The only question to link an individual to a particular generation was the question relating to the age of the individual.

4.4.3 Data Collection, Data Analysis and Validity

4.4.3.1 Collecting the data

Taking cognisance of the fact that surveys in general tend to have a very low response rate, support was first solicited on management level before sending out individualised emails to the selected individuals in the company. This email contained an introduction to the research, as well as the link to the survey (refer to the example in Appendix C3 - Email For Survey).

A complete list of all individuals in the target population was obtained from the ICT Company's HR department, and this was used to generate the list of email addresses. An MS Word document with the introduction to the purpose of the survey was linked to the database of addresses and then merged into Outlook. The subsequent individualised emails were sent out to the selected individuals in the sample and the Outlook read receipt was activated. The respondents were given two weeks to respond. The response rate on the surveys was 49.7% (232 respondents), of which 44.7% (206 respondents) could be included in the analysis.

The 229 respondents represent 86% of the "read receipts". This indicates that a large percentage of people who actually read their emails were inclined to complete the survey. This can be ascribed to three reasons: in the first place that the survey was internal to the ICT Company and the author may have been known to the individuals. In addition, prior support had been sought through management. Secondly, there was the fact that individually addressed emails were sent out, and not a blanket email. Thirdly, that interest in the topic and general positivism to assist was made obvious by 6% or 26 respondents who

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provided positive s[illegible] s. Refer to Appendix C4 - Read Receipt Status, for the tables and data relating to the "read receipt" analysis.

4.4.3.2 Analysing the data

The first level data analysis included descriptive statistics to compare the resultant respondents with the original population, and also provide some overall descriptive statistics on the respondents. Some of the data was transformed to a format that better supported the data analysis in achieving the objectives of the research (Zikmund, 2003). This included converting the age fields to a generation category by splitting the respondents, as well as their managers, into the related age groups. Age group 21 to 37 was set to Xer, 38 to 57 set to Boomer and 58 and older set to Silent. There were no Millenials among the respondents. The second part of the transformation was to use the elements of hours worked, location worked and percentage spent at the locations to determine whether the individual could be classified as a virtual worker or not. The hours relating to duration and place of work were also used to calculate the category for supplementors, substitutors and campus workers as defined in Table 2-1: Summary of the classification of virtual workers, Chapter 2. The detailed rules relating to the transformations are available in Appendix C5 - Data Transformation Rules, while the results are available in Chapter 5 - Results.

4.4.3.3 Rationale for statistical tests used

Once the data had been transformed and cleaned, the standard quantitative analysis tools and techniques were used to answer the research hypotheses and questions. The detail of how each survey question answers the specific

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research hypothes . found in Appendix C6 - Detailed Rules For The Data Analysis.

The hypotheses were first tested by using linear regression testing. Summary statistic tables and correlation matrices were interrogated to determine if any positive relationships existed between the variables. A positive relationship would be denoted by one (1) and a negative relationship by minus one (-1). This gave an initial indication for the acceptance or rejection of the related null hypothesis.

In order to determine the significance of these differences in the means and modes of groups of variables so that the null hypotheses could be accepted or rejected with a greater degree of certainty, an analysis of variance was used to perform a one-factor (or two-factor) analysis test where, for example, “Virtual Worker = Yes” was the independent variable and the parameter for the hypothesis, e.g. “Needs for working virtually” was the dependent variable. A single variable (measured at the interval level and assumed to have a normal distribution) was grouped according to the values of one or two independent variables. The arithmetic mean of the dependent variable would be expected to be different for the respective groups. The analysis of variance determined to what extent the difference was in fact significant. “Degree of Freedom” (DF) was the number of degrees of freedom. The “Mean Sum of Squares” (SS) was the quotient of the sum of squares and DF. The “Between groups” f-value was the quotient of the mean SS (between) and the mean SS (within) and was a measure of the differences in means among the various groups. The p-value indicated the significance of this difference, it being the probability that the

observed differenc dom fluctuations in the dependent variable rather than of a true dependency. Small p-values (<0.001) suggested that the null hypothesis was unlikely to be true. The smaller it was, the more convincing the rejection of the null hypothesis. It indicated the strength of evidence for, say, rejecting the null hypothesis, rather than simply concluding "Reject the null hypothesis" or "Do not reject the null hypothesis".

The analysis of variance was valid only if the groups could be assumed to have equal variances. A Bartlett test was performed to test this assumption. In the Bartlett test, the chi-square value is a measure of the differences in variances among the various groups. The p-value again indicated the significance, i.e., if there was a significant indication that the probability of the dependant variable was in fact dependent on the independent variable, e.g., the "needs associated with working virtually". No further tests needed to be conducted, since the Bartlett test indicated that there was no significant difference in the variances.

Propositions consisting only of questions were answered by using descriptive statistics in the form of simple counts and pivot tables in Excel.

4.4.3.4 Generaliseability and validity

Based on the high response rate, the results are generaliseable to the population as defined for the quantitative component of the research. However, as only one company was included in the survey, the results will not be generaliseable to the ICT industry as a whole, or to any other industry as such. In terms of validity, questions were not designed to cross-check each other, therefore no Cronbach's Alpha analysis was run on the questions.

4.5 TEAM LEVEL (QUALITATIVE)

4.5.1 Sampling Frame, Sample Size and Sampling Technique

The sampling frame for the teams included any team where team members worked at least part of the time away from the main office location or from each other, within the organisations which were selected on organisational level. A combination of snowball sampling and convenience sampling was then used to identify teams to include in the interviews. The first focus group interviews were held with those teams who were known to the author to be working virtually. Thereafter referrals to other teams were used, as indicated by either the IT or HR Managers, or through reference by the teams who were interviewed first. A total of seven teams were identified and interviewed in this way.

This sampling method may have excluded teams who were not known to the IT or HR managers. This was due to the low (known) prevalence of virtual work, or by virtue of virtual work not being an accepted practice in most organisations, which meant that the HR or IT managers could not identify any teams in their environment. Teams where at least part of the work was performed away from the main office location, or away from each other, were included, even though the deliverables might have been more on the individual level. This might not have been a representation of a virtual team in the strictest sense of the definition - creating combined deliverables. However, it was found that the principles discussed were applicable, whether team or individual deliverables were the outcomes.

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4.5.2 Measuring instrument: Focus Group Interview

To answer the team related questions, focus group interviews were conducted with small teams who were deemed to be working virtually at the stage of the research. The questions for the teams were also determined using a method similar to that used for both the surveys and the semi-structured interviews. Questions were formulated based on the literature review, entered into a spreadsheet, and then linked to the categories within the team objective. These four categories formed the themes covered in the interview, being: firstly demographic information regarding the team members and their manager in order to link this back to generational theory; secondly key factors that virtual teams should address in order to support positive outcomes of work deliverables; thirdly the importance of mindsets and attitudes relating to mobile work and remote collaboration; and lastly needs of individuals, including barriers and drivers, to work in a virtual team. All of the questions were asked within the context of mindsets prevalent in the team and their manager and co-workers.. The questions were conveyed from the spreadsheet into an interview guide using a mind map format. The discussion guide for the focus group interview can be found in Appendix E - Team Data Collection And Analysis.

As with the semi-structured interview, the limitation of this measuring instrument is that the questions could be influenced by the mindset and interviewing skills of the interviewer. Also, it was important to ensure that all individuals participated equally. The advantage of focus group interviews was that synergy and spontaneity was attained in the group, and that answers could immediately be cross-checked within the group context (Zikmund, 2003).

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4.5.3 Data Collection, Data Analysis and Validity

Focus group interviews were arranged through the manager or team leader of the group in question, providing the purpose of the interview as well as a summary of the research.

Discussion guides were used to provide a context for the interview. The first step was an introduction of the topic, the interviewer (being the author) and definitions of the virtual workplace. Permission was requested to record the interview, and was granted in all cases. The second step was to establish the working relationship and demographics of the team. Then the factors ensuring successful deliverables were discussed, followed by a discussion on mindsets and concluded by questions on the needs, barriers and drivers of the team members relating to working virtually.

The group sizes varied from three to thirteen team members. In support of the virtual team principles, only in three of the six interviews, all team members were present in the same venue. In one interview an additional international team member was teleconferenced in. In another interview, one team member was video-conferenced in from a remote location, and in the last interview, only one member was physically present in the meeting room, while the others were located in either remote office locations (nationally dispersed), at home or busy travelling. The work of six of the groups was related to IT and knowledge work, while the seventh group was a team of occupational health practitioners who deliver services to geographically distributed sites of the organisation.

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The data was ana[illegible] interviews, and making detailed notes of the actual conversations, without transcribing it completely. Following the method of content analysis as described by Henning, Van Rensburg and Smit (2004), the notes were then coded and reworded using more general terminology. The codes (still in full-sentence format) were then categorised into related groups, referred to as the detail objective subcategory (or thematic pattern). These objective subcategories were then further related to each other by categorising them according to the objective categories (themes), namely collaboration, communication, socialisation, mindset and need (refer to Table 2-5: Team objective categories and subcategories, in Chapter 2, for more detail). In addition, the codes were also aligned with the issue areas and subareas as identified in Figure 2-3: Management disciplines and telecommuting issues, in Chapter 2. An example of the content analysis outcome is given below.

Table 4-2: Example of content analysis for team level data

Codes	Issue Area	Issue Subarea	Objective Subcategory (Thematic Pattern)	Objective Category (Theme)
Need to resolve issue of staying in touch, quickly picking up on things and quickly resolving issues.	Workforce	Communication	Collective Action	Factor: Collaboration
Limited procedures and processes in place. Still in trial phase.	Workforce	Productivity	Process / Rules	Factor: Collaboration
Calendar sharing and LCS is used for presence. No fixed schedule of which days out of the office.	Organisation	Intra-organisational communication	Timing / Schedules: Perceived availability	Factor: Collaboration

The common themes between the interviews were then clustered and interpreted according to the objective categories and subcategories of the research. In addition, each team was given a “virtuality score”. This was done

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by measuring the [illegible] ries or themes, using a combination of the Process Maturity Framework (PMF) measures, and a simple category measure of “Very low” to “Very high”. This framework is described in Appendix E3 - Team Assessment Framework.

4.6 ORGANISATIONAL LEVEL (QUALITATIVE)

4.6.1 Sampling Frame, Sample Size and Sampling Technique

The sampling frame on organisational level included all the customers in the Johannesburg Region of the ICT Company. Within this sampling frame, five of the customers were selected on a simple random basis. Judgemental sampling was then performed in selecting the IT and HR managers for the semi-structured interviews, as the literature reviews had shown that most of the strategy issues fall in their areas. The ICT Company was included as the sixth organisation to ensure that the ICT Company was represented on all levels of the research. This resulted in a total of 11 interviews, six of which were with HR related managers and five were with IT related managers.

As the sample included only a small number of organisations from the ICT, mining, retail, manufacturing and finance industries, the results are less generaliseable for any one industry in particular. However, the results give a broader view on cross-industry knowledge workers, who were found to be present in all these organisations.

4.6.2 Measuring Instruments: Semi-Structured Interviews

To answer the questions related to organisations, semi-structured interviews (non-expert) were conducted with the CIO or IT Manager as well as with the HR

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Manager of the se llowed to determine the guiding questions for this part of the research, was similar to that of the surveys, namely that questions were formulated based on the literature review, entered into a spreadsheet, and linked to the categories within the organisational objective. These four categories formed the themes covered in the interview. They were: firstly, the organisation and interviewee's demographics; secondly, the organisation's need for a virtual workplace; thirdly, the practicality within the organisation for implementing a virtual workplace; and fourthly, the readiness of the organisation to implement a virtual workplace. All of the questions were asked within the context of mindsets prevalent in the organisation. The questions were conveyed from the spreadsheet into an interview guide using a mind map format. The discussion guide for the interview can be found in Appendix D1 - Interview Discussion Guide.

The limitation of this type of measuring instrument is that the questions could be influenced by the mindset as well as the ability of the interviewer. The advantages of the individual interviews were that they did not have the complexity of trying to synergise answers between individuals at the time of interview, and could be completed in a relatively short period of time. The interviews were recorded (with consent) which assisted the interviewer after the interview in ensuring that the interview was accurately documented.

4.6.3 Data Collection, Data Analysis and Validity

As the organisations were all customers of the ICT Company, the initial contact was made via the account engagement teams, providing the targeted individuals with a summary of the research, as well as the objective for the interview. Once initial contact had been established with the relevant individual,

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the interviews were [illegible] nisations from the retail, financial, mining and manufacturing industries were included. The roles of individuals on the IT side varied from CIO's to General Managers for Outsourcing (will be referred to as "IT managers" for conciseness, unless quoting a specific individual). The roles of individuals on the HR side included HR Directors and Executives, HR Managers and HR consultants (will be referred to as "HR managers" for conciseness, unless quoting a specific individual). The objective for interviewing two different managers in a particular organisations was firstly to obtain both an HR and an IT view on the topic, and secondly to be able to establish common themes for the organisation between the different managers being interviewed, thereby employing a second level of data triangulation.

Interviews lasted between 35 and 75 minutes, with most of the interviews lasting one hour. Interviews took place in either the office of the individual or else in a meeting room at the organisation's head office. One interview took place in a public area of a branch office, accommodating the already virtual work style of the individual concerned. The discussion guide was used for the interviews, with the first step being an introduction to the interviewer (being the author) and the aim of the research. Permission was obtained from all the participants to record the respective interviews. In addition, notes were made during the interview. After the interview, short notes were written relating to the environment, body language and general non-verbal communication experienced during the interview.

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The data was ana[illegible] interviews, and making detailed notes of the actual conversation, without transcribing it completely. As for the team level analysis, the method of content analysis was followed (Henning *et al.*, 2004), coding the notes into segments of meaning and then rewording them according to more general terminology. The codes (still in full-sentence format) were then categorised into related groups. This was also referred to as the detail objective subcategory (or thematic pattern). These objective subcategories were then further related to each other by categorising them according to the objective categories (themes) of need ("Need-" indicating a low or negative need and "Need+" being a positive need), practicality (including both "Practicality" when a virtual workplace was deemed to be practical, and "Barrier" if a virtual workplace could not be implemented) and lastly readiness ("Readiness+" indicating positive proof of a virtual workplace and "Readiness-" indicating the non-existence of an element of the virtual workplace). In addition, the codes were related to the issue areas and subareas described in Figure 2-3: Management disciplines and telecommuting issues, as presented in Chapter 2. An example of the content analysis outcome is given below.

Table 4-3: Example of content analysis for organisational level data

Codes	Issue Area	Issue Subarea	Objective Subcategory (Thematic Pattern)	Objective Category (Theme)
Mining industry does not lend itself to total virtual workplace	Organisational	Adoption Rates	Impact of industry	Practicality
From a global point of view, the organisation has operations all around the world.	Organisational	Adoption Rates	Impact of Company structure/geography	Need+
Time spent in traffic / time spent travelling	Workforce	Productivity	Remote access to save costs and increase productivity	Need+

The common themes between the interviews were then clustered and interpreted according to the questions of the research. In addition, each company was then given a "virtuality score". This was done by measuring the organisation against the themes, using a simple category measure of "Very Low" to "Very High". This model is described in Appendix D2 - Organisational Assessment Framework.

As only a few individuals were interviewed, the data cannot be used to draw inferences about the population or about any industry in particular. The data, therefore, has limited genereliseability potential. The themes identified could potentially be included in more widespread research in the future.

4.7 ASSUMPTIONS AND POTENTIAL RESEARCH LIMITATIONS

Most of the limitations of this research relate to the definition of the population and the sampling frame. A sampling frame error could have occurred as the bulk of the study was done within one region of one company. However, the services provided by this region would normally span all the types of services that are provided within an ICT company as a whole, and the individuals in this division would mainly be knowledge workers. Future research should be extended to larger sampling frames in organisations, as well as to organisations in other industries, so that different types of workers, and not only knowledge workers, could be included. Fortunately the organisations included in the organisational level sample, were members of the retail, mining, finance and manufacturing industries, which gave a broader scope to the research.

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The sampling frame are currently seeking employment, either with the ICT Company or its customers. The research has also excluded the Millennial group, as they will only be finishing off studies and starting to apply for work in the next year or so, i.e., they are not part of the workforce yet.

No testing was done to determine the validity of the generational groups and their frames of reference in the South African context. It was assumed that the age groups as provided by Codrington and Grant-Marshall (2006) represented the correct tiers for age categorisation.

A further aspect relating to collective experience in terms of generational theory, is that of race and culture. The impact of race and culture in terms of mindsets was not taken into consideration. There may be a difference between white and non-white South Africans in terms of their previous exposure to technology - it is likely that when looking at the political history of South Africa, that non-white South Africans could have had less exposure to technology, and even today, may still have only limited access to broadband connectivity outside of the company and its facilities. This should be considered as a topic for future research.

4.8 CONCLUDING REMARKS ON RESEARCH METHODOLOGY

This chapter has described the details of the research methodology. The research was focussed on one division within an ICT company and its customers. The qualitative component of the research, done via electronic surveys and statistical analysis, yielded 206 respondents which made the

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results generalisea . . rvey was performed, but not necessarily to any industry in particular. The quantitative component of the research, done via semi-structured interviews and focus group interviews, identified commons themes concerning virtual work, but the results are not generaliseable due to the small sample sizes.

Measuring instruments included electronic surveys for the individual level, as part of the quantitative component of the study and data was collected on a web page. For the qualitative component of the study, focus group interviews were conducted on a team level, and semi-structured interviews with IT and HR managers on an organisational level. Data was collected on a face-to-face basis for the semi-structured interviews, but the team interviews included individuals connecting remotely using telephone and video conferencing equipment, in addition to individuals being physically present in the interview rooms.

5 RESULTS

5.1 INTRODUCTION

The purpose of this chapter is to present the results of the research in relation to the stated research propositions, hypotheses and questions identified in Chapter 3. Results for the individual level were obtained through electronic surveys, and included 206 respondents. The data was captured in a spreadsheet and coded for analysis purposes. Results for the team level were obtained through seven focus group interviews with virtual teams. The data for the organisational level was obtained through individual interviews with IT and HR managers. A total of eleven interviews were held. The data of both the team and organisational levels was coded and categorised using the method of content analysis, in order to answer the stated propositions and questions. The results for the individual (quantitative analysis), the team (qualitative) and the organisational (qualitative) level are presented in the sections below.

5.2 OBJECTIVES 1, 2 AND 5: INDIVIDUAL (QUANTITATIVE)

5.2.1 Introduction

On the individual level, the profiles of the survey respondents were compared with those of the population and showed that the respondents were representative of the population, confirming the genereliseability of the results to the population. These comparisons can be found in Appendix F1 - Survey Respondents vs Population. In the paragraphs below, the questions pertaining

to Objective 5 are he profile of the virtual worker, and give some perspective on the characteristics of the respondents, before the rest of the hypotheses and questions are answered. Most of the hypotheses were answered by making use of linear regression, while the questions were answered by making use of descriptive statistics.

5.2.2 Proposition 9: Extent of Virtual Work

The data answering the questions relating to proposition 9, "The prevalence of individuals engaging in virtual work and/or wanting to engage in virtual work is much higher than generally thought", is presented below.

5.2.2.1 P9-Q1: What is the percentage of individuals who do work virtually in the sample?

This question can be answered by calculating the number of respondents who do engage in virtual work, and then analysing their profiles. To determine the number of virtual workers, respondents were classified as engaging in virtual work (i.e., working virtually) if they spent more than 10% of their time working away from the organisation's main office location, and they were not spending all of their time working on a client site, and they were using technology applications or communication methods to support remote work. The detailed rules can be found in Appendix C5 - Data Transformation Rules.

In terms of these transformation rules, it was found that 48% of the respondents could be classified as virtual workers. (If one would measure a virtual worker only on their time spent away from the main office location, without taking a minimum percentage into account, then the percentage of virtual workers would increase to 59% [i.e., 122 respondents indicated that they worked some time

away from the mai[illegible] F2 - Data to support P9-Q1, for the detailed data.

5.2.2.2 P9-Q2: How many individuals who do not work virtually at the moment, have indicated that they would like to work virtually?

Of the 108 respondents who were classified as not working virtually, 103 gave reasons for wanting to work virtually. The five who did not select reasons to work virtually, indicated that the job required onsite presence or they did not want to work more virtually. An additional five respondents indicated that they would not like to work virtually at all. Taking all of these answers into consideration, 98 out of 108 non-virtual respondents (i.e., 90.7% of the non-virtual respondents) indicated that they would like to work virtually. Data to support this finding is presented in Appendix F3 - Data to support P9-Q2.

5.2.3 Proposition 10: Virtual Worker Demographics

The data to answer the question relating to proposition 10, "The profiles of individuals working virtually in the study population are comparable with the profiles of individuals working virtually in American and Canadian studies, as well as the Tobin study", is given below.

5.2.3.1 P10-Q1: What is the profile of individuals working virtually in the study population?

In analysing the data, it was found that the largest portion of individuals fall in the management job category (46%), most are permanent, full-time employees (83%), and the largest percentage are Boomers (51%) with an overall average age of 39 years. Male workers make out 84% of the virtual workers, while most individuals have diplomas (38%). Regarding distance travelled, 40% of the virtual workers stay between 11 and 30 km from their main location of work, and

an average of 24 [illegible] away from this location. These statistics are represented graphically below while additional detail and graphs relating to the characteristics of all the respondents can be found in Appendix F4 - Data to support P10. The comparison with the American and Canadian studies is summarised in Chapter 6.

Figure 5-1: Virtual workers: Job category split

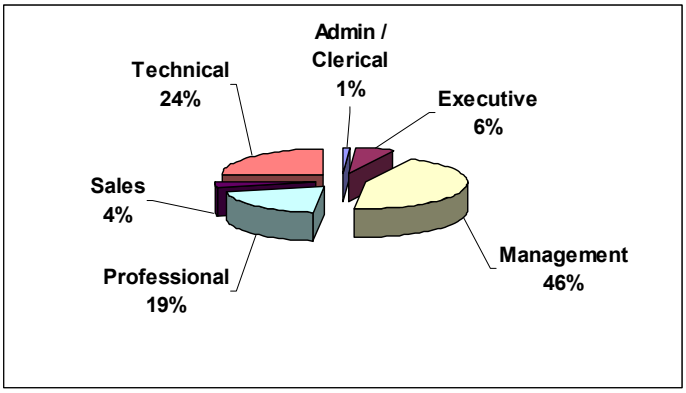


Figure 5-2: Virtual workers: Type of contract split

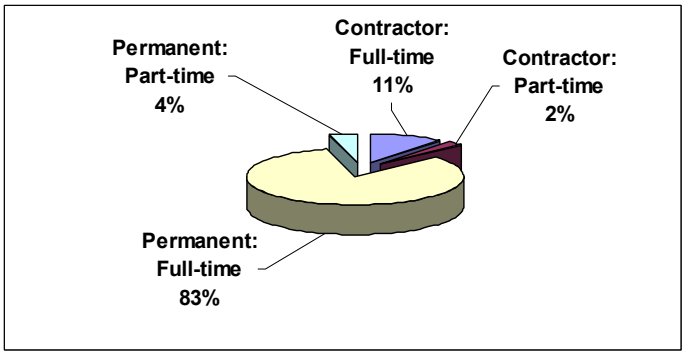
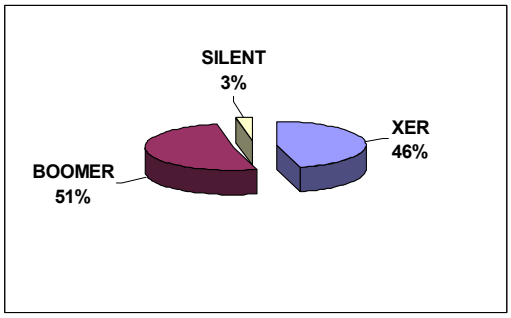


Figure 5-3: Virtual workers: Generational split and average age



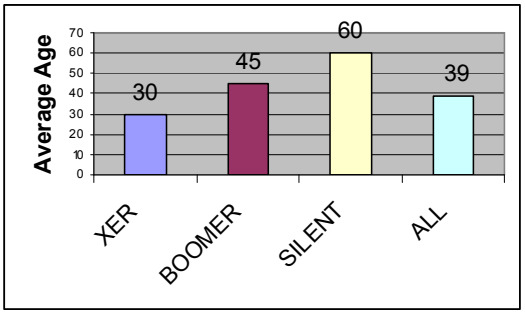


Figure 5-4: Virtual wo

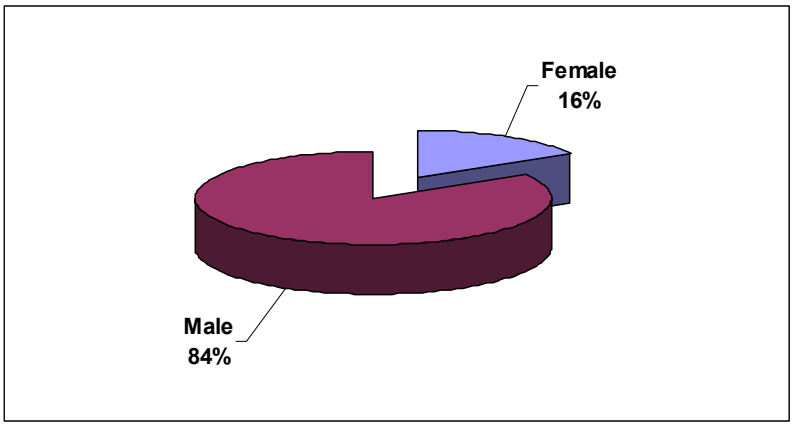


Figure 5-5: Virtual workers: Qualifications

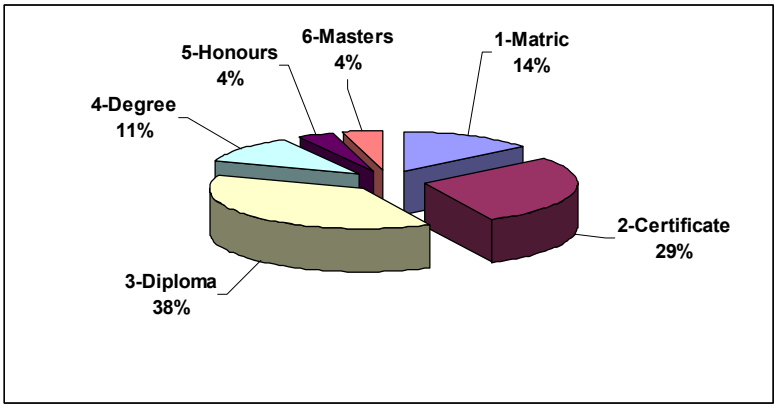


Figure 5-6: Virtual workers: Average one-way commute

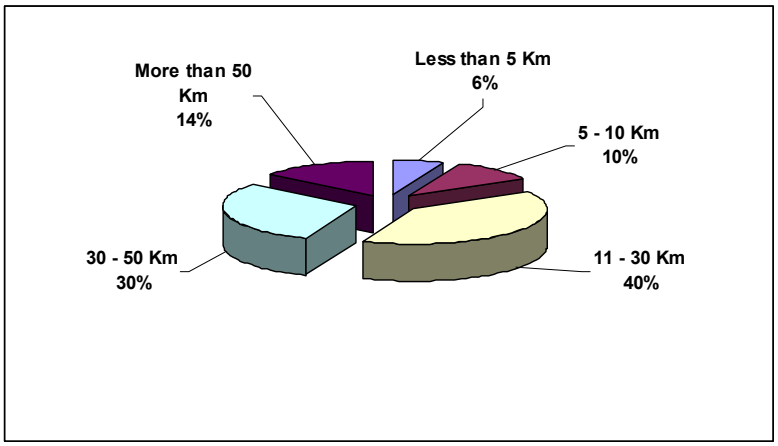


Table 5-1: Virtual workers: Average hours per week doing virtual work

Measure	Hours/week
Average hours worked virtually	24
Maximum hours worked virtually	50
Minimum hours worked virtually	3
Average percentage of total time / week	49%

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5.2.4 Proposition 1: Needs and Attitudes concerning Virtual Work

The data answering the questions relating to proposition 1, “On average, those individuals who do engage in virtual work are more likely to have many reasons for wanting to work virtually, have fewer reasons that prevent them from working virtually and expect to use technology in a flexible and collaborative workplace environment”, is given below.

5.2.4.1 P1-NH1a: Needs/attitudes concerning virtual work

Null Hypothesis (P1-NH1a): There is no significant difference in the means / medians of the different subgroups (virtual vs non-virtual) and their needs and attitudes concerning virtual work.

Linear regression testing was used to analyse the data. The correlation matrix in Table F-11: Correlation matrix for P1-NHa, shows that there are no positive relationships (this would have been denoted by values of + 1 or close to that) between employees who are classified as virtual workers and non-virtual workers when it comes to their needs pertaining to virtual work, as the correlations vary between -0.004 and +0.236. The next step in the test was to conduct a one-factor analysis where “Virtual worker” was the independent variable and “Needs concerning virtual work” was the dependent variable. The analysis of variance was conducted to determine to what extent the difference is significant. The results of the tests are presented in Appendix F, in Table F-12: Analysis of variance: One-factor analysis (P1-NHa). “P” indicates the significance of this difference, it being the probability that the observed difference could be a result of random fluctuations in the dependent variable, rather than of a true dependency. Small p-values (<0.001) suggest that the null

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hypothesis is unlik , -value is > 0.001, and therefore the null hypothesis can be accepted because of the high p-value. So, it can be concluded with confidence that there is no significant difference in the mean scores of the different subgroups (virtual vs non-virtual) and their needs concerning virtual work. The data therefore supports the null hypothesis.

5.2.4.2 P1-NH1b: Needs/attitudes concerning virtual work: generations

Null Hypothesis (P1-NH1b): There is no significant difference in the means of the different subgroups (Xer, Boomer, Silent) and their needs/attitudes concerning virtual work.

A standard linear regression test was once again performed on the data for all respondents. The correlation matrix in Appendix F, Table F-15: Correlation matrix for P1-NHb, shows that there are no positive relationships (these would have been denoted by values of + 1 or close to that) between employees who are classified as Xers, Boomers and Silents when it comes to their needs concerning virtual work, as the correlations vary between -0.070 and +0.01. Because there are no significant relationships (correlations) between the generational age groupings and their needs and attitudes relating to virtual work, the data supports the acceptance of the null hypothesis.

Even though there was no significant statistical difference, when calculating the average rating per question, and comparing the generational groups with each other, there seemed to be a slight bias in the XER group towards the ”strongly agree” side of the scale. The overall average for the Xers is 1.92, for the Boomers is 2.02 and for the Silents is 2.11. The statements marked closest to 1 by the Xers, namely “I like learning new ways to do things “ and “I would like to

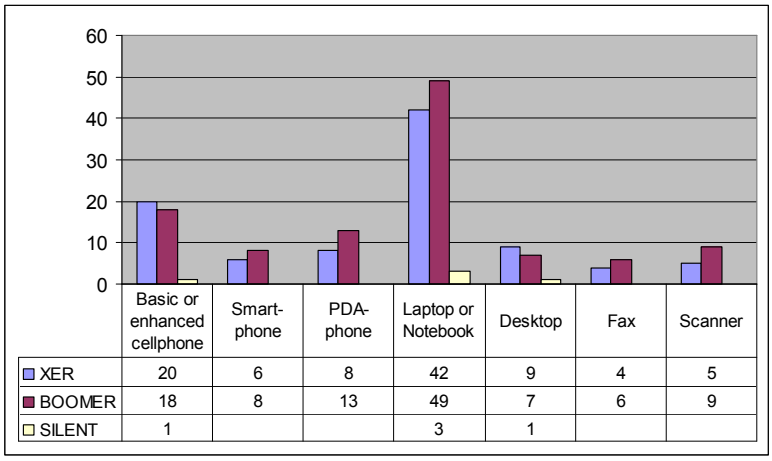
see more technolo e collaboration " had an average score of 1.46 and 1.48 respectively. The detail of this data is available in Appendix F, Table F-16: Comparison of averages for generations

5.2.4.3 P1-NH2: Generational groups and their use of technology

Null Hypotheses (P1-NH2): There is no significant difference between the means / medians of the different subgroups (Xer, Boomer, Silent) and the type of devices, technology and communication methods used when working virtually (i.e., only applied to individuals where working virtually = "Yes").

It was decided to test this null hypothesis by using descriptive statistics. In terms of devices used by respondents classified as working virtual, there does not seem to be a significant difference between the types of devices that Xers use in comparison with the type of devices Boomers use. The most frequently used device in both cases is the laptop or notebook. The second highest utilisation is for the cell phone. There does seem to be a significant difference relating to the Silents, but the number of Silents working virtually is three out of the total of ten respondents.

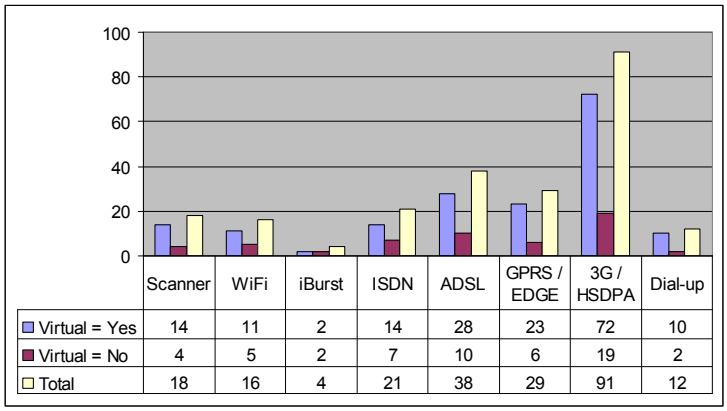
Figure 5-7: Devices used for remote connectivity: Generation



	Basic or enhanced cellphone	Smart-phone	PDA-phone	Laptop or Notebook	Desktop	Fax	Scanner
XER	20	6	8	42	9	4	5
BOOMER	18	8	13	49	7	6	9
SILENT	1			3	1		

With regards to the ologies with the highest utilisation is: firstly 3G / HSDPA; secondly ADSL; and thirdly GPRS/EDGE. This is similar for all three generational groups where the respondents have been classified as working virtually. WiMax, although given as an option, was not selected by any respondent as it is not a commercially available technology in South Africa as yet. “Dial-up” (i.e. using Telkom landline and modem) was added by 12 respondents as a technology used for remote connectivity.

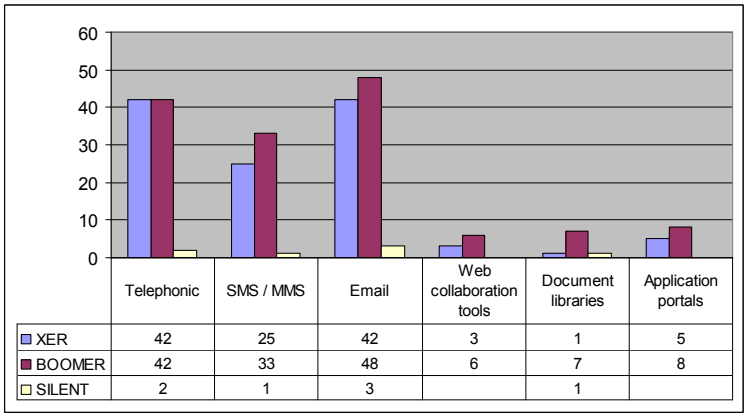
Figure 5-8: Technologies used for remote connectivity: Generation



	Scanner	WiFi	iBurst	ISDN	ADSL	GPRS / EDGE	3G / HSDPA	Dial-up
Virtual = Yes	14	11	2	14	28	23	72	10
Virtual = No	4	5	2	7	10	6	19	2
Total	18	16	4	21	38	29	91	12

The three types of communication methods used most frequently are email, telephone and SMS/MMS in that sequence. This is similar for Xers and Boomers. Silents seem to use the telephone in preference to using SMS/MMS.

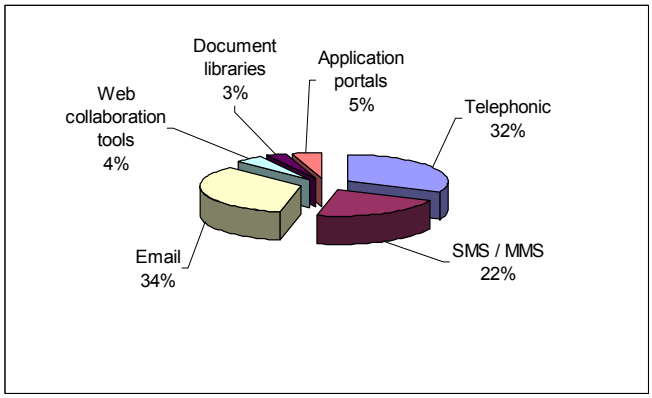
Figure 5-9: Tools / communication methods: Generation



	Telephonic	SMS / MMS	Email	Web collaboration tools	Document libraries	Application portals
XER	42	25	42	3	1	5
BOOMER	42	33	48	6	7	8
SILENT	2	1	3		1	

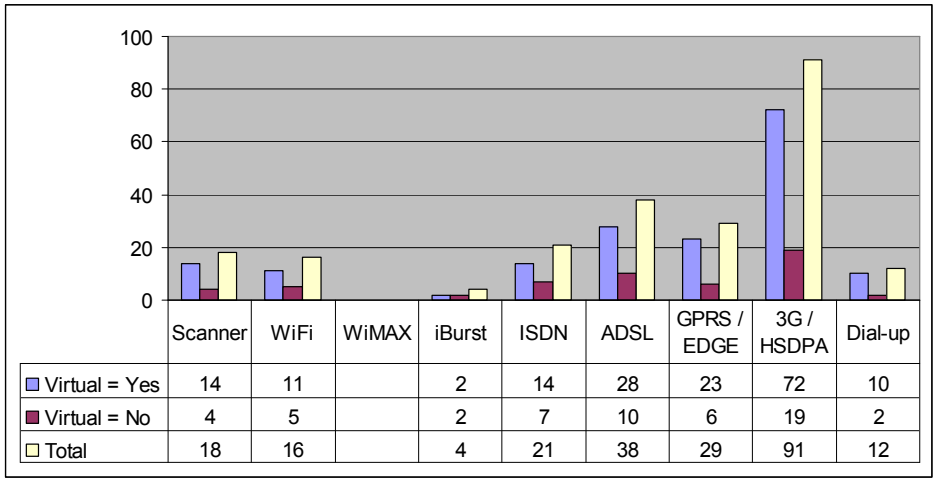
From an overall p[illegible] :ation methods used by respondents classified as virtual workers in the study, email is the most frequently used communication tool at 34%, with telephonic conversation a close second on 32%, and SMS/ MMS third on 22%.

Figure 5-10: Percentage split of tools: Virtual workers



For connectivity, most of the respondents who were classified as virtual workers use 3G / HSDPA. Even respondents, who were not classified as virtual workers, also seem to have a preference for this tool when they do spend the odd extra hour working outside of the main office location.

Figure 5-11: Technologies for remote connection: Virtual status



	Scanner	WiFi	WiMAX	iBurst	ISDN	ADSL	GPRS / EDGE	3G / HSDPA	Dial-up
Virtual = Yes	14	11		2	14	28	23	72	10
Virtual = No	4	5		2	7	10	6	19	2
Total	18	16		4	21	38	29	91	12

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The data presente[illegible]sis, iIn other words, the sample supports the statement that there is no significant difference between the preferences of the different subgroups (Xer, Boomer, Silent) and the type of devices, technology and communication methods used when working virtually.

5.2.4.4 P1-Q1: Is there a difference between individuals who work virtually and individuals who do not work virtually, and the number of reasons given to increase the time spent working virtually?

The maximum number of reasons selected by non-virtual workers was 10, although the average reasons selected per person was the same for virtual and non-virtual workers. It thus seems that there is a slight difference between the groups. In terms of the maximum number of reasons given, non-virtual workers seem to have more reasons than virtual workers to increase the time spent working virtually. Refer to the detailed data table in Appendix F, Table F-17: Number of reasons to increase working virtually (Virtual status).

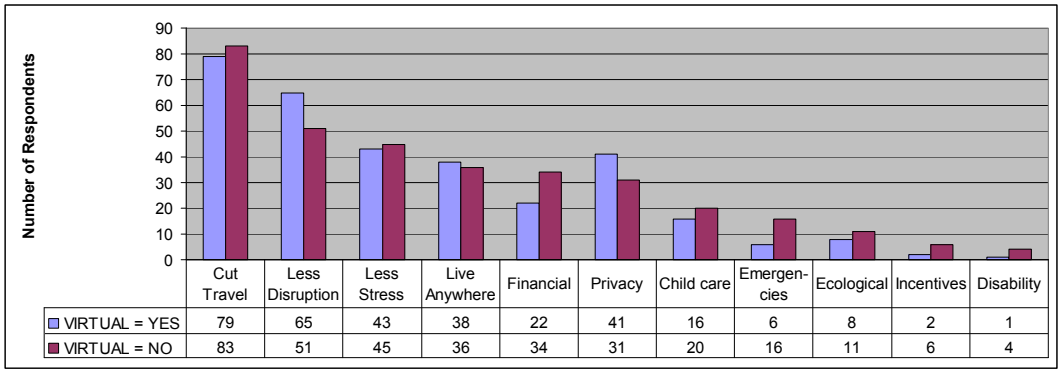
5.2.4.5 P1-Q2: Is there a difference between Xers, Boomers, Silents and the number of reasons given to increase the time spent working virtually?

The maximum number of reasons selected by Xers, Boomers and Silents is ten, nine and six respectively, although the average number of reasons selected per person was the same for all three the generations, only the Silents had one reasons less on average. In answering the question, the number of reasons given to increase the time spent working virtually does not seem to differ significantly. Refer to the detailed data table in Appendix F, Table F-18: Number of reasons to increase working virtually (Generation).

5.2.4.6 P1-Q3: What are the reasons given by virtual workers vs non-virtual workers to increase the time spent working virtually?

The top four reasons for increasing time spent working virtually by both virtual and non-virtual workers, were: to cut down on travel time; to work without disruptions; to cut down on personal stress; and in order to live anywhere. An additional reason for wanting to work more virtually was to increase productivity. Cutting down on stress was slightly more important for the non-virtual employees.

Figure 5-12: Reasons to increase working virtually (Virtual status)



	Cut Travel	Less Disruption	Less Stress	Live Anywhere	Financial	Privacy	Child care	Emergen-cies	Ecological	Incentives	Disability
VIRTUAL = YES	79	65	43	38	22	41	16	6	8	2	1
VIRTUAL = NO	83	51	45	36	34	31	20	16	11	6	4

The reasons for the different generations to increase their time spent working virtually were also analysed. The top two reasons were the same between the generational groups, namely cutting down on travel time and working without disruptions. However, the third highest reason for wanting to work virtual with Xers was “In order to live where I want”, while for Boomers it was to “Cut down on personal stress”. Silents gave “living anywhere”,’ reducing stress” and “more privacy” the same ranking. The rankings for the generations are given in the table below. Additional graphs can be found in Appendix F7 - Data to support P1-Q1 to P1-Q6.

Table 5-2: Reasons to increase working virtually (Generation)

Generation	Generation	Ranking	Numbers
Xer	To cut down on travel time	1	74
	To work without disruptions	2	53
	In order to live where I want	3	38
	To cut down on personal stress	4	36
Boomer	To cut down on travel time	1	80
	To work without disruptions	2	59
	To cut down on personal stress	3	49
	To find privacy when working	4	39
Silent	To cut down on travel time	1	8
	To work without disruptions	2	4
	In order to live where I want	3	3
	To cut down on personal stress	3	3
	To find privacy when working	3	3

5.2.4.7 P1-Q4: Is there a difference between individuals who work virtually and individuals who do not work virtually and the number of reasons given that prevents them from increasing the time spent working virtually?

The maximum and average number of reasons selected by virtual and non-virtual workers were counted in a pivot table, and found to be exactly the same. The data therefore does not show a difference between these two groups and the number of reasons given preventing them from increasing their time spent working virtually. Refer to the detailed data table in Appendix F, Table F-21: Number of reasons preventing virtual work (Virtual status).

5.2.4.8 P1-Q5: Is there a difference between Xers, Boomers, Silents and the number of reasons given that prevent them from increasing the time spent working virtually?

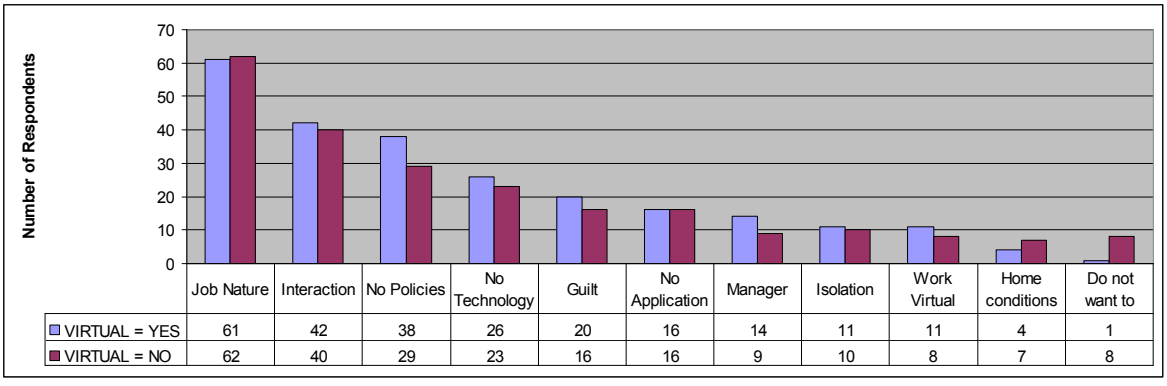
The maximum number of reasons selected by the different generations was seven, and the average number of reasons selected the different generations was two. The data therefore does not show a difference between the Xers,

Boomers and Siler n preventing them from increasing their time spent working virtually. Refer to the detailed data table in Appendix F, Table F-22: Number of reasons preventing virtual work (Generation).

5.2.4.9 P1-Q6: What are the reasons given by virtual workers vs non-virtual workers preventing them to increase the time spent working virtually?

The four main reasons for not being able to increase the time spent working virtually, were: that the nature of the job demands onsite presence; interaction is required with fellow employees; the fact that there are insufficient company policies; and also due to insufficient technology. An additional comment was made concerning the narrow-mindedness of fellow-employees and customers about working from home - the mindset is: "you are not working if you are not in the office".

Figure 5-13: Reasons preventing virtual work (Virtual status)

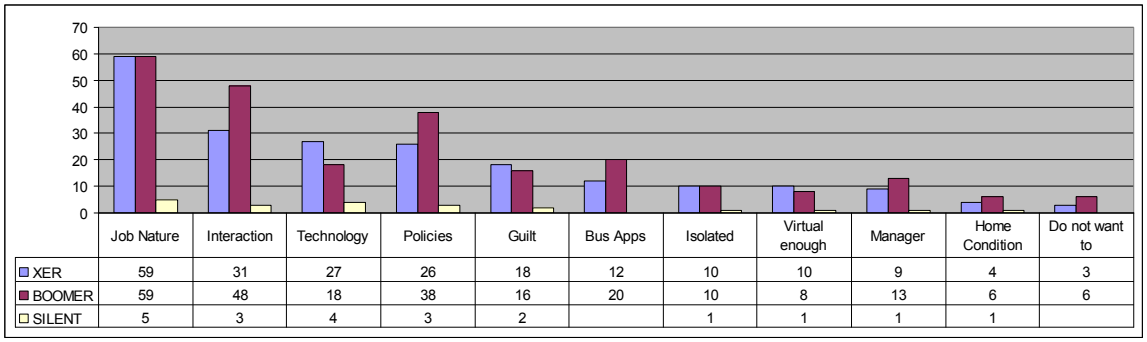


	Job Nature	Interaction	No Policies	No Technology	Guilt	No Application	Manager	Isolation	Work Virtual	Home conditions	Do not want to
VIRTUAL = YES	61	42	38	26	20	16	14	11	11	4	1
VIRTUAL = NO	62	40	29	23	16	16	9	10	8	7	8

The main reason for all generations preventing them from increasing their time working virtually is the nature of the job. For both Boomers and Xers, the second highest reason is the fact that interaction is required with fellow

employees. For Xe availability of technology, while this same reason is the second highest for Silents. The third highest reason for Boomers is the lack of policies regarding virtual work.

Figure 5-14: Reasons preventing virtual work (Generation)



	Job Nature	Interaction	Technology	Policies	Guilt	Bus Apps	Isolated	Virtual enough	Manager	Home Condition	Do not want to
XER	59	31	27	26	18	12	10	10	9	4	3
BOOMER	59	48	18	38	16	20	10	8	13	6	6
SILENT	5	3	4	3	2		1	1	1	1	

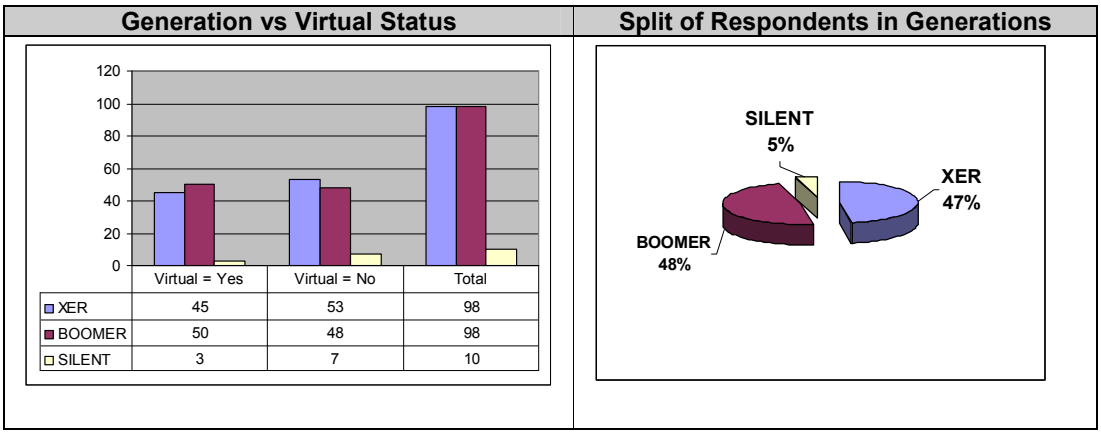
5.2.5 Proposition 2: Generations and Virtual Work

The proposition, "On average, the Xers and Millennials are more likely to engage in virtual work and telecommuting." Differently stated, "Those individuals who do engage in virtual work are more likely to be Xers and Millennials", will be answered by calculating the number of Xers, Boomers and Silents respectively who were found to be working virtual.

5.2.5.1 Are there more Xers than Boomers who have been identified as working virtually?

The percentage of Xers working virtually at 46% (45 out of 98) was found to be slightly less than the percentage of Boomers working virtually at 51% (51 out of 98). Silents make up 3% of the number of respondents classified as working virtually. The data does not support the proposition, in other words, it seems that Xers are not engaging in virtual work more than Boomers.

Figure 5-15: Generati



5.2.6 Proposition 3: Managers of Virtual Workers

The questions and hypothesis that follows will aim to answer the proposition, "The managers of those individuals who do engage in virtual work are more likely to be Xers".

5.2.6.1 P3-Q1: Are the managers of those individuals who do engage in virtual work, mostly Xers?

The age data was transformed into generational groupings, and then cross-tabulated with individuals working virtual (yes/no) is used to answer this question. Only 27% of the managers of individuals who work virtually in the sample are Xers. By far the majority of managers of individuals working virtually are Boomers (73%). It should be noted that for the whole population, the majority of managers are Boomers. Percentage wise the number of managers, who are Xers, and are the managers of those individuals who are not working virtually, are more than the population split, namely 34%. The one individual, who indicated that his /her manager is a Silent, is not working virtually.

Table 5-3: Generation of Managers (vs Virtual Status of Employee)

Generation of Manager	Employee Virtual = Yes	Virtual Yes %	Employee Virtual = No	Virtual No %	Total	Total %
XER	26	27%	37	34%	63	31%
BOOMER	72	73%	70	65%	142	69%
SILENT	0	0%	1	1%	1	0%
Total	**98**	**100%**	**108**	**100%**	**206**	**100%**

5.2.6.2 Null Hypothesis (P3-NH1)

Null Hypothesis (P3-NH1): There is no significant difference between means / medians for the different subgroups (i.e., the generational groups of the managers of the individuals who are working virtually) in questions relating to the manager's attitudes as perceived by their employees.

Linear regression was once again used to test this hypothesis. Only managers of those respondents classified as working virtually were included. The age of the manager was transformed to the relevant generational grouping, and then correlated with the perceived attitudes of these managers. There were no significant relationships or correlations highlighting any significant differences between the means of the different subgroups (i.e., managers who are Xers or Boomers). To test the extent that the difference is significant, the analysis of variance test was run next. The results of this test also suggested that there was no significant difference in the means and medians of the data. Key indicators were the high p-values and the Chi-square test value. High p-values suggested that the data was distributed normally and therefore there was no significant difference in the means or medians of the data. The detailed tables can be found in Appendix F8 - Data to support P3-NH1.

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Therefore, the null [illegible] an be said that there are no significant differences in the means and medians for the different subgroups (generational groups of the managers of the individuals who are working virtually) in questions relating to managers' attitudes as perceived by their employees.

5.2.7 Proposition 4: Managers and Trust

The proposition, "The managers who do allow their workers to work virtually have a longer relationship with the individual, and they trust the individual", was answered by testing two hypotheses.

5.2.7.1 Null Hypothesis (P4-NH1)

Null Hypothesis (P4-NH1): There is no significant difference between the means / medians of the subgroups (virtual vs non-virtual) and the duration of time worked for the manager.

Linear regression was used to test this hypothesis and the correlation value of only 0.015 (compared to a positive correlation value of 1) indicated that no significant correlation existed. The data therefore supports the acceptance of the null hypothesis, namely that there is no significant difference between virtual workers and non-virtual workers and the duration of time they have worked for the manager. The detailed data tables can be found in Appendix F9 - Data to support P4-NH1.

5.2.7.2 Null Hypothesis (P4-NH2)

Null Hypothesis (P4-NH2): There is no significant difference between the means / medians of the subgroups (virtual vs non-virtual) in the perceived level of trust.

No significant relationship or correlations were found between the perceived level of trust of the manager and whether the respondent works virtually or not. A correlation value of only 0.049 was obtained, where a value closer to 1 would have indicated a significant positive correlation. The analysis of variance test was run next to determine the extent to which the difference was significant. The results showed that there were no significant differences in the means of the two variables – “virtual worker” and “my manager trusts me”. Therefore the null hypothesis can be accepted and it can be said that a manager’s perceived level of trust does not vary significantly between individuals who have been classified as working virtually, vs those who have been classified as not working virtually.

5.3 OBJECTIVE 3: TEAM LEVEL (QUALITATIVE)

5.3.1 Introduction to Results of Objective 3

All seven of the focus group interviews were recorded and cursory notes were made during the interview, by the author who was the interviewer. After the interview, some additional notes were made relating to perceptions and non-verbal information. To analyse the data, the recorded interviews were re-played, with the aim of capturing the key points of the discussion. This was done either on an Excel spreadsheet or in a Word document. During the second phase, the key discussion points were coded in a spreadsheet and then categories relating to the overall issue area (technology, organisation, workforce and environment) and issue subarea were added (as per Figure 2-3: Management disciplines and telecommuting issues). The largest portion of the coded discussion points

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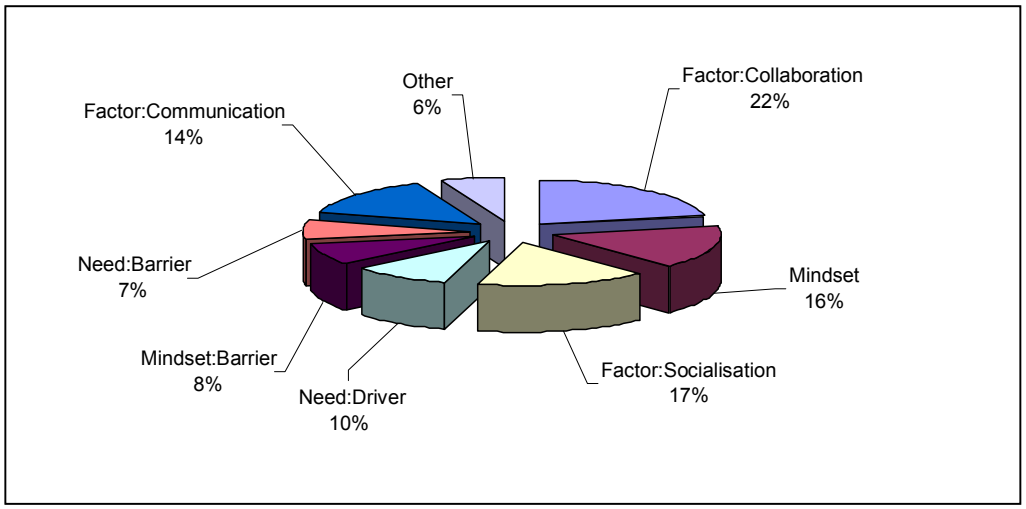
where classified as [illegible] isational issues resulting in 30% of the references. Technology was the lowest at 17%.

The coded discussion points were also categorised according to the team themes, namely factors for successful delivery, mindsets and needs, as well as the theme subcategories (refer to Table 2-5: Team objective categories and subcategories, in Chapter 2). The largest portion of the coded discussion points related to the collaboration factor at 22%, with the socialisation factor and mindsets at 17% and 16% respectively. The lowest portion of references (i.e., coded discussion points) related to barriers.

Figure 5-16: Team: Objective subcategory split



Of the seven teams who were included in this level of research, five teams were IT service related, one team delivered online training products, and one team delivered an occupational health service. This last team provided a counter-balance in the research, as the team members were virtual in terms of team-work, but the individuals had to work onsite due to the interactive nature of their work.

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5.3.2 Proposition 5: Factors, mindsets and needs

The data answering the questions relating to proposition 5, “There is a list of factors, mindsets and needs that can be compiled to make working in a virtual team more successful”, is given below.

5.3.2.1 Question P5-Q1: What are the key factors required by virtual teams in order to support positive outcomes of work and project deliverables?

The key factors identified during the focus group interviews, which were deemed by the groups to be necessary to ensure success in virtual teams, were classified under collaboration, communication and socialisation subcategories. A framework, including these factors, was constructed to use in the comparison of the teams. The framework is available in Appendix E3 - Team Assessment Framework. The detailed data for each team can also be found in Appendix E, while the summary is presented below.

In the first set of measures, teams were compared in terms of their process maturity in relation to virtual work. All items included in this set of measures were rated according to the Process Maturity Framework (PMF) as described in Appendix E2 - Introduction to the Process Maturity Framework. The second set of measures, named the “team virtuality score”, used a simple category scale from 1 (very low) to 5 (very high). In using this score, Team 7 was identified as the team with the highest total score, including the highest in process maturity. Team 3 was identified as the team with the highest measure of virtuality. Team 4 had the lowest virtuality score, while Team 5 had the lowest process maturity. Team 2 was the team with the lowest overall score. It is of importance to note that the non-IT team scored very high on their process maturity, giving them an

overall high score[illegible] can be improved by improving process maturity.

Table 5-4: Team data summary

Team	Team Size (Excl Mng)	Number working virtually	Manager working virtually ?	Duration working virtually	Type of deliverable	Process Maturity (5)	Team Virtuality Score (5)	Total Score (10)
Team 7	18	2	No	3 years	Training Products (Individual)	4.4	3.4	7.8
Team 3	4	4	Yes	3-5 years	Business Optimisation	3.0	4.1	7.1
Team 6	5	5	Unknown	5 months	System Availability	3.2	3.4	6.6
Team 4	11	11	Yes	Shortest 6 months, longest 11 years	Occupational health services (OH).	3.9	2.5	6.4
Team 5	3	3	Yes	8 months	Application development and resourcing	2.6	3.7	6.3
Team 1	7	5	Yes	11 months	System Support (Individual)	3.0	3.0	5.9
Team 2	7	7	Yes	9 months as this team, but longer in terms of flexible work.	System Support (Individual)	2.8	2.9	5.7

Themes that surfaced constantly during the focus group interviews as contributing to success of deliverables for the teams included the establishment of procedures and rules which team members need to subscribe to as part of collaboration. These rules are in most cases implicit and unwritten, while in other cases they are very specific and documented in detail, as the non-compliance with these procedures has strategic a impact on the company. Another theme for success was around timing and schedules. Team members need to make sure that their schedules are available, and that their individual

presence informati members, the manager and other individuals in the organisation. Another item high on the list as contributing to the success of the team, was the definition of performance measures relating to specific deliverables. It was also believed that this, together with the trust relationship, is necessary to reduce conflict in the team.

Under socialisation, group norms were the most important, and within group norms, trust played an important role. The face-to-face component was also still noted as an important factor for success. It assisted in the trust relationship, in establishing group norms (both implicit and explicit), as well as identifying personality traits quickly. These all facilitate the correct interpretation of written messages. As part of socialisation, team members confirmed that participation is important as it facilitates knowledge sharing, learning, and ensuring that individuals feel less isolated.

Most of the communication was facilitated by the fact that the team members were all South Africans, and therefore English is used as the business language. The technology played a big role in the success of the team, especially the use of a collaboration tool like Microsoft Office Communicator (also referred to as Microsoft Live Communication Server or LCS). The “presence” information (i.e., visually showing if a person is online) was seen as a huge contributor to team success, as with collaboration, increasing perceived availability and facilitating quick communication.

Table 5-5: Key factors

Factor	Subcategory	References
Factor: Collaboration	Process / Rules	19
	Timing / Schedules	13
	Performance Measures: Specific Deliverables	10
	Collective Action	9
	Conflict Management	8
	Timing / Schedules: Perceived availability	7
Factor: Socialisation	Group Norms	18
	Face-to-Face component	13
	Participation	12
	"Teamness"	10
Factor: Communication	Technology: LCS: Communication, Presence, Application Sharing	12
	Technology: Email	6
	Language / Understanding	5
	Technology: Telephone	5
	Technology: 3G	4

References to technology used included 3G, ADSL and VPN tunnels. LCS, email, telephone, cell phone, SMS, conference calls and video conferencing all of which are used for communication purposes. Various applications are available remotely, including system monitoring tools.

Mindsets are also important for the success of deliverables in virtual teams, but will be discussed as part of question P5-Q2. However, it is important to note the importance of executive support, as well as a positive management attitude in addition to the factors identified in this paragraph, to support the successful functioning of a virtual team.

5.3.2.2 Question P5-Q2: How important are mindsets and attitudes regarding mobile work, collaboration and connectivity in determining the success of a virtual team?

There are specific mindsets and attitudes that individuals in virtual teams need to have in order to survive in the virtual world. The four top characteristics are maturity and being output driven (i.e., focus on deliverable and not time);

discipline and inde need to ask a manager for guidance all the time, but is expected to define his / her own micro tasks within the greater delivery target); positive attitude towards technology; and having a high emotional quotient. The summary list is given below, while the detailed data is available on request.

Table 5-6: Employee / Workforce mindsets

Objective Subcategory	Mindset	Refs	Total
Attitude / Mindset	Mature, delivery driven; Mature, independent, delivery driven (from day 1); Focus on output not time.	7	**26**
	Disciplined, positive attitude, able to take responsibility, assertiveness and independence; Prioritise, make decisions, take actions independently; Self-starter, work without supervision/monitoring.	4	
	Background in technology so adapts more quickly; Technophile - must like to play with technology; Trying out new technology.	4	
	High Emotional Quotient	2	
	Various other (refer to appendix for details).	9	
Job satisfaction	More positive towards work and deliverables.	1	**1**
Productivity	Do not feel guilty when taking some hours off, but will be working later.	1	**2**
	Work harder so that people cannot point fingers.	1	
Work/Life Balance	Supplementors have issues with work/life balance.	10	**14**
	Connectivity exists, therefore work anytime; Working longer hours.	2	
	Do not feel guilty when working from home.	1	
	Spend time on interaction when at the office.	1	

From the table presented above, and the references to discipline as well as the issues with work/life balance, it is clear that the individual should be disciplined from both a work and personal perspective. Discipline from the work perspective is needed to ensure that work is performed as expected, even when working from home, where there could potentially be additional distractions. On the other hand, the individual needs to be disciplined from a personal point of view as well, since the individual may tend to work longer hours from home just because the technology for connectivity is available, and because the individual is generally driven to work until the output is delivered.

The managers of virtual teams also need to have specific mindsets to support the virtual team. They need to have a clear vision for the team, and solicit support from executive management. They should not micromanage, but set direction, and allow individuals to define their own tasks and pace. The other mindsets for managers are tabulated below.

Table 5-7: Mindsets and attitudes required by managers

Model	Mindset	Refs
Management Attitude (10)	Vision for the virtual team	2
	Executive Support	1
	Allow virtual work	1
	Do not have to see the person to communicate	1
	Do not micromanage	1
	Do not need to see the individual if deliverable successful	1
	Expect deliverables, time no longer important.	1
	Expect quality goods on time	1
	Redundancy of managers - no longer need for control	1
Manager-employee relationship (10)	Trust to deliver	3
	Balance Task and Human interface; Do not micromanage	1
	Change approach and communication styles	1
	Do regular site visits	1
	Give Direction	1
	Manage on Output, not Time	1
	Set boundaries and rules in advance	1
	Risk - losing individuals	1

5.3.2.3 Question P5-Q3: What are the needs of individuals regarding the applicability and desirability of working in a virtual team?

By coding and categorising the data, it was found that the greatest need for individuals to work virtually is driven by the need for flexibility and quality of life. Traffic also plays an important role in driving this need. By working remotely, or by changing the hours at work, the number of hours spent in traffic is reduced, productivity is increased, and more time can be spent with the family. Stress is reduced as well. Other needs include the fact that it provides an opportunity to

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learn new technolo to travel in South Africa and also abroad.

Table 5-8: Individuals' needs for working virtual

Need: Freedom and control of schedule, including creativity needs	6
Need: Flexibility, Different locations, Traffic	5
Need: Quality of Life	4
Need: Save travel time, increase productivity	2

A need associated with the South African context relates to the safety of individuals especially those on standby. If tasks/work can be performed remotely, they do not have to travel at night.

Barriers on the individual level are: if the type of job does not permit it; if the technology is not sufficient to allow collaboration; or if the job requires knowledge sharing. Some individuals may also choose to work from the office if they cannot organise a suitable workstation at home, are not disciplined enough, require more socialisation at work or find that family interference makes them unproductive.

5.3.3 Proposition 6: Age Groups of Managers and Team Members

The data answering the questions relating to proposition 6, "The ages of team members in teams working virtually are more likely to fall within the Xer generation." and "The age of the managers of teams working virtually, are more likely to fall within the Xer generation", is set out in the summary table below. All managers of virtual teams interviewed fell in the Boomer generation. The average ages of team members fell in the Xer generation in five of the seven teams.

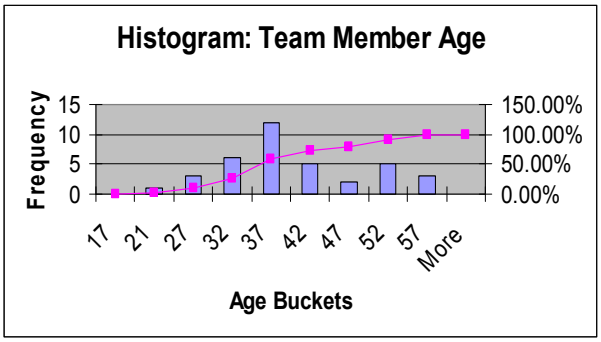
Table 5-9: Team and i

Industry	Team	Number working virtually	Manager working virtually	Duration working virtually	Manager / team lead age	Average age team members	Total score (10)
Finance	Team 7	2	No	3 years	Boomer	50	**7.8**
Manufacturing	Team 3	4	Yes	3-5 years	Boomer	**37**	7.1
Mining	Team 6	5	Unknown	5 months	Boomer	**35**	6.6
Manufacturing	Team 4	11	Yes	Shortest 6 months, longest 11 years	Boomer	45	6.4
ICT	Team 5	3	Yes	8 months	Boomer	**28**	6.3
Manufacturing	Team 1	5	Yes	11 months	Boomer	**36**	5.9
Manufacturing	Team 2	7	Yes	9 months	Boomer	**34**	**5.7**
Legend:	**Xer Age Group**		**Highest Virtuality Score**			**Lowest Virtuality Score**	

5.3.3.1 Question P6-Q1: What is the average age of team members working in virtual teams?

The ages of team members ranged from 20 to 57, covering both Xer and Boomer generation members. The average age of four of the seven teams did fall in the Xer generation, therefore the proposition holds that "The ages of team members in teams working virtually are more likely to fall within the Xer generation".

Table 5-10: Team member age histogram and data



Age	*Freq*	*Cum %*
17	0	0.00%
21	1	2.70%
27	3	10.81%
32	6	27.03%
37	12	59.46%
42	5	72.97%
47	2	78.38%
52	5	91.89%
57	3	100.00%
More	0	100.00%

However, according to the team evaluations (as scored by the author), the teams with the younger average ages are not necessarily the best performing virtual teams.

5.3.3.2 Question: P6-Q2: What is the average age of the managers of team members working in virtual teams?

The ages of team managers ranged from 38 to 51+, which implies that, according to the age groups used for this research, all of the managers fell in the Boomer generation. From this data, the proposition, therefore, does not hold that "The ages of the managers of teams working virtually, are more likely to fall within the Xer generation". However, considering the fact that most of the individuals in the teams also fulfil a management or team lead role within their respective teams, the majority of managers can still be deemed to be Xers.

5.4 OBJECTIVE 4: ORGANISATIONAL (QUALITATIVE)

5.4.1 Introduction to Results of Objective 4

All interviews were recorded and brief notes were made during the interview, by the author who was the interviewer. After the interview, some additional notes were made relating to perceptions and non-verbal information. To analyse the data, the interviews were replayed, with the aim of coding the data. The main themes of the coded data were then also noted. During a second phase, the coded data was captured in a spreadsheet and then categorised according to the model issue area (technology, organisation, workforce and environment), the issue subarea (refer to Figure 2-3: Management disciplines and telecommuting issues, in Chapter 2), the objective category (readiness,

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practicality, mindse tegory (refer to Table 4-3: Example of content analysis for organisational level data, in Chapter 4).

Most of the data centred on organisational issues (67%). Technological and workforce issues reflected 17% and 16% of the issues respectively. No specific environmental issues were mentioned about “greening”, however, reference was made to the safety and crime situation in South Africa, both from a travel, and from an availability of connectivity point of view.

The organisations were also compared by evaluating each company using the organisational assessment framework described in Appendix D2 - Organisational Assessment Framework. Organisations were rated according to the factors of need, practicality, and readiness in terms of both technology and policies. Using this scoring method, the organisation in the finance industry scored the highest result. The detailed scores are available in Appendix H - Organisational Scoring.

Table 5-11: Organisational virtuality score comparison

Organisation Number	Industry	Virtuality Score (Out of 5)
4	FINANCE	4.3
1	MANUFACTURING	3.1
2	ICT	2.9
3	RETAIL	2.6
5	MINING	2
6	MANUFACTURING	2

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5.4.2 Proposition 7: Organisational Readiness

The data answering the questions relating to proposition 7, “Organisations are in general not ready for the virtual workplace, and have no strategies and policies in place to support this phenomenon”, is given below.

5.4.2.1 Question P7-Q1: What needs in organisations are driving the implementation of a virtual workplace?

Themes which surfaced concerning the need in organisations included: the need for flexible schedules to miss traffic or to accommodate more time for children at home (14 references); the impact of company structure/geography both on a regional and global context (14 references); the type of job / work performed which demands off-site work (as in the case of sales staff) (10 references); and remote access needed to save costs and increase productivity - mainly based on the travel issue and geography of the organisation (8 references). A need was also identified by individuals who have to “catch up” work, which was classified as “Supplementors and issue of work/life balance” due to additional time spent working at home. In the South African context, one individual mentioned the fact that travel time needs to be decreased because of safety reasons. This can be related to the crime situation in South Africa. In general, the need for virtual work as perceived by the IT and HR managers as expressed by individuals seemed to be very low in most cases. It was also found that in many organisations the actual requests to work virtual were very infrequent.

Table 5-12: Organisat

Needs	References
Impact of Company structure/geography	14
Need for flexible schedules	14
Type of job / work performed	10
Remote access to save costs and increase productivity	8
Supplementor and issue of work/life balance	5

5.4.2.2 Question P7-Q2: Will the implementation of a virtual workplace strategy be practical for the organisation?

The themes identified from the interviews indicated that the practicality of the virtual workplace in an organisation depends to a large extent on the type of job or work performed. The type of work performed also relates to the impact of the industry, namely that the practicality for the mining and manufacturing industries was seen to be lower than for the finance, ICT and retail industries. Although the job performed is key to the practicality of the virtual workplace, there was a noticeable opinion about the perceived unfairness by those workers who cannot work virtually. Knowledge management also needs to be made practical. Other issues that affected the practicality were concerned with defining the home-office environment and way of work, which are expressed in policy prescriptions, and also surface in the debate around standardisation, ownership and usage issues. Another factor that was identified as affecting practicality is the fact that human interaction will always be required.

Table 5-13: Practicality factors of the virtual workplace for organisations

Factor	References
Type of job / work performed	21
Impact of industry	4
Knowledge management	4
Policy: prescriptions	4
Standardisation, ownership and usage issues	4
Human interaction will always be required	4
If workers cannot work virtually, it is perceived as being unfair	2

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Some of the theme[illegible]t that human interaction will always be needed; the barrier imposed by the type of industry; and the fact that for many people technology literacy is still an issue; also for South Africa connectivity must be cost effective and speeds and reliability must be improved. The fact that most managers were schooled in the old regime of "control and command", and the lack of maturity of the organisations in allowing virtual work, all represent additional barriers to the successful implementation of a virtual workplace.

Table 5-14: Barriers that prohibit the implementation of a virtual workplace

Barrier	References
Human interaction will always be required	5
Impact of industry	5
Technology literacy to improve understanding and productivity	5
Connectivity must be cost-effective	4
Infrastructure/Technology in SA	4
Management paradigm : old school of command & control	3
Maturity of company	3

5.4.2.3 Question P7-Q3: Are organisations in general ready to implement a virtual workplace strategy?

The themes identified concerning readiness showed that connectivity, applications and technologies to support remote access exist in all of the organisations included in the study. From the interviews it was evident that much work has been performed for improving retention strategies for female employees, recruitment of younger talent as well as the inclusion of technology as a retention strategy in general. There was also evidence that virtual work was being explored through either a proof of concept, by evaluating global trends in the specific industries or by actively implementing additional technologies, even though the main reason for implementing remote access

was to save costs) implement virtual work specifically. Some policies relating to the use of mobile devices and flexible hours were also found to be inexistence.

Organisations are still deficient in the area of policies specifically for virtual work as well as performance management required for this type of work arrangement. A key theme that emerged was the lack of readiness due to the extent and complexity of organisational change that would be required to implement a virtual workplace. In some cases retention strategies did not specifically make provision for factors needed to stimulate the new work environment. The readiness and non-readiness factors are tabulated below.

Table 5-15: Organisational readiness factors

Readiness Factor	References
Connectivity, applications and technologies support remote access	19
Exploring virtual work	6
Retention strategy for female employees	6
Type of job / work performed	5
Technology as retention strategy in general	4
Remote access to save costs and increase productivity	4
Recruitment strategy for younger talent	4

Table 5-16: Organisational "non-readiness" factors

Non-Readiness Factor	References
Policies for virtual work do not exist.	7
Organisational change required to address all touch points	4
Performance Management	3
Technology as retention strategy in general	2

5.4.3 Proposition 8: Organisations and Generations

Data answering the proposition, "The age group of the executives of companies where the virtual workplace is not prevalent, is more likely to be that of the Boomers or Silents", is given below.

5.4.3.1 Questions P8-Q1, P8-Q2 and P8-Q3

Questions P8-Q1 to Q3 related to the generations of the IT and HR managers, the company executives and the average age of employees. It was found that IT managers, HR managers as well as the executives of the organisations could all be classified as Boomers. Employees could mostly be classified as Xers, while one manufacturing company indicated that their workforce was mixed between Boomers and Xers. The age groups are summarised in the table below. The table also includes a virtuality score for each organisation.

Table 5-17: Comparison of age groups in the organisations

Org No.	Industry	Ave Age Execs	Ave Age Mng	Age Mng IT	Years with comp (IT)	Ave Age IT staff	Age HR	Years with comp (HR)	Ave Age all staff
1	MAN	51	48	Boomer	26	n.o.	Boomer	8	n.o.
2	ICT	40	40	Boomer	4	late 20's-early 30's	Boomer	13	36 (Xer)
3	RETAIL	42	38-39	Boomer	3	20-60	Boomer	9	34 (Xer)
4	FINANCE	45	n.o.	n.o.	n.o.	n.o.	Boomer	16	34-35 (Xer)
5	MINING	40s to early 50s	n.o.	Boomer	20	30-40	Boomer	20	30s (Xer)
6	MAN	45-48	n.o.	Boomer	13	23 - mid-late 30s;	Boomer	29	Boomers / Xers;

Abbreviations: Org No.= Organisation number; MAN=Manufacturing; Mng=Manager; Ave=Average; comp=Company; Virt=Virtuality; env=environment; n.o.= not obtained

5.4.3.2 P8-Q4: What is the prevalence of the virtual workplace in the organisations?

From both the IT and HR managers the perceived prevalence is very low, but the author is of the opinion that with the technology that has been made available, the prevalence of people working virtual, especially supplementors, is much higher than would be commonly thought by the management of the organisations.

5.5 CONCLUDING REMARKS ON RESULTS

On the individual level, 48% of the respondents were classified as virtual workers, of which 51% fell into the Boomer generation. Managers of virtual workers were also found to be mostly Boomers. All of the null hypotheses were accepted, indicating that the survey data on individual level was not able to support a distinct difference between attitudes and mindsets for the different generational groupings.

On the team level, success factors, needs and mindsets were determined. Success factors included agreeing on outcomes and defining performance measures. Team members needed to be mature and disciplined and managers needed to understand the importance of managing outputs and not time. Most of the team members resided in the Xer generation, while the managers, contrary to expectation, resorted in the Boomer generation. A framework was also used to evaluate the teams in terms of their process maturity regarding virtual work processes, as well as their “virtuality”.

On organisational level various needs were identified as drivers for the implementation of a virtual workplace, including travel issues, especially between geographically remote branches. The practicality was very dependant on the industry while the from a readiness perspective, most organisations had technology in place, but often not the supporting virtual workplace policies.

Interpretation of the data and correlations between the different levels of the study will be explored in Chapter 6.

6 DISCUSSION OF RESULTS

6.1 INTRODUCTION

This chapter will discuss the results in relation to the literature review, to determine how far the results support, reject or supplement the literature that was studied. The chapter discusses the results in the context of the propositions, hypotheses and research questions. The results from an individual, team and organisational level are reviewed respectively, and then the triangulation of data between the different levels or components of the study is discussed. Outcomes to the objectives are given at the end of each subsection.

It should be noted that the findings of the survey can be generalised to the study population defined for the individual level, but not to the ICT industry as a whole. The findings relating to teams and organisations cannot be generalised to either the study population or to any industry in particular, due to the small sample sizes used.

6.2 INDIVIDUALS

6.2.1 Proposition 9: Extent of Virtual Work

Schweitzer and Duxbury (2006) refer to statistics available for various countries regarding the prevalence of teleworking. Estimates of the percentage of the workforce teleworking quoted for the US range from 21-24%, while the figure for Europe was estimated at 13%. The Canadian study showed 6% of workers

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making use of tele these percentages, the 48% of the respondents classified as working virtually in this research study, can be seen as a high percentage (P9-Q1). Furthermore an additional 90.7% of the 108 “non-virtual” individuals gave reasons for wanting to spend more time working virtually (P9-Q2). Based on these comparisons, the proposition, “The prevalence of individuals engaging in virtual work and/or wanting to engage in virtual work is much higher than generally thought”, can be deemed to be true for the study population.

The high amount of individuals working virtually in the study population may also be ascribed to the fact that the organisation in which the survey was conducted, resorts under the ICT industry, and therefore would have many knowledge workers. In addition, even though this company does not have a formal virtual work policy, it does seem that many line managers are making informal arrangements with their resources to allow them to engage in more virtual work. These findings are supportive of the concept of “guerrilla work” identified in the study by Schweitzer and Duxbury (2006).

To further understand where people spend their time, if they are working virtually (i.e. not working at the main office location), the data was analysed in terms of the classification of virtual workers as defined in Chapter 2, Table 2-1: Summary of the classification of virtual workers. This gives a more comprehensive view of the virtual / non-virtual work patterns, and is presented in the table below. All percentages are calculated based on the total sample size. The classification shows that 33% of all the workers do a combination of substitution and supplementation of work hours, of which 14% spend most of

their time on a clie ers can be classified as "Travelling workers", in other words their time is divided between the various locations of work, while 6.5% of workers spend the time worked virtually at home. Only one person (0.5%) could be classified as a teleworker who substitutes more than 90% of their time working from home.

Table 6-1: Summary classification of virtual / non-virtual workers

LOCATION	*(Schedule)* ***TIME*** *(Proportion)*	**IN OFFICE HOURS**	**AFTER HOURS**	**ANY HOURS**
Fixed Location: Main Office	**100%**	Main Campus Worker (Only) **24%**	Main Campus Worker - also Overtime **11%**	Not defined
Fixed Location: Satellite or Client	**95-100%**	Site Campus Worker (Only) **16%**	Site Campus Worker - also Overtime **1%**	Not defined
TOTAL FOR NON-VIRTUAL WORKERS		**52%**		
Variable Location: Satellite / Client	**<95%**	**Site Worker: Substitutor 5.5%**	**Site Worker: Supplementor 2.5%**	**Site Worker: Both 14%**
Fixed Location: Home	**95-100%**	**Teleworker: Substitutor 0.5%**	**Teleworker: Supplementor 0%**	**Teleworker: Both 0.5%**
Variable Location: Home	**<95%**	**Teleworker: Substitutor 0%**	**Teleworker: Supplementor 6.5%**	**Teleworker: Both 0.5%**
Non-Traditional Work Location(s)	**<95% per location**	**Travelling Worker: Substitutor 0%**	**Travelling Worker: Supplementor 0%**	**Travelling worker 18%**
SUBTOTALS FOR VIRTUAL WORKERS		**6%**	**9%**	**33%**
TOTALS FOR VIRTUAL WORKERS		**48%**		

Legend:	**Virtual Worker**	Non Virtual Worker

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6.2.2 Proposition for Virtual Worker Demographics

When comparing the data from the literature reviews and from the study, it was found that the characteristics of the respondents classified as working virtually in the study were comparable to those seen in the American studies referred to by Schweitzer and Duxbury (2006), but less so in the case of the respondents in the Canadian study. In the current study, the first finding indicates that the virtual working respondents were mainly men (84%). It should be noted however that there was a bias towards men in the study sample, as the number of male respondents was 71%, which is similar to the percentage of men in the population.

Secondly, the average age of the virtual working respondents this study was 39, which compares with the average age of 40 in the American study, and 41 in the Canadian study. In terms of qualifications, the bulk of the respondents in the current study have diplomas (37%). Regarding the status of children, only 24% of the respondents indicated that they had children under six years of age, which is much lower than the figures for both the American and Canadian studies. The number of permanent employees in the current study is much higher, due to the fact that the study was done within one organisation only. The one-way commute distance of between 11 and 30 km is comparable with the 32 km in the American study, as is the average hours of time spent working virtually (24 hours per week in this study vs 20 hours per week in the American study and eight hours per week in the Canadian study). The comparisons are tabulated below.

Table 6-2: Study com

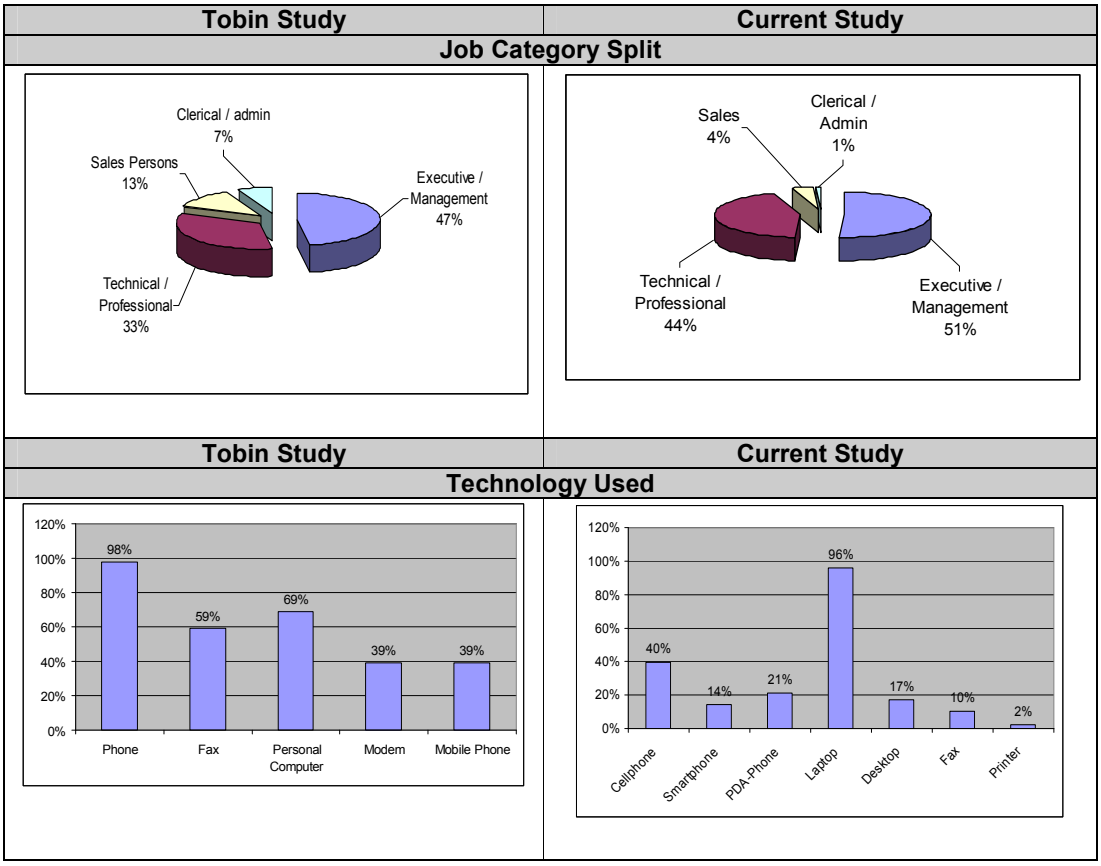
Parameter	American Study (Schweitzer and Duxbury, 2006)	Canadian Study (Schweitzer and Duxbury, 2006)	Current Study (Virtual Worker = Yes)
Gender	65% male	49% male	84% male
Average age	40	41	39
Average qualification	College (82%)	University (39.2%)	Diploma (37%)
Children under 6	33-66%	60.5%	24%
Contract type	54% full-time; 13% contractors, 24% self-employed	More substitutors were regular employees; Supplementors were unionised contractors (No % provided)	83% full-time (permanent); 4% part time (permanent); 13% contractors
Average 1 way commute	32 Km	No data provided	11-30 KM on average
Average hours / week teleworking (working remote in current study)	20 hours	8 hours	24 hours

The current study was also compared with two measures in the Tobin study (1994), namely job category and devices used. Looking firstly at the job category, the current study shows a slightly higher percentage of both technical / professional and also executive / management individuals working virtually (at 44% and 51% respectively), while both the sales and clerical / administrative type categories are lower (at 4% and 1 % respectively). The executive / management is also the most represented job category for those working virtually in the current study, as it is in the Tobin study.

In terms of technology used, the use of mobile phones has proliferated into standard cell phones (40% of virtual working respondents), Smartphones (13% of virtual working respondents) and PDA-phones (21% of virtual working respondents. The virtual workers using personal computers are now almost 100%, with 96% of the virtual working respondents using laptops and 17% still using desktops. The detail graphs are presented below. (As device usage is not

mutually exclusive, [illegible]e per device do not sum to 100%.)

Figure 6-1: Comparisons with Tobin study (1994)



Based on the positive correlation between the data of the current study, with that of the American / Canadian studies as described in the preceding paragraphs, it can be concluded that the proposition: “The profiles of individuals working virtually in the study population are comparable with the profiles of individuals working virtually in American and Canadian studies, as well as the Tobin study”, is true for the study population.

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6.2.3 Proposition 1: Needs and Attitudes concerning Virtual Work

6.2.3.1 P1-NH1a and P1-NH1b

The first two null hypotheses to test Proposition 1 were accepted, indicating that there is no significant difference between either the virtual / non-virtual groups (P1-NH1a) or the generational groupings (P1-NH1b) in terms of their needs and attitudes concerning virtual work. The average ratings for the survey questions were also calculated, and yielded an average score of 1.92 for the Xers, with the Boomers on 2.02 and Silents on 2.11. This put all three groups on the "agree" side of the scale. The fact that the null hypothesis were accepted, and that all generational groups agreed with the statements, is contrary to the literature, where Baum (2004) stated that the new generation would expect to use technology in a more flexible and collaborative workplace, implying that the "old generation" would not. In line with this, the statements in the survey were selected in such a way that the Xer generation would have been more likely to have an average closer to 1 ("strongly agree"), while the Boomer, and especially Silents, would have been expected to have average scores closer to 4 or 5 on the "disagree" side of the scale (IT Online, 2007; Codrington and Grant-Marshall, 2004).

When looking at the data of all the respondents in histogram format, as set out in Appendix F, Table F-13: Histogram data for needs concerning virtual work, it shows that the 94% of individuals agreed with the statement that they like new ways to do things, 91% agreed that they would like to see more technology in the workplace that allows online collaboration, 75% agreed with the statement that they proactively seek out and use new technologies and 73% agreed with the statement that they prefer to interact and network simultaneously with many

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others. Even though [illegible]gnificantly linked to the different generational groups, it still gives an overall picture of the employees currently in the workplace, and it is in line with the trends identified in the literature, and the mindsets that are necessary for embracing the virtual workplace (IT Online, 2007; Baum, 2004; Apple, 2007). IT and HR managers will have to keep in mind that positive attitudes concerning the virtual workplace are not only related to specific generations, but the workforce in general, which makes the necessity for a general "framework" supporting a virtual workplace in the organisation all the more important.

6.2.3.2 P1-NH2: Generational groups and their use of technology

The data analysed supported the null hypothesis, in other words, the statement that there are no significant differences between the preferences of the different subgroups (Xer, Boomer, Silent) and the type of devices, technology and communication methods used when working virtually, is supported by the data, and can be generalised to the survey study population. Overall, 3G/HSDPA was the most selected technology, email and telephone conversations were the most selected communication methods, with SMS a close third place, and the laptop and cell phone being the most frequently used devices. In terms of connectivity technology, dial-up connection was added as "other" by 12 respondents. This was not an option as originally identified in the literature review (IT Web, 2005), which implies that there are still some individuals who use the older dial-up facility and not the more recent technologies.

What is shown significantly is the take-up of 3G / HSDPA by individuals, which shows the impact that the availability of new technology has on the market. CIO's should therefore ensure that policies concerning the use of these mobile

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technologies exist, [illegible] the organisation when individuals use this mode of connectivity to the corporate network. In terms of tools, the application portals, document libraries and other collaboration tools do not seem to have been adopted with the same enthusiasm displayed for simple email. This should be considered as an area where collaboration and communication in the virtual workplace can be improved, by implementing the correct technologies and software tools.

6.2.3.3 P1-Q1:Q6 - Drivers of and barriers to virtual work

The number of reasons given to increase the time spent working virtually by non-virtual workers was slightly more than the number of reasons given by people working virtually already. This is contrary to expectations, as one would expect that individuals, who are already working virtually, would have a stronger "case" for working virtually. It could however be concluded that there is in general a strong need for individuals to work virtually, although there may be many barriers that still need to be overcome. In relating this question to the generational groups, there was no difference in the number of reasons given to increase time spent working virtually.

The main reason for wanting to increase the time spent working virtually, was to cut down on travel. This was in accordance with the expectation, especially with the increased traffic in the Gauteng area (RTMC, 2007). The only interesting difference in the generational groups was that the third highest reason for wanting to increase working virtually with Xers was "in order to live where I want", while for Boomers it was to "cut down on personal stress". This corresponds with the literature around the "lifestyle" approach of Xers (Codrington and Grant-Marshall, 2004). Overall, the reasons for wanting to

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increase time spe rend towards improved work/life balance, not only for the Xer generation, but for employees in general. This makes the virtual workplace an even more important option for HR managers when planning their staff retention and recruitment strategies, which is one of the organisational issues identified in the literature study of Siha and Monroe (2006).

When looking at the barriers preventing the increase in time spent working virtually, there were only slight differences between the generations, and then only on the third highest ranking. When analysing the third highest barrier as identified by Xers, they stated it as unavailability of technology. This could match the literature in terms of the greater need of Xers for technology, although the Silents selected this as their second highest reason, which is contrary to expectation, i.e., the expectation is that Silents would in general not want to work virtually. The third highest reason for Boomers was the lack of policies. This is in line with the generational theory and what generations expect at work. Although Boomers are not as formal and structured as the Silents, who implemented a work system based on military precision and rules, they were still strongly influenced by this work environment, evident in the fact that parking bays were pre-allocated, dress code was suit-and-tie and working hours were still very much fixed as 9-to-5 (Codrington and Grant-Marshall, 2004). Therefore, a statement like of “I cannot work virtually or remotely if there are no rules or policies to support it” is in line with the Boomer mindset.

Over and above the differences stated above, there was also no significant difference for the generational groups in terms of number of reasons selected,

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or the actual reasc re are general reasons, like the nature of the job, and the interaction required with fellow employees, which prevent individuals from spending more time working virtually. The proposition by Gartner (Baum, 2004; Auston *et al.,* 2007; IT Online, 2007), is that by providing more effective and efficient collaboration tools, individuals would feel more comfortable in working remote from each other, and be able to perform tasks remotely, which currently seem to need onsite presence.

6.2.3.4 Proposition 1: Conclusion

The data from the sample does not support the proposition, "on average, those individuals who do engage in virtual work are more likely to have many reasons for wanting to work virtually, have fewer reasons that prevent them from working virtually and expect to use technology in a flexible and collaborative workplace environment". However, what is important to note is, that for the study population on individual level, most employees in the workplace have many reasons for wanting to increase the time spent working virtually, even though there are still many barriers preventing individuals from doing so. These barriers should be explored from an organisational perspective, and actions put in place to counter them (refer to the recommendations in Chapter 7).

6.2.4 Proposition 2: Generations and Virtual Work

The results of the study were quite surprising in that the Boomers had the highest percentage for working virtually, namely 51%, in comparison with the 46% Xers who were found to be working virtually. The proposition, "On average, the Xers and Millennials are more likely to engage in virtual work and telecommuting" is, therefore, not supported by the data, and cannot be deemed to be true for the study population.

The expectation according to the literature would have been for more Xers to be working virtually based on their attraction to technology and technology trends (Baum, 2007; Codrington and Grant-Marshall, 2006). This would be consistent with the results of the Tobin study (1994), namely those individuals in more senior positions (and more likely to be Boomers) are expected to "get the job done" irrespective of work hours, and have more freedom to work from different locations. As shown in the study by Tobin (1994), the largest portion of virtual workers could be categorised as working in the executive / management job category. A similar profile for respondents has been established in the current study (refer to Figure 5-1: Virtual workers: Job category split, in Chapter 5).

Another fact from the literature that supports the study finding, is that Boomers are achievers who like challenges, and with two of the economic drivers in their work environment being quality and customer service (Codrington and Grant-Marshall, 2004), they are likely to be more diligent in terms of the demands of the work environment in which they were schooled. Therefore, they would tend to supplement their office work, with after hours work. This may once again have a negative impact on work/life balance if individuals are not disciplined enough to manage their after hours work. Lastly, this finding does correlate with the American and Canadian studies where the average age of individuals working virtually was 40 and 41 respectively (Schweitzer and Duxbury, 2006). This age falls into the Boomer generation as defined for this study.

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6.2.5 Proposition [illegible] s

In answering P3-Q1, it was found that the managers of virtual workers were mostly Boomers (73% of the managers), and not Xers (only 27%). This is contrary to the proposition, that the managers of those individuals who do engage in virtual work, are more likely to be Xers. The proposition was formulated based on the literature which indicates that Xers are more likely to work in the new style. So if they are managers, they would be more likely to allow their staff to work virtually (Codrington and Grant-Marshall, 2004). The finding can however be correlated to the fact that most managers in the dataset were Boomers (refer to Table F-4: Respondent age, in Appendix F), and it also to the fact that in this dataset, the largest percentage of virtual workers were Boomers (refer to Table F-5: Generation (Transformed), in Appendix F).

In testing the P3-NH1, it was found that the null hypothesis could be accepted, in other words there was no significant difference between the perceived attitudes of managers who fall into a specific generational group, and the number of individuals being allowed to work virtually. When analysing the detailed data, it was found that the respondents who were classified as working virtually, rated “I am given a considerable amount of freedom to adopt my own approach to my job” and “My manager trusts me” closest to “Strongly agree” (at 1.93 and 1.97 respectively), while “I am allowed to select my location of work” was rated closer to “Disagree” at an average rating of 3.27 (refer to Table F-26: Summary statistics, in Appendix F). In taking the overall ratings obtained in the sample, 80% of individuals agreed that they were given a considerable amount of freedom to adopt their own approach to their jobs and 84% agreed that their immediate manager used technology for online collaboration. However, 55%

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disagree that they ıtion of work and 25% disagreed that they were able to work flexible hours, these being two of the key components of virtual work (Schweitzer and Duxbury, 2006; Thatcher and Zhu2006). (Histogram data available in Table F-29: Histogram data for perceptions regarding managers, Appendix F.)

In summary, Proposition 3, “The managers of those individuals who do engage in virtual work are more likely to be Xers”, could not be supported by the data. Managers do, however, need to give their employees freedom to adopt their own approach to their job and trust the latter to deliver the output. Managers will need to change their mindsets in allowing individuals to work more flexible hours and select a location of work, rather than expecting onsite visibility of their resources every day. In this regard, job outcomes will have to be defined more clearly, and the manager should trust his / her employee to deliver the work.

6.2.6 Proposition 4: Managers and Trust

Both P4-NH1 and P4-NH2 were accepted, which implies that there is no significant difference between the virtual and non-virtual groups, and the length of time that these individuals have worked for the manager, nor in the measure of trust experienced from the manager. This implies that individuals, who work virtually, do not necessarily think that their managers trust them more, than those individuals that do not work virtually. Also, individuals who work virtually have not necessarily worked with the manager for a longer period of time, than those individuals not working virtual. It can therefore be assumed that trust is important in both virtual and non-virtual working environments, and that trust is not necessarily established by a long working relationship. Trust has been mentioned as an important component of making the virtual workplace

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successful (Frogga) and the fact that 19% of the respondents in the sample indicated that their manager did not trust them, should be a point for concern, and something that needs to be addressed by managers.

6.2.7 Summary for Individuals

6.2.7.1 Objective 1

The first objective of the study was to determine the attitudes, perceptions, needs and behaviours of individuals regarding the desirability of a virtual workplace and whether there is any variation in attitude between individuals based on generational differences.

In reviewing the outcomes of the propositions, questions and hypotheses related to individuals, it can be summarised that in general, the generation of an individual does not have a significant impact on the needs, attitudes, perceptions and behaviours of individuals regarding the desirability of a virtual workplace. However, it has been established that there is a great need to increase the time working virtually, and the need is centred on an improved work/life balance across all generations. The availability of technology is a significant driver for allowing individuals' remote access and mobility.

The top four needs of individuals to increase time spent working virtually are:

1. to cut down on travel time;
2. to work without disruptions;
3. to cut down on personal stress; and
4. in order to live where I want.

The top four reasor

1. nature of job demands onsite presence;
2. interaction required with fellow-employees;
3. insufficient company policies; and
4. technology not sufficient.

The attitudes found to be present were:

- learning new ways to do things;
- wanting to see more technologies in the workplace that allow online collaboration;
- proactively seeking out and using new technologies; and
- preferring to interact and network simultaneously with many others.

Attitudes / mindsets that individuals would have to improve are:

- change of mindset to be paid for output and not hours; and
- choosing own technology and not being restricted by company policy.

The fact that 91% of individuals agreed with the statement “I would like to see more technology in the workplace that allows online collaboration”, and that the use of collaboration tools, application portals and document libraries was found to be very low in P1-NH2, indicates that this is an area that needs to receive attention at an organisational level.

6.2.7.2 Objective 2

The second objective of the study on the individual level was to determine the perceptions of individuals about their management's attitudes and behaviours in relation to the implementation of a virtual workplace, and whether there is any difference in attitude based on generational differences between the two groups (management vs employees). The objective was also to determine whether managers who fall in the younger age group were more likely to support the implementation of the virtual workplace, than older managers.

The perceptions of individuals regarding their managers do not differ whether the individual is working virtually or not. Due to the high number of individuals being classified as working virtually, it can be concluded that managers do seem to support a virtual workplace, even though they fall in the Boomer generation.

The top two perceptions of individuals regarding their managers appear below.

1. My immediate manager uses technology for online collaboration.
2. I am given a considerable amount of freedom to adopt my own approach to my job.

The bottom three perceptions of individuals regarding their managers are stated below.

1. I am not allowed to select my location of work.
2. I am no allowed to work flexible hours.
3. My job outcomes are not clearly defined.

6.3 TEAMS

6.3.1 Proposition 5: Factors, Mindsets and Needs

The need for face-to-face interaction was still found to be very strong: not only for team members to interact with each other, but also for team members to experience the social “vibe” of the organisation. Sharing of experiences (good and bad), sharing of jokes (humour) and just in general “being in the know” in terms of office talk were identified as important factors. Most teams indicated that a maximum of two or three days could be spent away from each other or from the office. Conflict management, knowledge sharing, “teamness” and socialisation in general are seen to be the drivers for face-to-face contact. As one team member put it “A virtual workplace is good but you need a place to interact, irrespective - you can never just sit at home and work the rest of your life sitting there."

Although face-to-face contact in facilitating collaboration, communication and socialisation of teams was not advocated in the literature relating to virtual teams (Knoll and Jarvenpaa, 1998; Harvey *et al.*, 2005), it does seem that all teams were in agreement on this issue, and that it was key to ensuring successful deliverables. One reason for this could be the fact that all individuals in teams interviewed still come from a corporate background that was mainly institutionalised by Silents and Boomers. This experience forms a strong part of what has shaped their “mindset” and frame of reference relating to the work situation up to now. Furthermore, as mentioned under limitations of the research, only individuals and teams in an organisational context were be included in the study.

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The other reason c m human nature, and in general, most humans are social animals, and require socialisation and self-verification in the office environment (Thatcher and Zhu, 2006). It seems that social (face-to-face) interaction is still deemed to be necessary, and forms an important part of building the relationships, understanding the personalities, and forming the basis on which the “virtual” relationships can be built. This supports the literature, which states that the basic rules of teams need to be established first, and then one can add the additional layer of complexity relating to virtuality (Daniels *et al*., 2000).

One interesting comparison can be made between the one non-IT team that was interviewed, and the other, mostly IT / knowledge-related teams. In all the IT teams, little evidence of written procedures and documented team norms was found, although there was a strong sense of cohesion amongst team members, and this “teamness” was enhanced somewhat by the online collaboration tools available. For the Occupational Health team, the “teamness” was encapsulated in the fact that they all had a similar background (same qualification required for the position), the fact that they were all people- and service-orientated, and that there are very strict rules and governance that apply to the deliverable. The deliverable of this team calls for a very high level of process maturity, up to the strategic level. Other teams may have a lower process maturity, but a better sense of “teamness” and socialisation enhanced by the technology used. As one member of a team with high “teamness” put it, "As a virtual team we would battle if there were rules in place because that would make it much more difficult...(to function effectively)".

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Summarising the [illegible] t of mindsets includes discipline, maturity and being able to deliver output independently. Older team members also had to change their mindset not to feel guilty when working from home, or when working more flexible hours. In essence they had to change from an hours-driven to an output-driven mindset. Factors required by teams for ensuring successful deliverables relate to categories identified in the original model, namely collaboration, communication and socialisation as summarised in the team model (Knoll and Jarvenpaa, 1998; Harvey *et al.*, 2005; Donaldson and Weiss, 1998). An overall maturity of processes was also found to be required to support successful team deliverables. The needs of team members to work virtually relate back to flexibility of schedule, reducing travel and improving work/life balance overall.

6.3.2 Proposition 6: Age Groups of Managers and Team Members

Even though the average ages of team members fell in the Xer generation for five of the seven teams, these average ages were much higher than expected, namely for three of the Xer teams, the average age was 35 and above. The mindsets of younger members were found to be much more technology-orientated (i.e., curiosity for new technologies), while the older members saw the advantages of efficiency and flexibility that this style of work brings. The key factors for individuals (both managers and employees) to work in virtual teams could be summarised as improved work/life balance, flexibility, freedom and productivity.

The data, therefore, supports proposition 6 partially, which suggested that the ages of team members working in virtual teams were more likely to be Xers, and the managers of these types of teams were also more likely to be Xers. The

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fact that most tea[illegible] oomers was contrary to expectations in terms of the new technology trends and the generation that would typically be using this technology (Baum, 2007). It does, however, correlate with the data analysed on the individual level of the study (average age found to be 39) as well as the American and Canadian studies where the average age of individuals working virtually was 40 and 41 respectively (Schweitzer and Duxbury, 2006), which falls into the Boomer generation.

6.3.3 Summary for Teams

The third objective of the study was to determine the mindsets required by virtual teams in order to support positive outcomes of work and project deliverables in a virtual workplace.

It was difficult to find teams working virtually and delivering a combined product, as most teams interviewed did not have collective deliverables, but rather collective goals, with individual deliverables. However, the feedback provided by teams did show a strong correlation with the literature in general. The findings are summarised below.

Overall a team needs a vision in order to be successful, as stated by the manager of a virtual team, “(A team) cannot be a successful virtual team if you do not have a vision to be a successful virtual team”. The most important factors identified included:

- Collaboration - processes and rules, timing and schedules and clear performance measures;
- Socialisation - group norms and retaining a face-to-face component were most important; and

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- Communication technology to support communication, presence and application sharing.

The most important mindsets/attitudes included:

- maturity, continuous guidance not needed and taking responsibility;
- delivery and output driven; and
- discipline on both work and home life side.

The highest needs to work in a virtual team were stated as:

- freedom and control of schedule, including creativity needs;
- flexibility, work is at different locations, missing traffic;
- quality of life; and
- saving travel time, increasing productivity.

6.4 ORGANISATIONS

6.4.1 Proposition 7: Organisational Readiness

In reviewing the proposition, “Organisations are in general not ready for the virtual workplace, and have no strategies and policies in place to support this phenomenon”, the companies were measured according to their overall virtuality. This was accomplished by rating the company on each of the main themes covered in the interviews, namely: the need in the organisation, practicality for the organisation; readiness in terms of technologies; and readiness in terms of policies. Each theme was given a rating out of 5, with 1 indicating a very low compliance or prevalence, and 5 being a very high compliance or prevalence. The organisation in the financial industry scored the

highest, as various [illegible] cifically for virtual work, and this policy contained various rules and procedures for its implementation. The detailed scoring per organisation can be found in Appendix H - Organisational Scoring. The summary scores are presented below.

Table 6-3: Comparison of virtuality scores of organisations

	Industry	Size of Company	Size of IT department	Virtuality Score (out of 5)
1	MANUFACTURING	15,000	30-40	3.1
2	ICT	4,500	100	2.9
3	RETAIL	19,000 employees; 18,000 casuals; 920 stores	550	2.6
4	FINANCE	35,000	Not available	4.3
5	MINING	50,000 full-time ; 20,000 contractors	60	2
6	MANUFACTURING	7,500 in SA; 15,000 world wide	72	2

The data discussed for questions P7-Q1, P7-Q2 and P7-Q3 shows that even though organisations fall in industries which would in general not make a virtual workplace practical, companies are ready for the virtual workplace from a technology point of view. There are technology strategies in place to move towards more “mobile” and “remote access”, although from a corporate culture point of view, this is not deemed to be a “virtual workplace”. Specific policies to support a virtual workplace, especially from a human resources perspective, are not in place in most cases. However, the HR managers did confirm that providing a more mobile work style was part of their recruitment and retention strategies.

The general culture in organisations was perceived as not supportive of the virtual environment. This appears to be in direct contrast with the actual need for mobility and remote connectivity that seems prevalent in these

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organisations, espe ure and its geographical distribution into account. This is especially true for companies where the administrative functions have been centralised to improve efficiencies. In addition, in most of the industries the plants, factories or mines are geographically distributed over the whole of South Africa, and managers regularly need to travel to the plant to follow up on their responsibilities. In addition many of these companies belong to large multi-nationals, which increases the need for national and global connectivity requirements.

Two of the biggest barriers on the organisational side was found to be the mindset of the particular industry and the general mindset of “command and control” in the organisation as a whole. This was reflected by comments made by two CIO’s namely, "The Company is not focused on virtualisation because of its nature….The global mining industry is still some years away from really making use of that. But it is a concept that is seen as beneficial", and "Culture permeates from the factory floor up and tends to push an environment at levels where not required, to have the same mentality". The mentality of “command and control” has been established through the previous generations as part of their education in particular business principles. In addition, to change the total way of work in an organisation, would require a significant effort, and IT and HR managers were in agreement that this should be run as an organisational change intervention, rather than as isolated projects. As voiced by one of the CIOs, "(The organisation) is traditionally in manufacturing and on top of that we are trying to build a quite modern, virtual and new way of thinking, and the two are incompatible and it is not easy to implement or manage." In this context, the influence of unions and the impact of the Labour Relations Act (LRA), as well as

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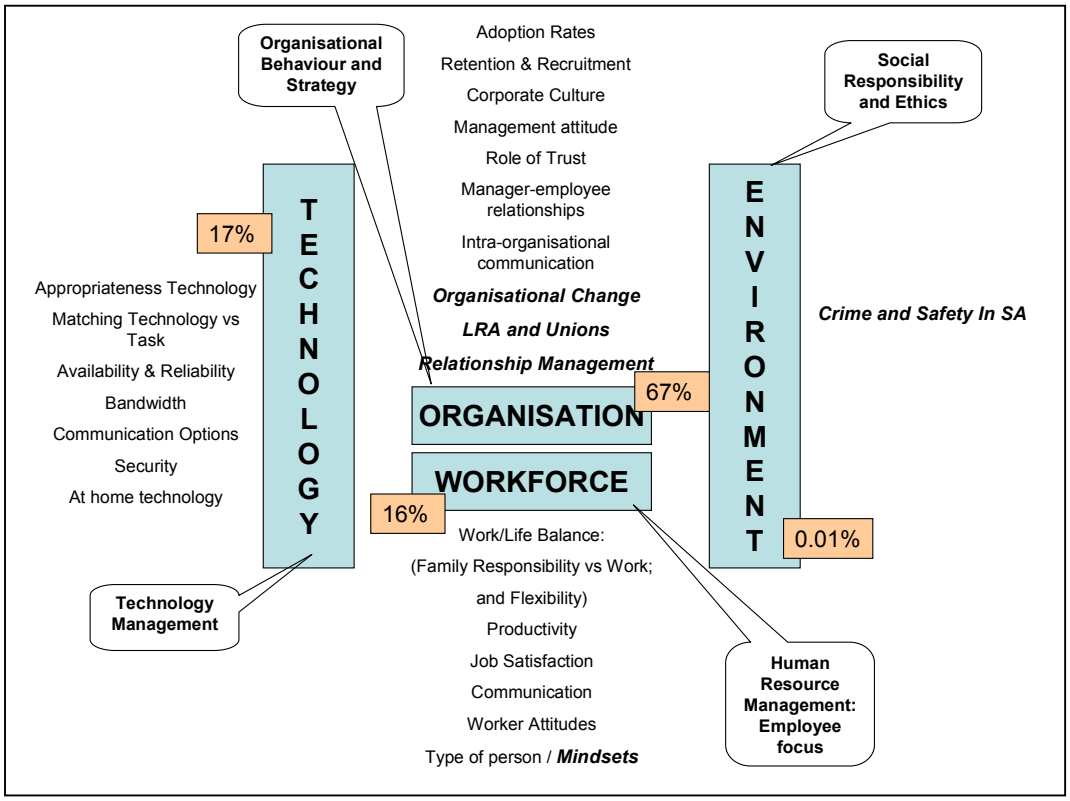
technological litera[illegible] should be taken into consideration. As one HR director put it "Let's not just say it won't work. Let's rather understand and address the challenges."

In linking the results to the model of management disciplines as described in Chapter 2, Figure 2-3 (Siha and Monroe, 2006), most of the data seemed to centre on organisational issues (67%). In addition to the already identified issue subareas, the "LRA and Unions" (changing of employment contract and impact of unions), as well as "Relationship management" (ensuring intimacy in a virtual world) were added. The Business Process Re-engineering (BPR) subarea was changed to "Organisational Change", as this received a great deal of attention in the interviews. No specific environmental issues around "greening" were mentioned, however, reference was made to the safety and crime situation in South Africa, both from a travel, and from an availability of connectivity point of view (that is cable theft leads to low availability). Lastly, the subarea of "Type of Person" was enhanced by the concept of "mindset". These additional issue subareas were added in the model of management disciplines and issues, and are indicated in ***bold italics*** in the diagram below. The percentages indicate the percentage split of coded issues mentioned by the individuals in the interviews (IT / HR managers), and categorised according to issue area.

Figure 6-2: Updated n elecommuting issues



6.4.2 Proposition 8: Organisations and Generations

Proposition 8 states that "the age group of the executives of companies where the virtual workplace is not prevalent is more likely to be that of the Boomers or Silents".

The one thing that does stand out from an organisational point of view is the fact there is still an enduring legacy left by previous executives and directors who fell into the "Silent" generation. So, even though currently, executives and senior management fall in the Boomer generation, and many individuals are much more positive towards a virtual workplace, it is still much more difficult to convince the older Boomers and Silents who have been brought up in the "control and command" school of business with policies which have been

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successful up to no[illegible]isational mindset, which could also be referred to as the corporate memory or culture established in the previous era, than the mindsets (and ages) of individuals as such, which acts as the inhibiter.

Therefore, the proposition that executives of companies where the virtual workplace is not prevalent are more likely to be Boomers or Silents, is partly true. The prevalence of a virtual workplace is dependent on individuals, but even more on the mindset of the organisation in the context of its industry.

6.4.3 Summary for Organisations

The fourth objective of the study was to determine the need for, readiness for and practicality of implementing a virtual workplace from an organisational point of view. A summary of the findings follows.

In general there is a need for working more virtually, although it seems to be lower in manufacturing companies. The need is increased by the following factors:

- the centralised company structure and distributed geography;
- need of individuals for flexible schedules;
- type of job / work performed demanding offsite work;
- remote access to save costs and increase productivity; and
- many individuals demanding work/life balance who are prepared to "supplement" their schedules.

From a readiness [illegible] ow were found to be in place.

- Connectivity, applications and technologies support remote access.
- Various organisations were actively exploring virtual work.
- Various retention strategies for female employees were in place.
- Where the type of job / work performed has allowed it, employees have been given the technology to make use of remote connectivity.
- Availability of the right technology is seen as a retention strategy in general.
- Remote access is seen to save costs and increase productivity from an organizational point of view.
- Allowing remote connectivity is seen as a recruitment strategy for younger talent.

The implementation of a virtual workplace becomes practical if:

- the type of job / work performed allows remote work;
- the impact of industry can be dealt with;
- knowledge management can facilitate online sharing and learning;
- policies are clear and concise without being too prescriptive;
- technology standardisation, ownership and usage issues have been resolved;
- human interaction is still allowed for and encouraged; and if
- the issue of “unfairness” as perceived by non-virtual workers has been addressed.

6.5 TRIANGUL[illegible]

6.5.1 Extent of Virtual Work

When evaluating the extent of individuals working virtually on an organisational and team level, it was evident that technology was a key driver for enabling people to work remotely. Once the technology was available, and individuals identified the benefit thereof, there was an automatic enthusiasm for that technology - be it infrastructure or application related. As the CIO of a manufacturing company remarked, “I have been surprised how little elements of virtualisation enter an organisation quite quickly without huge fuss. …How today we manage email all over the world…that was not a deliberate strategy…We just put the tool in place, and because people needed it, it just worked. Sometimes one has got to put the tools in place, and if there is a real need, that need in itself will drive the virtualisation.”

From an organisational point of view, the prevalence of individuals working virtually, as perceived by the HR and IT managers seem to be low in most organisations. In only for 2 organisations the perception of the current prevalence of virtual workers was high. Most of the organisations do have the technology in place to be able to connect remotely, but the corporate culture and general mindset is that the “extended environment” is not deemed to be classified as part of the workplace (that is categorised as a virtual workplace).

In terms of the need experienced on an organisational level, half of the organisations indicated that they received very few requests, while the other half indicated that they received many requests, and that the need is great. The requests received are for specific types of work that can be or must be

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completed remote [illegible] hours support) and in particular companies where there is a global or regional component, where connectivity would be required from these remote locations.

Based on this, there seems to be a correlation between the data different levels, and the author would suspect that in organisations where the perceived need is low, there may be a greater prevalence than anticipated, due to technologies that have been made available.

6.5.2 Virtual Worker Demographics and Generations

There was little significant data relating to specific generations on the individual, team and organisational levels. In fact, it was often found that Boomers were more supportive of the virtual workplace due to their own need for a better work/life balance, and their technological background enabled them to see the benefits of the available technology more clearly. There were only a few examples of Boomers specifically having the traditional Boomer mentality of "must work 8-5 and must be in the office". This work ethic was mentioned more generally in relation to the mentality of the organisation as a whole, and is, therefore, more representative of the culture prevalent in an organisation, than being the culture of individuals as such.

The fact that there were more Boomers in the individual level of the study, also correlates with the ages of the IT/HR managers, as well as the managers of the virtual teams, who were all Boomers. The average age of virtual workers in the individual study was 39 (Boomers). In contrast to this, the average age of five of the virtual teams was in the Xer range (average ages between 28 and 37), and two were in the Boomer range (45 and 50 respectively).

6.5.3 Attitudes / [illegible]

Definite correlations were found between the needs of individuals, the needs of individuals in teams and the needs of individuals in organisations to increase time spent working virtually. The overlap in these needs related to additional flexibility required, improving work/life balance and cutting down on travel to increase productivity and reduce stress. On the barrier side, both teams and individuals felt that technology was not always sufficient, and that often work had to be performed on site due to interaction needed with others.

Also, many individuals and teams work remotely because technology permits it. As one HR Director put it, “The higher the connectivity, the more individualistic we are becoming and we are more willing to compromise our group association in the workplace in order to be with our families”. This is supported by Morello and Burton (2006), who state that the future worker will seek extreme individualisation.

There was also a wide overlap in the attitudes and mindsets identified by teams with those attitudes identified by IT / HR managers. This included that individuals needed to be more mature, self-driven, and should not seek constant guidance from their managers. Maturity, or differently stated, a high level of emotional quotient, was also found to be needed in socialisation, in that it was necessary to be able to have “debates without consequence” (as stated by a virtual team member). Both levels felt that managers also needed to relinquish the “control and command” approach for a more collaborative and consultative approach, ensuring that overall goals are set, without micro-managing the individuals on task level. As one HR director put it, "We need to

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move away from th ever, there was also still a a great deal of scepticism on the organisational side about managers working remotely, especially in the mining and manufacturing industries. Two comments made by CIO's in manufacturing concerns were: "I have not taken the paradigm shift yet to say that managers can manage remotely. I do not believe that it is possible. Managers simply need to manage by being present", and another stating "We do not expect managers to manage from home - it's a mindset. For me a manager is about being there with the people, suffering there with the people. Although he/she can manage from home, we do not expect that".

On the negative side, many team members indicated that they work even more hours now that they are working virtually. This was reflected by the high average hours worked after hours by virtual workers in the individual study. This may once again have a negative impact on work/life balance if individuals are not disciplined enough to manage their after hours work. As one team member put it, "(Previously you) needed discipline for not bringing your personal life to work, now you need discipline for not bringing your work into your personal life – which is happening more because of technology".

6.5.4 Managers of Virtual Workers

The average age group of managers on both individual and team level fell in the Boomer range. This also correlated with the fact that the management level in organisations on average also fell within the Boomer range. Therefore it is not necessarily the managers' generation, but their mindset in general that would prevent employees from working virtually. On organisational level, though there may not be formal policies in the organisation, yet the technology is available for remote connectivity, so the choice is left to the manager as to whether his/her

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employees may w[illegible]ork therefore depends heavily on the bias of the manager (as well as their superior) towards virtual work.

Trust was identified as an important factor on both the team and the organisational levels to ensure success in a virtual workplace. The fact that only 69% of respondents on the individual level of the study agreed that their managers trusted them, is therefore a result worthy of further exploration.

6.6 CONCLUDING REMARKS ON RESULTS

In reviewing the results on the individual, team and organisational levels of this study, it was found that there was a correlation between them. In most cases, the results were supported by the literature review, although not very strongly biased towards the results expected for particular generational groupings, i.e., the age group of an individual was not found to be the determining factor pertaining to positive mindsets for implementing a virtual workplace.

The study found that mindsets and attitudes do make a difference in the adoption rate of the virtual workplace, as well as the efficiency with which teams operate. However, more generic mindsets and needs have surfaced. The average age of teams interviewed was in the 30's – 40's range, therefore including both Xers and Boomers according to the age definitions used, while the individuals working virtual averaged 39 years of age. A strong component (attitude / mindset) found was the general willingness to use and explore technology, especially where the individual was working in a technological environment, or had some technical background. According to the study, the

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biggest barrier fou , was therefore not the mindset of the individuals, but the mindset of the industry in terms of the acceptability of this type of practice. This is especially true in the South African context, where the impact of unions and how they interpret the fairness of virtual work in relation to the Labour Relations Act, is of critical importance.

Even though the results of this study has limited genereliseablity due to the population selected, the fact that the study found that the needs for a virtual workplace were not only tied to one specific generation, will have to be a key factor for HR managers to keep in mind when defining their recruitment and retention strategies. Also the role that organisational change should play in implementing a virtual workplace was highlighted by the research: that is, one cannot simply implement mobile technologies. It is necessary to change the mindset of the whole organisation around it.

7 CONCLUSION

7.1 INTRODUCTION

A great deal of literature exists on telecommuting, mobile technologies and the virtual workplace. In the light of this, the question was asked why virtual work has not really received the attention it deserves. This research has investigated specifically the issues pertaining to mindsets of individuals, teams and organisations to determine if there were mindsets that would support (or become a barrier to) the implementation of a virtual workplace. Issues were found to be multi-dimensional, and could be related to technology, the workforce, the organisation and the environment.

The study found that various mindsets and needs do exist, and on an individual level the mindsets and needs are not restricted to specific generations. This could be of significance to HR and IT managers in general, who may need to take a wider target group into consideration when designing policies and procedures for the organisation. Secondly the organisation itself emerged as an entity with a mindset or culture that transcends the individuals working for the organisation. To implement a virtual workplace would, therefore, require an overarching strategy and organisational change interventions to ensure that all the facets of a virtual workplace are addressed in a balanced way.

The paragraphs below outline broad recommendations for organisations, teams, individuals, and managers that could facilitate the successful

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implementation of . . so contains suggestions for future research, especially in the light of the restricted genereliseability of the results of the study.

7.2 RECOMMENDATIONS

7.2.1 Introduction to Recommendations

A high percentage of individuals in the survey were classified as working virtual. On the organisational level, at least two out of the six companies reported a high need. Two companies indicated that there was a need but only in particular areas, while only two companies indicated that they received very few requests. In general however, the perceptions of IT and HR managers were that the prevalence of virtual work was still very low or that if individuals did do some work remotely, that this was not deemed to be part of the "workplace". The only job categories where virtual work was more prevalent included executives, sales and IT staff, especially for standby arrangements. This is in contrast with the fact that all organisations in the study did indicate that they had implemented a vast range of remote access technologies. Yet, very few companies actually had a "virtual working" policy, or even a policy for flexible hours. The disparity between the IT and the HR functions, as well as the distance between the individual and organisational levels will have to be addressed, in order to implement a successful virtual workplace and benefit from the advantages that this type of workplace brings. The paragraphs below make recommendations on organisational, team, individual and management levels.

7.2.2 Recommendations for Organisations

7.2.2.1 Assessment process

To improve likelihood of implementing a successful virtual workplace, the organisation should complete the steps set out below.

1. Critically evaluate the organisation in terms of its virtuality status, by using the virtuality assessment framework to determine a current status or virtuality score.
2. Once the existing score is determined, a desired status should be agreed upon, by taking the overall strategy of the organisation into account.
3. Design the organisational change intervention(s) required to move from the current to the desired level for each category.

7.2.2.2 Improving the organisational scores

Organisations should approach the implementation of a virtual workplace from an organisational change point of view. In this regard, organisations and their executives should realise that the virtual workplace should be a total strategy which should address both the HR and IT related components in equal measures, and not give more focus to either of these areas. From an HR side issues need to be addressed concerning workforce, people management, and a review of the current contract of employment. From an IT side, the applicability of the technology should be reviewed, ensuring that the type of technology can match the task that needs to be performed. There should also be a drive to ensure that technology literacy is addressed, by implementing training plans to ensure that individuals can effectively use these new technologies. Governance and policies need to be put in place on both HR and IT side, but should not be over engineered.

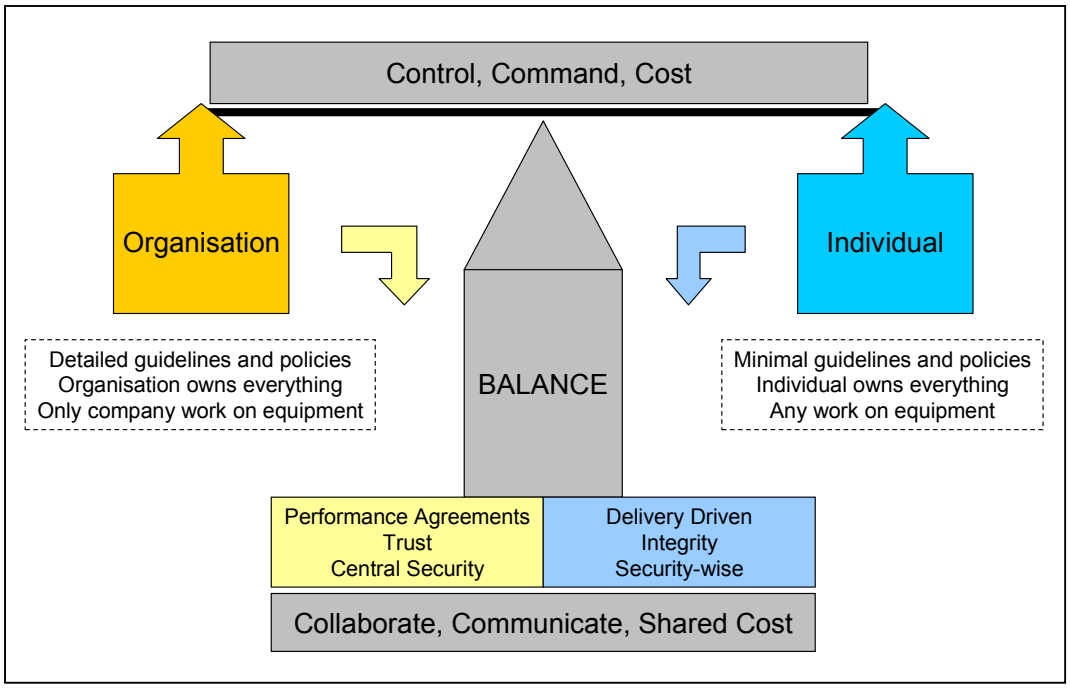
IT Managers should be aware of the business drivers that need to be addressed by technology, thereby not implementing technology that does not support strategic objectives. As shown from the data analysis, tools to support online collaboration and communication have a low utilisation, and this will need to receive some attention in supporting the implementation of the virtual workplace.

From a policy perspective the question of ownership of equipment must also be addressed. One stream of thought is that the company owns the equipment, and therefore the individual may only perform official business with the device. At the other extreme, the individual owns the device, and can therefore conduct both official and unofficial business on the device, and the organisation saves the cost related to the asset. In this case, the issue of securing the corporate networks will have to be addressed, as the individual may not necessarily have all the relevant security software installed on their device. The recommendation is however that a balance be achieved between these two extremes, where the organisation and individual share responsibilities, costs and accountability. This is indicated in Figure 7-1: Balance between organisation and individual, below.

HR managers need to ensure that their recruitment and retention strategies make provision for a more virtual workplace. The reasons for wanting to work more virtually support the trend towards improved work/life balance, not only for the Xer generation, but for employees in general. This makes the virtual workplace an even more important option for HR managers when planning their staff retention and recruitment strategies. In addition, if companies want the

type of individual virtual workplace, HR managers should recruit individuals who can work independently, and who are disciplined and mature.

Figure 7-1: Balance between organisation and individual



The tables in Appendix I - Organisational Assessment Steps, contain specific recommendations relating to the improvement of the different scores in the organisational assessment framework. To obtain specific inputs regarding policies and procedures, Thomas (2006) suggest guidelines for setting up policies relating to virtual work, and Prentice (2007) investigates the so-called "20-hour job description".

7.2.3 Recommendations for Teams

7.2.3.1 Team assessment process

To improve likelihood of a successful virtual team, the team could complete the steps listed below.

1. Critically evaluate the team in terms of its virtuality status, by using the team virtuality assessment framework to determine a current status or virtuality score.
2. Once the existing score has been determined, a desired status should be agreed, based on a clear vision and strategy for the team.
3. Design the team and organisational change intervention(s) required to move from the current to the desired level for each category. (The change interventions should be elevated to organisational level, due to the interrelationship between the effectiveness of the team in their environment.)

7.2.3.2 Improving the team scores

Virtual teams and their managers need to have a vision of what they define as a successful team. This should be reflected in the desired status of their virtuality scorecard. All rules and procedures that are of strategic importance to the success of the team should be formally documented and managed. All implicit rules should be known to all team members, and be easy to impart to new team members who join the team. Over and above the internal procedures, rules and norms, the team should also establish procedures and rules to facilitate intra-organisational communication and visibility.

For collaboration, teams should agree timing and schedules, agree upon deliverables and how they will be measured, and the process of attaining those

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deliverables. Tear , a sense of sharing, understand their roles and identities and create a sense of cohesion are successful on the socialisation side. For communication, a common language (including jargon and manner-of-speech), as well as using the right technology for the specific type of communication, is important.

Team members must be disciplined, mature and be able to deliver output independently. Individuals should also ensure that they balance their work and home life, especially when working from home. The tables in Appendix J - Team Assessment Steps, contain specific recommendations relating to the improvement of the different scores in the team assessment framework.

7.2.4 Recommendations for Individuals

Individuals should review the recommendations for teams, as they will inevitably form part of a larger team or department in which they need to produce results. In general, individuals must make sure that they keep abreast of technology, and are prepared to use technology for online collaboration. Employees need to be able to learn new ways how to do things and new ways of expressing themselves electronically. They will also have to become used to the idea of being paid for output and not for hours, and thus have a clear understanding of their outputs and how they are going to deliver them. This implies that individuals no longer need to feel guilty when working away from the main office location, because they will know that the focus is on the output, and not on the time being spent at the office. Individuals will be expected to be disciplined from both a work and personal perspective, be able to work without much guidance from their manager and communicate effectively, providing the right information

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at the right time. In[illegible] hey want the freedom to work more virtually, they will have to accept the resultant responsibilities.

7.2.5 Recommendations for Managers

Managers play a key role in the success of a virtual workplace. They are often in the position to decide on an informal basis whether individuals are given flexibility of location and time, and whether individuals are provided with the technology to support virtual work. Therefore, managers must first and foremost have a goal for the successful implementation of a virtual workplace, as well as have a vision for the success of the virtual team.

In terms of mindsets, managers should feel comfortable about not having to see a person to communicate or ensure a product is delivered. They should not micromanage, but should set clear performance criteria and measures for the overall goal to be attained, and then trust their employees to deliver. The principle is therefore to manage output (and no longer time), and that employees are given the freedom to adopt their own approach to their job and delivering the output. In terms of the study, trust has been identified as a critical factor for the successful implementation of a virtual workplace or a virtual team. Therefore, it is important that managers take stock of their own position on this matter, and ensure that trusting relationships are built with their employees.

7.3 AREAS FOR FURTHER RESEARCH

The first area for further research could be to extend the survey component of the study to more organisations and industries. This could be used to confirm whether there is a general need for individuals to spend more time working

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virtually across individual level. This could also confirm or reject the perceptions of the IT and HR managers relating to the needs of individuals in the organisation.

Secondly, the themes identified in the qualitative analysis could potentially be incorporated into a survey that can be run on the organisational level, and distributed to IT and HR managers of more organisations, to test the items discovered from this part of the research, in a larger population.

Thirdly, the survey component of the study should be run in such a way that it could include individuals who are not yet in the workplace. This would ensure that individuals are not already framed within the corporate mindset when answering the questions.

A further limitation of the study relates to the impact of race and culture on the collective experience of individuals in terms of generational theory. There may be a difference between white and non-white South Africans in terms of their previous exposure to technology – it is more likely that non-white South Africans would have had less exposure to the technology, and even today, may only have limited access to broadband outside of the company and its facilities. This could have an impact on how these individuals perceive the advantages and applicability of a virtual workplace. This should be considered as a topic for future research.

7.4 CONCLUDING REMARKS

The results have shown a generally high prevalence of individuals who work virtually on both an individual and organisational level, although they are not always classified as working virtually by the organisation. Various mindsets and attitudes have emerged as being more dominant in supporting the virtual workplace, although they cannot be clearly related to the different generations of Xers, Boomers and Silents. In this regard, the organisation has also emerged as a distinct persona, with a particular mindset that could either promote or inhibit a virtual workplace.

Mindsets and attitudes supporting the implementation of a virtual workplace include maturity, being self-driven and disciplined, and being able to make the mindset shift from time-driven to output-driven remuneration and management. Although face-to-face communication will still be vital for relationship building, individuals need to be willing to explore the possibilities of using online collaboration tools to replace components of personal interaction.

From a team perspective, there must be a balance between process maturity and overall “teamness” or sense of cohesion and interdependence among team members. If “teamness” is high, then process maturity can be lower, and *vice versa*. Moreover, process maturity does not have to imply inflexible rules. It should simply incorporate adequate rules, which are documented and aligned with the strategic objectives of the team, and known to all team members and related parties.

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On the organisatio[illegible]om this research is that the implementation of the virtual workplace should be driven from and organisational change perspective, and not from either the IT (technology driven) or the HR side (policy driven) only. Because the implementation of a virtual workplace touches so many facets of the organisation and the general way of work, and also does not only relate to a specific generation, it cannot be approached through isolated actions, but should be driven by a clear vision and strategy for the organisation as a whole.

Finally, managers, individuals, teams and organisations need to understand how to manage and work in this new collaborative virtual environment. They should not disregard the fundamentals of either management or team work, but realise that these principle need to be applied even more rigorously to accommodate the complexities added through the implementation of a virtual workplace.

With the changing generations, technology and the global work landscape, mobility and the virtual workplace is no longer an option, but a necessity. Only organisations that have made the mindset change, and not only the technology change, will be able to benefit from this force.

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9 APPENDICES

The appendices of the research follow.

APPENDIX A

A - ABBREVIATIONS AND ACRONYMS

Table A-1: Abbreviations and acronyms

Abbreviation	Description
3G	"Third generation mobile telephone technology that allows users to transfer both voice and non-voice data" (IT Web, 2005, p. 292)
ADSL	Asymmetric Digital Subscriber Line ("Uses compression techniques to provide high-speed broadband data connections over existing copper wire lines, enabling the carriage of voice, data and video simultaneously.") (IT Web, 2005, p. 292)
BPR	Business Process Re-engineering
CIO	Chief Information Officer
DF	Degree of Freedom (Analysis of variance)
EDGE	Enhanced Data rates for GSM Evolution – "The next generation of data service connection two or three times faster than GPRS" – but still slower than 3G and HSDPA (IT Web, 2005, p. 293)
GPRS	General Packet Radio Services – "A mobile data service available to users of GSM cell phones" (IT Web, 2005, p. 293)
GSM	Global System for Mobile Communication
HPW	High Performance Workplace

Abbreviation	
HR (Manager)	Human Resource(s) manager
HSDPA	High-Speed Downlink Packet Access. Also known as 3.5G, this is an enhancement to 3G platforms to allow for greater transfer speeds. (Simpson *et al*., 2005, p. 20)
ICT	Information and Communications Technology
IDC	International Data Corporation
ISDN	Integrated Services Digital Network (A Dial-up service offered by Telkom providing "fast" data transfer rates.") (IT Web, 2005, p. 294) Surpassed by ADSL.
IT	Information Technology
IT Manager	Information Technology Manager
JHB Region	Johannesburg Region (of the ICT Company)
LAN	Local Area Network
LCS	Microsoft Live Communication Server, also known as Microsoft Office Communicator.
LRA	Labour Relations Act
MS	Microsoft (used in relation to Word and Excel)
OHP	Occupational Health Practitioner
PDA	Personal Digital Assistant
PMF	Process Maturity Framework
RTMC	Road Traffic Management Corporation
SS	Mean Sum of Squares (SS)
US or USA	United States (of America)
Wi-Fi	Wireless Fidelity ("A radio frequency technology that allows laptop or handheld computers in the vicinity of a hotspot to

Abbreviation	[illegible]
	access the Web or corporate networks.") (IT Web, 2005, p. 295)
WiMAX	Worldwide interoperability for Microwave Access - "A certification mark for products that pass conformity and interoperability tests for the IEEE 802.16 standards" (IT Web, 2005, p. 295)

APPENDIX B

B – INDIVIDUAL SAMPLE SELECTION

B1 - SAMPLING ON INDIVIDUAL LEVEL

A staff list was received in Excel format from the HR department for the JHB Region with email addresses.

1) Numbering of individuals
    a. The list was sorted alphabetically and the individuals were numbered. The population count yielded 663 individuals.
    b. The list was re- sorted on age and renumbered again
    c. A generational age group tier was added to the list (Tier 1 = 18-37 [368]; Tier 2 = 38-57 [270]; Tier 3 = 58- 67 [23])
    d. The individuals were renumbered again starting at 1 in each tier.
    e. Refer Worksheet: 07-06 RO Jhb KL-Research: Nominal Roll
2) Calculations on size of given population, the size of the age groups, as well as number of replies required to determine the final sample to be selected:
    a. CHART: 07-06 RO Jhb KL-Research:ChartTiers
    b. PIVOT TABLE: 07-06 RO Jhb KL-Research:CountTiers
    c. Target was to obtain 200 returns of surveys out of the selected sample.
    d. Decided on 70% sample from the population (461 out of 663).
    e. Would require a 43% return rate from this sample size to obtain the number of 200.

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f. Dispr[illegible] tier. The reason for this was firstly because tier 3 was so small (23), all members were selected, and secondly to ensure equal representation and ease of comparison between tier 1 and tier 2, equal numbers of individuals in each of these two tiers were selected, namely 220 each.

3) Selection of individuals

   a. The Random number generation function ("Randbetween") of Excel was used.

   b. For Tier 1: RANDBETWEEN(1,368). Generated more than 400 numbers, as Excel gives many duplicates. Took the first 350 of these generated numbers, sorted and identified unique numbers, then took the last 50 sorted and identified unique numbers and added first three numbers that were not in the list. (Refer 07-06 RO Jhb KL-Research: RANDOM368)

   c. Repeated the process of tier 2 with RANDBETWEEN(1,270) (Refer 07-06 RO Jhb KL-Research: RANDOM270)

   d. Used the VLOOKUP function of Excel to match the randomly selected number, with the tier number of the individual in the "Nominal Role" sheet.

4) Sending Emails to selected individuals

   a. Transferred the selected individuals and their email addresses to a sheet for import into and Access database for link to Word and Outlook for email generation.

   b. Created a Word document with invitation to individuals to complete the survey.

c. Comp and Word and sent out the email on 3 August.

d. “Read” receipts were activated and analysed.

APPENDIX C

C - INDIVIDUAL DATA COLLECTION AND ANALYSIS

C1 - CONSISTENCY MATRIX FOR QUESTIONS

Table C-1: Consistency Matrix for survey questions

No.	Obj	Cat	Mapping Model	Question	Notes / Link to objectives / Lit studies	Reference
1	O2+O5	a-Profile	Organisation	What is your job category?	Can link this to propensity to work virtual. It will especially be interesting to see how many managers actually work virtual. Literature indicates that certain types of jobs cannot work virtual. (Will people know the difference between Technical and Professional???)	(Tobin, 1994), (Schweitzer and Duxbury, 2006)
4	O1	a-Profile	Workforce	What is your age?	Age will be used as key for mapping to the Generation. And compare with Other Profiles	Codrington & Grant-Marshall; Schweitzer and Duxbury, 2006
9	O5	a-Profile	Workforce	What is the direct distance in Km between your residence and your primary location of work?	Determine if travel has an impact.	(Grantham, 2000)
14	O1	bb-Virtual Work	Workforce	On average per workweek, how many hours do you work? (Monday - Sunday)	Want to determine how many hours a person is actually not working at "main" location of work. Total Hours per week including after hours.	(Grantham, 2000),(Schweitzer and Duxbury, 2006)
17	O1	bb-Virtual Work	Organisation + Workforce	Where is most of work performed? (Choose the appropriate percentages per location. Try to be as accurate as possible in arriving at a sum of 100% for all locations.)	Determine if this is a "virtual" worker. (LOCATION - where work is done)	(Schweitzer and Duxbury, 2006) (But where get examples

C2 - FINAL QUESTIONNAIRE

The Virtual Workplace - SURVEY

Welcome to the survey relating to research on the Virtual Workplace. Thank you for taking the time to complete the questionnaire. The survey is completely anonymous and data cannot be traced back to specific respondents.

This research is being submitted as partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria.
Researcher: Karen Luyt
Supervisor: Charlene Lew, Senior Programme Manager (Dr), GIBS

The Virtual Workplace in the context of this research is defined as a workplace where the TIME and LOCATION can be chosen and TECHNOLOGY is the key enabler for connectivity and collaboration. TIME can be chosen in terms of a schedule (when work is performed) and proportion (how many hours are spent working virtual). LOCATION can vary between Main Office Location, a Satellite Office Location (could also be a customer site), Home and any other Non-Traditional Working place where technology enables connectivity (e.g. Coffee shop with wireless connection).

This survey will take approximately 10-15 minutes to complete. There are 4 pages in total. Please answer ALL the questions:

For Radio Buttons (◉) tick (✓) or mark (×) only ONE per question or row.

For Check Boxes (☐) tick (✓) or mark (×) all that apply.

Enjoy...!

SECTION 1

Please answer the following questions relating to your profile as individual.

1) What is your job category?

- ◉ Administrative/Clerical
- ◉ Executive
- ◉ Management
- ◉ Sales
- ◉ Technical
- ◉ Professional

2) Are you a permanent employee or contractor?

- ◉ Permanent - Part Time
- ◉ Permanent - Full time
- ◉ Contractor - Part Time
- ◉ Contractor - Full time

3) How long have you been employed in your current company?

- ☐ Less than 1 year
- ☐ 1-3 years
- ☐ 4-6 years
- ☐ 7 to 10 years
- ☐ More than 10 years

4) What is your age?

5) What is your gender?

- ☐ Male
- ☐ Female

6) What is your race?

- ☐ African
- ☐ Coloured
- ☐ Indian
- ☐ White
- ☐ Other (Please Specify):

7) What is your highest qualification?

- ☐ Matric
- ☐ Certificate
- ☐ Diploma
- ☐ Degree
- ☐ Honours
- ☐ Masters
- ☐ Doctorate

8) Do you have children under the age of 6?

- ☐ Yes
- ☐ No

9) What is the direct distance in Km between your residence and your primary location of work?

- ☐ Less than 5 Km
- ☐ 5 - 10 Km
- ☐ 11 - 30 Km
- ☐ 30 - 50 Km
- ☐ More than 50 Km

10) On average, how long on does it take you to travel from your residence to your primary location of work (one-way)?

- ☐ Less than 10 minutes
- ☐ 10 to 30 Minutes
- ☐ 31 to 59 Minutes
- ☐ 1 to 1.5 hours
- ☐ More than 1.5 hours

11) In total, how many hours do you travel on average per working day (includes travel to/from your residence as well as other travel during the day)?

- ☐ Less than 0.5 hours
- ☐ 0.5 to 1 hour
- ☐ 1+ to 1.5 hours
- ☐ 1.5+ to 3 hours
- ☐ More than 3 hours

12) How many years have you been using a computer?

- ☐ Less than 1 year
- ☐ 1 to 3 years
- ☐ 4 to 6 years
- ☐ 7 to 10 years
- ☐ 11 to 15 years
- ☐ More than 15 years

13) How many years have you been using a Mobile Phone?

- ☐ Less than 1 year
- ☐ 1 to 3 years
- ☐ 4 to 6 years
- ☐ 7 to 10 years
- ☐ More than 10 years

SECTION 2

Please answer the following questions relating to your style of work.

---

14) On average per week, how many hours do you work? (Monday to Sunday)

15) On average per week, how many hours do you work away from your Organisation's Main Office Location? (Monday to Sunday)

16) Of these hours worked away from your Organisation's Main Office Location, how many hours of these are outside of normal office hours? (You may use decimals, e.g. 1.5)

17) Where is most of your work performed? (Choose the appropriate percentages per location. Try to be as accurate as possible in arriving at a total of 100% for all locations.)

	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Main Office Location	○	○	○	○	○	○	○	○	○	○	○
Satellite Office	○	○	○	○	○	○	○	○	○	○	○
Client Site	○	○	○	○	○	○	○	○	○	○	○
Home	○	○	○	○	○	○	○	○	○	○	○
Internet Cafe	○	○	○	○	○	○	○	○	○	○	○
Coffee Shop	○	○	○	○	○	○	○	○	○	○	○
Other	○	○	○	○	○	○	○	○	○	○	○

18) What type of devices do you use when working remotely? (Select all that apply, or "Not Applicable" if you do not work remotely.)

- ☐ Basic or enhanced cell phone
- ☐ Smartphone
- ☐ PDA-phone
- ☐ Laptop or Notebook
- ☐ Desktop
- ☐ Fax
- ☐ Scanner
- ☐ Not Applicable

Other (Please Specify): _____

19) What type of technologies do you use when working remotely? (Select all that apply, or "Not Applicable" if you do not work remotely.)

- ☐ WiFi
- ☐ WiMAX
- ☐ iBurst
- ☐ ISDN
- ☐ ADSL
- ☐ GPRS/EDGE
- ☐ 3G/HSDPA
- ☐ Not Applicable

Other (Please Specify): _____

20) How do you transmit work and/or communicate with your co-workers or manager while working remotely? (Select all that apply, or "Not Applicable" if you do not work remotely.)

- ☐ Telephonically
- ☐ SMS / MMS
- ☐ Email
- ☐ Web collaboration tools
- ☐ Document libraries
- ☐ Application portals
- ☐ Not Applicable

Other (Please Specify): _____

SECTION 3

Please answer the following questions relating to your needs and beliefs around the concept of "working virtual", i.e. working with location and time flexibility while enabled by technology.

21) Why would you like to work more virtual? Or, if you are already working virtual, what are the main reasons for doing so? (Select all that apply)

- ☐ To accommodate child care
- ☐ To work without disruptions
- ☐ For ecological reasons
- ☐ Because of company incentives
- ☐ To find privacy when working
- ☐ Because of personal emergencies
- ☐ For financial reasons
- ☐ In order to live where I want
- ☐ To cut down on personal stress
- ☐ To accommodate a disability
- ☐ To cut down on travel time

Other (Please Specify): _____

22) What is preventing you from working virtual more often? (Select all that apply)

- ☐ Technology not sufficient
- ☐ Business applications not available
- ☐ Nature of job demands onsite presence
- ☐ Insufficient company policies
- ☐ Immediate manager is not supportive
- ☐ Interaction required with fellow-employees
- ☐ Feelings of guilt when not "onsite"
- ☐ Home conditions not suitable
- ☐ Feeling too isolated when working remotely

☐ I do not want to work virtual

☐ I work virtual often enough

Other (Please Specify): ____

23) Select the most appropriate answer to each statement:

	Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly Disagree 5
I proactively seek out and use new technologies	○	○	○	○	○
I like learning new ways to do things	○	○	○	○	○
I would like to see more technology in the workplace that allows online collaboration	○	○	○	○	○
I would like to choose the technology I use for work, and not be restricted by company policy	○	○	○	○	○
I should be paid for my outputs and not the hours I work	○	○	○	○	○
I should be able to choose my location of work	○	○	○	○	○
I prefer to interact and network simultaneously with many others	○	○	○	○	○
Social relationships (non-work related) are important to me	○	○	○	○	○
I find it easy to express myself while collaborating online	○	○	○	○	○

SECTION 4

Please answer the following questions in relation to your immediate / line manager. (I.e. can also be the person allocating work to you in the case of independent contract work.)

24) In what age group does your immediate manager fall?

- ☐ Younger than 27
- ☐ 27-31
- ☐ 31-37
- ☐ 38-42
- ☐ 43-47
- ☐ 48-52
- ☐ 53-57
- ☐ Older than 58

25) How long have you been working as subordinate for your immediate manager?

- ☐ Less than 1 year
- ☐ 1-3 years
- ☐ 4-6 years
- ☐ 7 to 10 years
- ☐ More than 10 years

26) Select the most appropriate answer to each statement:

	Strongly Agree 1	Agree 2	Neutral 3	Disagree 4	Strongly Disagree 5
I am given a considerable amount of freedom to adopt my own approach to my job	☐	☐	☐	☐	☐
I am allowed to work flexible hours	☐	☐	☐	☐	☐
I am allowed to select my location of work	☐	☐	☐	☐	☐
My job outcomes are clearly defined	☐	☐	☐	☐	☐

My manager trusts me	☐	☐	☐	☐	☐
My manager often uses technology for online collaboration	☐	☐	☐	☐	☐
My manager often works in a different location to where I work	☐	☐	☐	☐	☐

THE END – THANK YOU.

C3 - EMAIL FOR SURVEY

Hi <Name>

You have been selected randomly from a list of the Johannesburg Regional Office Staff to partake in this research. The research is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration being completed by me at the Gordon Institute of Business Science (GIBS), University of Pretoria. The survey is completely confidential, and the data will only be used as part of this research.

The topic for my research is: "Mindsets required for implementing a Virtual Workplace"

The survey can be found at the following link:
http://FreeOnlineSurveys.com/rendersurvey.asp?sid=ct8ic9yfndsyds5326283
The password to access the survey is: MBA-GIBS2007

It should take you between 10 and 15 minutes to complete the survey. The target date for completion is **17 August 2007**.

Your participation is highly appreciated.

Regards

Karen Luyt

Contact Number: 082-895-2289

C4 - READ RECEIPT STATUS

The detailed read receipt data is presented in the two tables below. All percentages are based on the sample size of 461 which was the number of emails sent out.

Table C-2: "Read" status analysis of emails

Comment on "Read" status of Email	Number	Extra
Delivery Status Notification Failure / Undeliverable	18 (3.9%)	
No Receipt or Reply	162 (35.1%)	
Deleted - Not Read	5 (1.1%)	
Out of Office (No further reply)	5 (1.1%)	
Read Receipt	267 (57.9%)	
- Provided "completed" notification		48 (10.4%)
- Provided additional comment o Good Luck / Thanks o Positive Feedback o Request Report o Specific Comment o No Access / Cannot Open o Do I have to / Why me? o Not in Population		40 (8.7%) **(11)** **(7)** **(4)** **(4)** (8) (4) (2)
Notification Verbal	4 (0.9%)	
TOTAL (Sample Size)	**461**	

Table C-3: Respondent analysis

Respondent data	Totals (Responses)	True Respondent
Incomplete Data	22 (4.8%)	YES
Test (Ignore)	1 (0.2%)	NO
Duplicates (Ignore)	2 (0.4%)	NO
Inconsistent Data	1 (0.2%)	YES
To Include	206 (44.7%)	YES
TOTAL	**232**	**229 (49.7%)**

C5 - DATA TRANSFORMATION RULES

The data transformation rules for the survey data are given below.

(1) Age transformation: The answers to survey question 4 were used to determine the generation of the respondent. In addition, the answers to survey question 24 were used to determine the generation of the manager of the respondent. The table below applies in both cases.

Table C-4: Age group transformation

Age Group	Generation
Younger than 27*	Xer
27-31	Xer
31-37	Xer
38-42	Boomer
43-47	Boomer
48-57	Boomer
Older than 58	Silent

* As it was known that there were no Millenials in the sample, this could still be used to indicate that the person fell in the Xer generation.

Table C-5: Detailed generation map based on SA generational groupings

	Millennial (1990-2005)			Xer (1970-1989)				Boomer (1950-1969)				Silent (1930-1949)	
Date of Birth	2000	1995	1990	1985	1980	1975	1970	1965	1960	1955	1950	1945	1940
Age in relation to 2007	7	12	17	22	27	32	37	42	47	52	57	62	67
Age Groups			13-17	18-22	23-27	28-32	33-37	38-42	43-47	48-52	53-57	58-62	63-67

(2) Virtual worker e below. The reference "Qxx" below (e.g., Q14) refers to the relevant survey question.

Table C-6: Virtual worker transformation

Question	Rule	Description
Q15/Q14	>10% AND	Number of hours working away from the main office location > 10% of all hours worked. (Q14 and Q15)
Q17a	Main Office < 100% AND	Time spent at main office location <= 100% (Q17a) (Not working fulltime at main office location)
Q17c	Client Office < 100% AND	Time spent at client office location <= 100% (Q17c) (Not working fulltime on client site)
Q18	Not Equal to "NA" AND	Answered "Not Applicable" on Q18, Q19 and Q20 which related to technology, applications and communication methods used while working remotely or virtually.
Q19	Not Equal to "NA" AND	
Q20	Not Equal to "NA"	

(3) Type of virtual worker transformation is given below

Table C-7: Type of virtual /non-virtual worker transformation

Question	Rule	Description
Q16 17a	= 0 =100%	If hours away and after hours = 0, and main site = 100% Then MAIN CAMPUS Worker = 36 (17.5%)
Q16 17c	= 0 =100%	If hours away and after hours = 0, and client site = 100% Then CLIENT CAMPUS Worker = 13 (6.3%)
Q16/Q15	=100% =NONE = 0 ELSE	All time spent after hours, then SUPPLEMENTOR No additional hours worked If extra time worked, but not after hours, then SUBSTITOR If time spent both in hours and after hours at different locations, then BOTH substitutor and supplementor.

C6 - DETAILED RULES FOR THE DATA ANALYSIS

The table below contains all the rules for the data analysis, and how each question is linked to the hypotheses and questions as defined in Chapter 3.

Table C-8: Link to the research hypotheses and questions

Legend:

Q1- Q13	Page 1 of online Survey - Profile related
Q14 - Q20	Page 2 of online survey - Virtual work related
Q21 - Q23	Page 3 of online survey - Need, mindset and attitude related
Q24 - Q 26	Page 4 of online survey - Manager related

Number	Survey Question	Link to Research Hypotheses and Questions
1	What is your job category?	(1) How many per Job Category are working virtually? (P10-Q1)
2	Are you a permanent employee or contractor?	(1) What is the profile of the Virtual Worker? (P10-Q1)
3	How long have you been employed in your current company?	(1) What is the profile of the Virtual Worker? (P10-Q1)
4	What is your age?	(1) What is the profile of the Virtual Worker? (P10-Q1) (2) Map to Generation (See "Generation Map") - Q4b-CALC (3) P2-Q1: Are most people who do work virtually more likely to be XERS (or late-BOOMERS)? (Map to "Work Virtual - YES/NO - calculated field)
5	What is your gender?	(1) What is the profile of the Virtual Worker? (P10-Q1)
6	What is your race?	(1) What is the profile of the Virtual Worker? (P10-Q1) (2) FUTURE: Map RACE (Q6) vs VIRTUAL WORKER vs Q12 + Q13 (Is there a significant difference between NON-WHITES and VIRTUAL WORK and number of years they have used technology?)
7	What is your highest qualification?	(1) What is the profile of the Virtual Worker? (P10-Q1)
8	Do you have children under the age of 6?	(1) What is the profile of the Virtual Worker? (P10-Q1)
9	What is the direct distance in Km between your residence and your primary location of work?	(1) What is the profile of the Virtual Worker? (P10-Q1)
10	On average, how long on does it take you to travel from your residence to your primary location of work (one-way)?	(1) What is the profile of the Virtual Worker? (P10-Q1)
11	In total, how many hours do you travel on average per working day (includes travel to/from home and as well as other travel during the day)?	(1) What is the profile of the Virtual Worker? (P10-Q1)

Number	Survey Q	earch Hypotheses and Questions
12	How many years have you been using a Computer?	(1) What is the profile of the Virtual Worker? (P10-Q1)
13	How many years have you been using a Mobile Phone?	(1) What is the profile of the Virtual Worker? (P10-Q1)
14	On average per workweek, how many hours do you work? (Monday - Sunday)	Basis for other calculations
15	On average per workweek, how many hours do you work away from your Organisation's Main Office Location? (Monday - Sunday)	Compare with Q17: IF Q15 > 0; then Give list of alternative locations (where Q17b,c,d,e,f,g > 0%)
16	Of these hours worked away from your Organisation's Main Office location, how many hours of these are outside of normal office hours? (You may use decimals, e.g. 1.5)	IF Q16/Q15=100% THEN "SUPPLEMENTOR", ELSE IF "NONE" THEN "NONE", ELSE IF 0% THEN "SUBSTITUTOR" ELSE "BOTH"
17	Where is most of the work performed? (Choose the appropriate percentages per location. Try to be as accurate as possible in arriving at a sum of 100% for all locations.)	Check against Q16….. (Type of Virtual Worker) IF Main = 90%-100% THEN CAMPUS WORKER IF Client or Satellite = 90%-100% THEN SITE WORKER IF Home = 90%-100% THEN TELEWORKER IF "spread" (not one greater than 80%) THEN MOBILE
18	What type of devices do you use when working remotely?	(1) Compile list of all devices and % used by VIRTUAL WORKERS (2) Compare list of Devices used by VIRTUAL WORKERS for different age groups (mapped in Q4b). (There is no significant difference between the means / medians of the different subgroups (XER, BOOMER,SILENT) and the type of technology used in Q18, Q19 and Q20) (P1-NH2)
19	What type of communication technologies do you use when working remotely?	(1) Compile list of all technologies and % used by VIRTUAL WORKERS (2) Compare list of Technology used by VIRTUAL WORKERS for different age groups (mapped in Q4b).(P1-NH2)
20	How do you transmit work / communicate with your co-workers or manager while working remotely?	(1) Compile list of all communication methods and % used by VIRTUAL WORKERS (2) Compare list of communication methods used by VIRTUAL WORKERS for different age groups (mapped in Q4b).(P1-NH2)
21	Why would you like to work more virtually? Or, if you are already working virtually, what are the main reasons for doing so? (Select all that apply.)	(1) VIRTUAL vs NON-VIRTUAL and Average count of reasons to work virtually (Q21) (2) XER, BOOMER, SILENT and Average count of reasons to work virtually (Q21) (3) Compile a list of all reasons for wanting to work virtually (VIRTUAL vs NON-VIRTUAL worker and GENERATION) (4) P9-Q2: How many individuals who do not work virtually at the moment, have indicated that they would like to work virtually?

Number	Survey Q	earch Hypotheses and Questions
22	What is preventing you from working virtually more often?	(1) VIRTUAL vs NON-VIRTUAL and Average count of reasons NOT wanting to work virtually (Q22) (2) XER, BOOMER, SILENT and Average count of reasons NOT wanting to work virtually (Q22) (3) Compile a list of all reasons for not wanting to work virtually (VIRTUAL vs NON-VIRTUAL worker and GENERATION)
23a	I proactively seek out and use new technologies	(1) Compare all these questions in terms of the Age Group (Q4b) Is there a significant difference between XERS and BOOMERS and SILENT in their answers for each question? For all questions the expectation is that XERS will be closer to "1". Null Hypothesis: There is no significant difference between the means/mediums of the different subgroups (XER, BOOMER,SILENT) in Q23. (P1-NH1b) (2) Compare virtual workers in terms of their preference (Expect virtual worker to be closer to 1). Null Hypothesis: There is no significant difference between the means of the different subgroups (VIRTUAL vs NON-VIRTUAL) in Q23. (P1-NH1a)
23b	I like learning new ways to do things	
23c	I would like to see more technology in the workplace that allows online collaboration.	
23d	I would like to choose the technology I use for work, and not be restricted by company policy.	
23e	I should be paid for my outputs and not the hours I work	
23f	I should be able to choose my location of work.	
23g	I prefer to interact and network simultaneously with many others	
23h	Social relationships (non-work related) are important to me.	
23i	I find it easy to express myself while collaborating online	
24	In what age group does your immediate manager fall?	P3-Q1: Are the managers of those individuals that do work virtually mostly XERS?
25	How long have you been working as a subordinate for your immediate manager?	(P4-NH1) Null Hypothesis: There is no significant difference between the means of the subgroups (VIRTUAL vs NON-VIRTUAL) and the duration worked for the manager
26a	I am given a considerable amount of freedom to adopt my own approach to my job	(P3-NH1) Null Hypothesis: There is no significant difference between means for the different subgroups (generational groups of the managers of the individuals who are working virtually) in questions relating to attitude perceived by their employees.
26b	I am allowed to work flexible hours.	
26c	I am allowed to select my location of work	
26d	My job outcomes are clearly defined.	
26f	My immediate manager uses technology for online collaboration.	
26g	My manager often works in a different location to where I work.	
26e	My manager trusts me	(P4-NH2) Null Hypothesis: There is no significant difference between the means of the employee subgroups (VIRTUAL vs NON-VIRTUAL) in the perceived trust level of their managers.

APPENDIX D

D - ORGANISATIONAL DATA COLLECTION AND ANALYSIS

D1 - INTERVIEW DISCUSSION GUIDE

This appendix contains the discussion guide for the individual interviews on organisational level, as based on the items identified in the literature review. It consists of the actual discussion guide for both IT and HR managers (refer to Figure D-1 and Figure D-2 respectively below), some additional definitions required for the interview (refer to Figure D-3 below) as well as the post-interview checklist (refer to Figure D-4 below). A separate discussion guide was created for IT managers and HR managers, as additional technical questions were included for the IT Manager, while some HR related issues were included on the HR manager side.

Figure D-1: Semi-stru

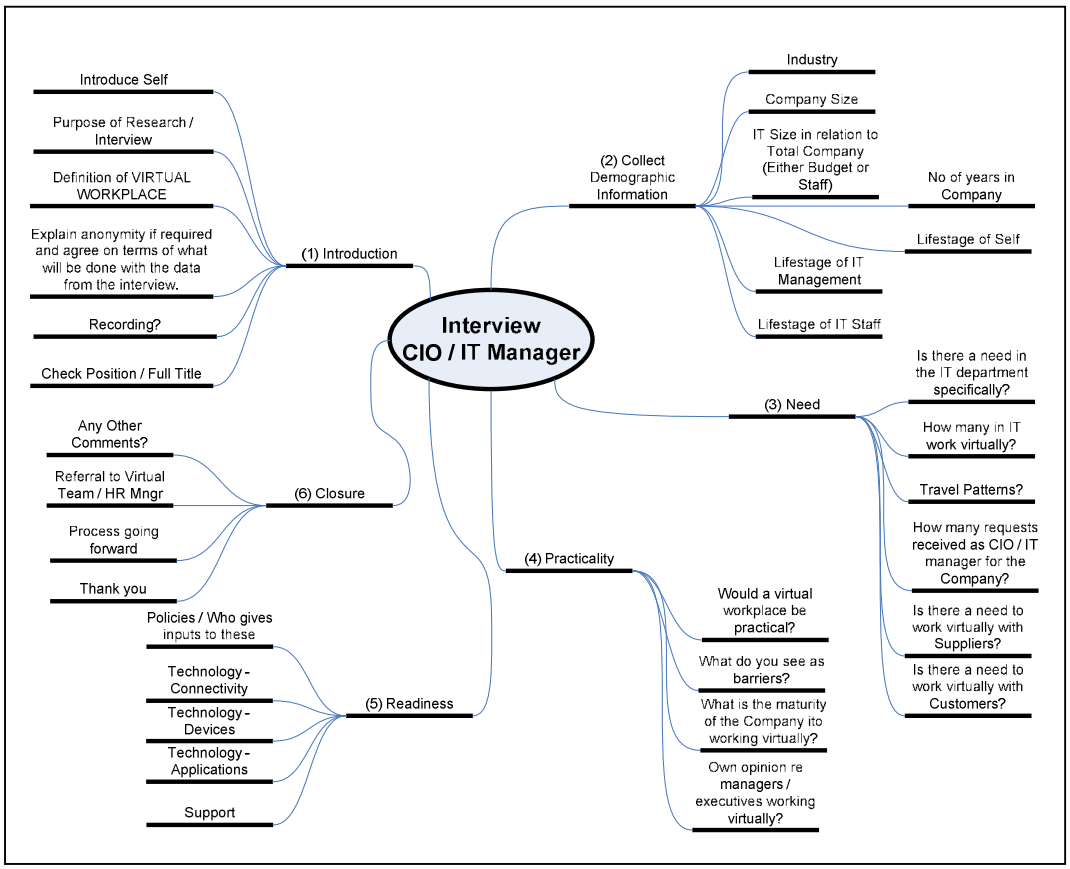


Figure D-2: Semi-stru

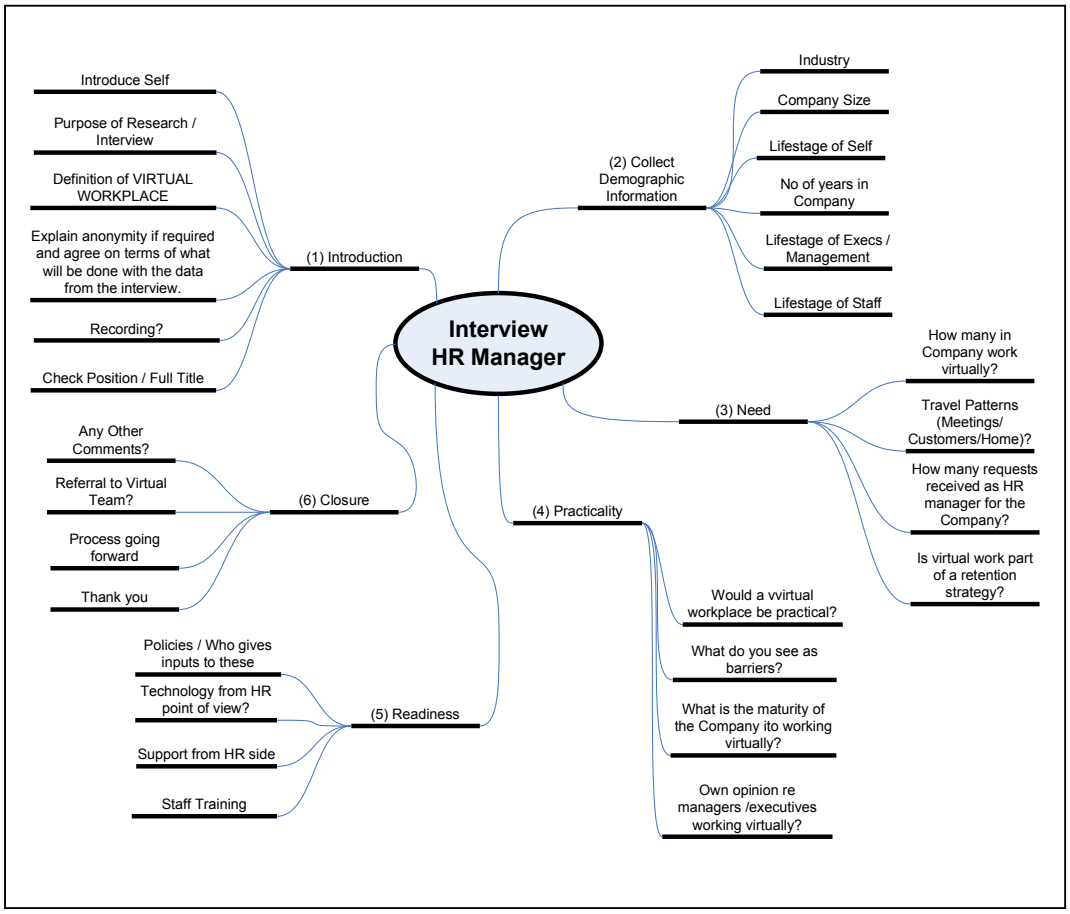


Figure D-3: Semi-stru

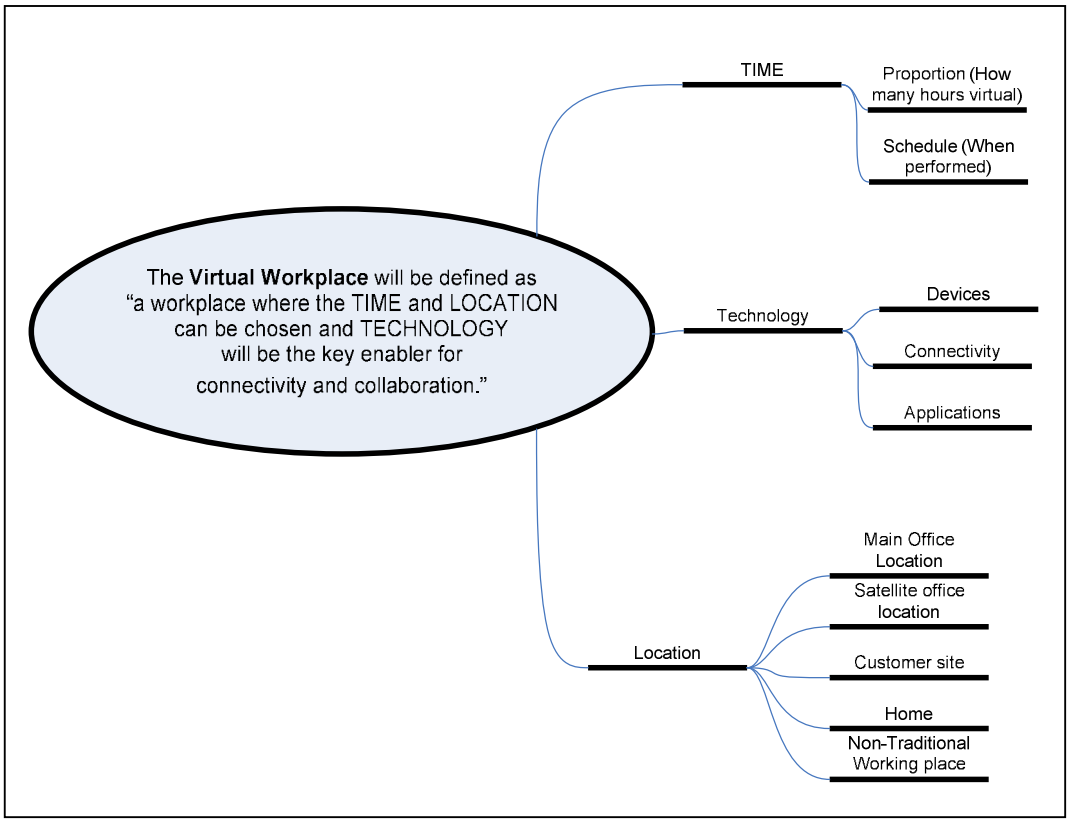
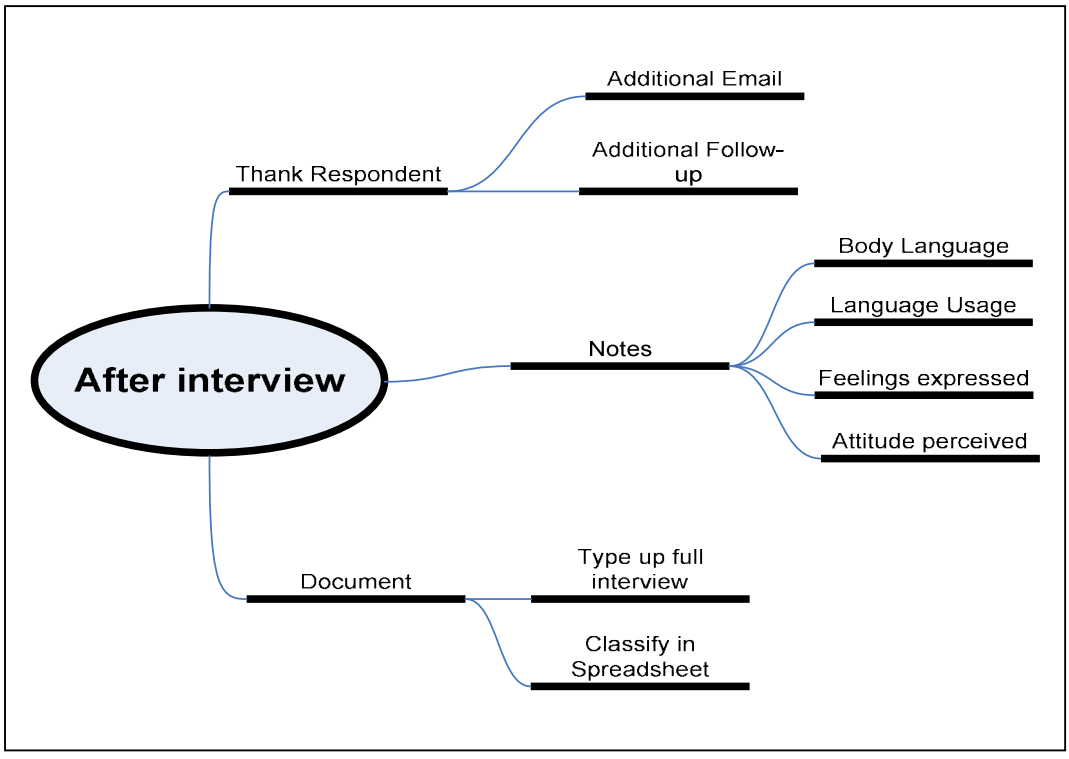


Figure D-4: Semi-structured interview: Post-interview items



D2 - ORGANISATIONAL ASSESSMENT FRAMEWORK

The organisational assessment framework was created based on the themes or objective categories used as discussion points in the interviews. This framework was used to calculate a "virtuality score" for each organisation included in the interview process. The framework places a greater weighting on the "readiness" category, as this is crucial for organisations to have in place should they want to support a virtual workplace. The framework uses a rating of 1 to 5 per category, with 1 being very low, and 5 very high. The detailed ratings are given in Table D-2: Prevalence category measures (P), below. The highest total score that can be obtained by an organisation is 5.

Table D-1: Organisational assessment framework

Category	Weighting (W)	Rating (R)	Comment / Motivation for score	Final Score (W * R)
Need How great is the need within the organisation?	20%	5	*<Insert comment>*	1
Practicality How practical is the implementation of a virtual workplace in the organisation?	20%	5	*<Insert comment>*	1
Readiness - Technology and Applications Is sufficient technology and applications available / deployed to support a virtual workplace?	30%	5	*<Insert comment>*	1.5
Readiness - Policy Is there a specific policy for the virtual workplace and is it integrated with existing policies to give a holistic framework / strategy for the virtual workplace in the organisation?	30%	5	*<Insert comment>*	1.5
TOTAL	**100%**	**40**		**5**

Table D-2: Prevalence category measures (P)

Prevalence Category	Rating
Very Low	1
Low	2
Average	3
High	4
Very High	5

APPENDIX E

E - TEAM DATA COLLECTION AND ANALYSIS

E1 - FOCUS GROUP INTERVIEW GUIDES

This appendix contains the discussion guide for the team interviews, as based on the items identified in the literature review. It consists of the actual discussion guide (Figure E-1), and some additional definitions required for the interview (Figure E-2), as well as the post-interview checklist (Figure E-3).

Figure E-1: Focus group interview: Discussion guide

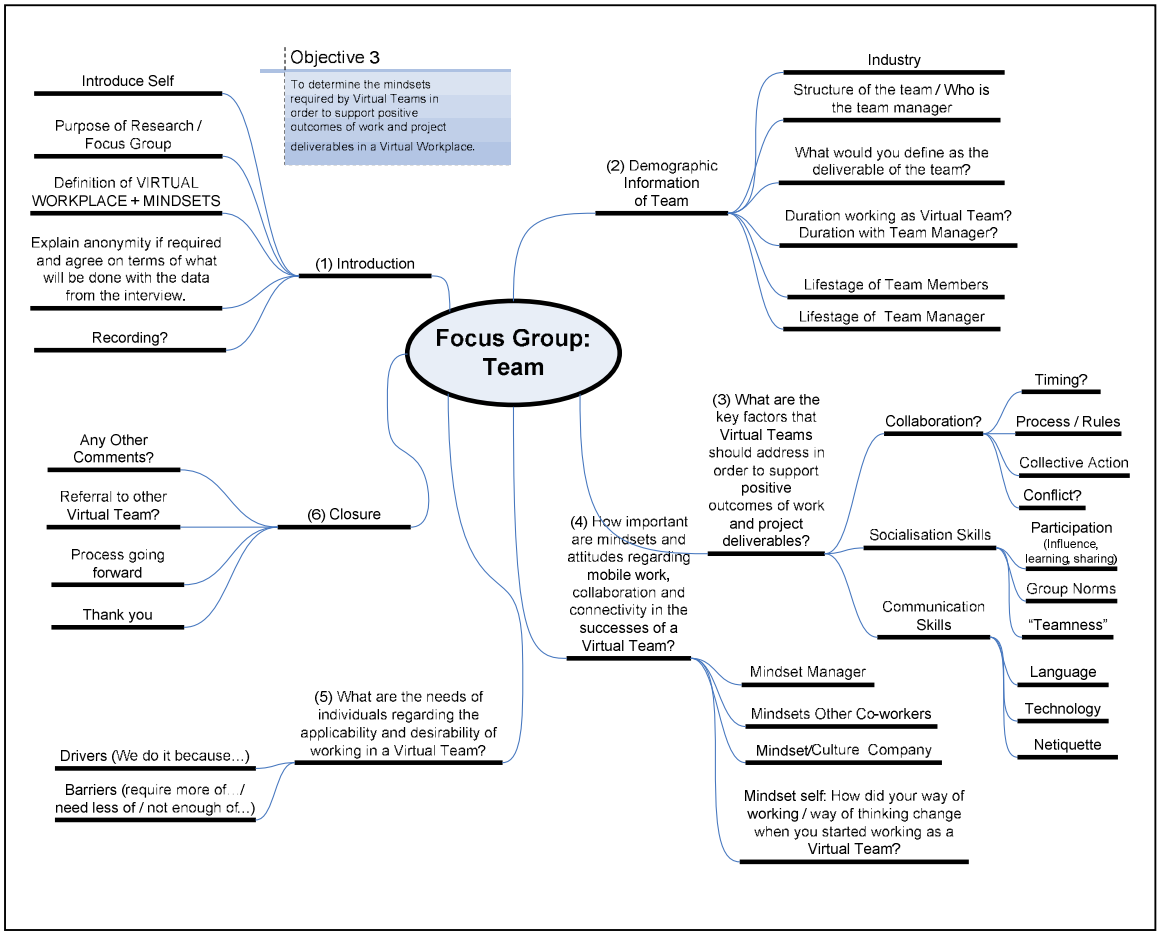


Figure E-2: Focus gro

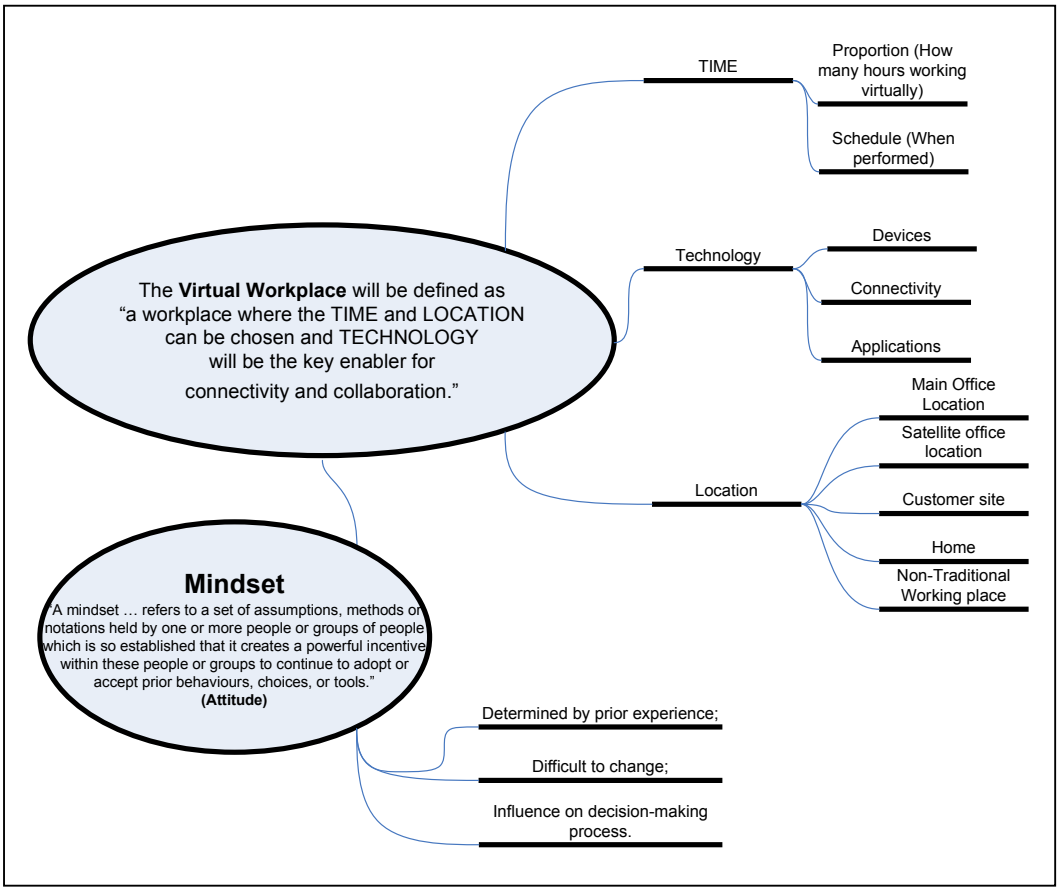
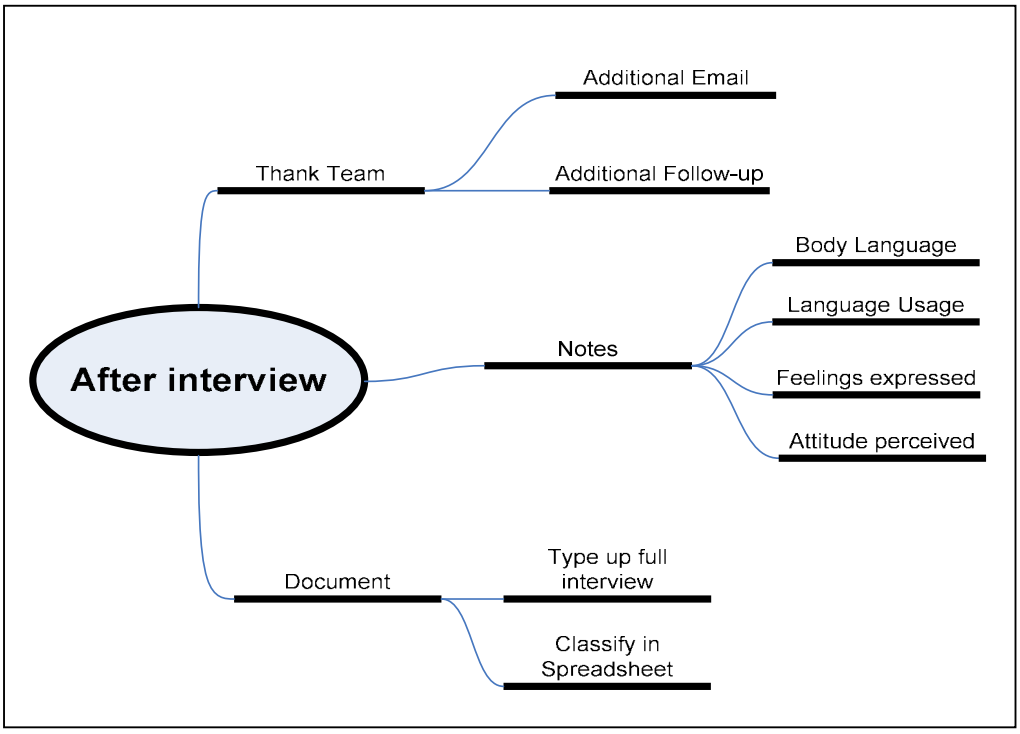


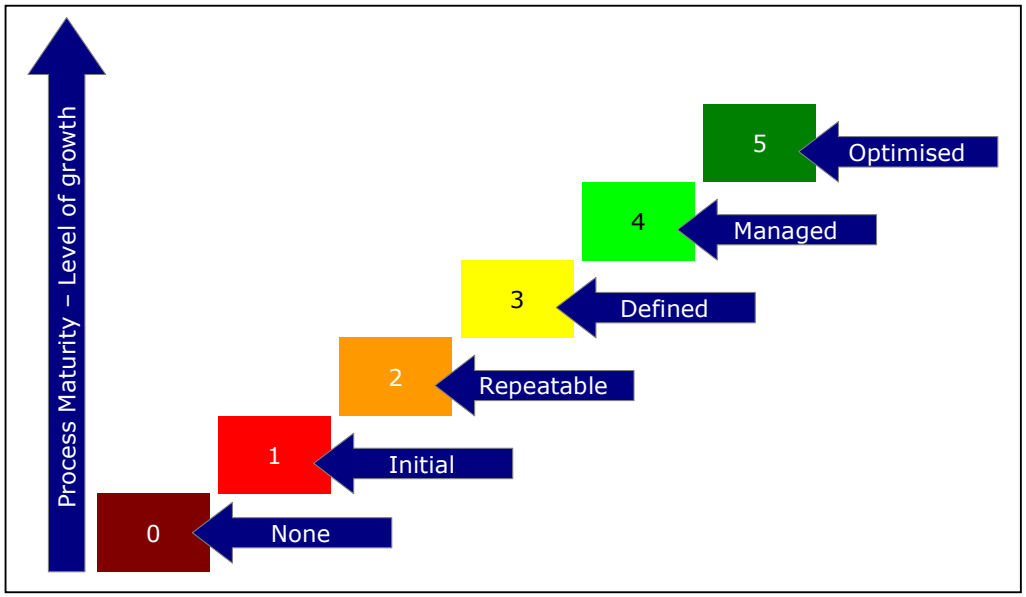
Figure E-3: Focus gro



E2 - INTRODUCTION TO THE PROCESS MATURITY FRAMEWORK

The Process Maturity Framework (PMF) originates from the area of software technologies and methodologies used in software development projects (Paulk, Curtis, Chrissis and Weber, 1993). The principle behind the model is that continuous improvement in software project delivery cannot only be dependant on individuals and their specific experience and skills, but must also be based on building effective software engineering processes. Building these types of repeatable processes is a journey on which an organisation embarks, starting with no processes, to the point where processes are completely optimised. The maturity of a process is heavily dependant upon the stage of growth of the organisation and the team as a whole. It is difficult, if not impossible, to develop the maturity of a processes beyond the maturity and capability of the overall organisation. The maturity of the organisation is not just dependant upon the maturity of a single process. Each level requires a change to a combination of elements in order to be fully effective. To move from one level to the next, elements of vision, process, people, technology and culture need to be included. The PMF has been used as a framework to assess the maturity of five of the team dimensions.

Figure E-4: Levels in



E3 - TEAM ASSESSMENT FRAMEWORK

The team model consists of two components for measurement. The first component is the process maturity, and its subsections are weighted to 100%. A maximum rating of 5 can be attained.

Table E-1: Process maturity framework measures (PMF)

Description	Rating
None (Does not exist - No processes at all or not processes not recognised)	0
Initial (Ad hoc - The process has been recognised, but there is little or no process management activities, and it is allocated no importance.)	1
Repeatable (Uncoordinated - The process is recognised, but is given little importance. General activities around the process are irregular.)	2
Defined (Documented - The process has been recognised and is documented but there is no formal agreement, acceptance and recognition of its role within the organisation / team as a whole.	3
Managed (Aligned - The process has now been fully recognised and accepted throughout the organisation / team. It has objectives and targets that are based on team objectives and goals. Interfaces with other processes are taken into consideration.	4
Optimised (Institutionalised - The process has now been fully recognised and has strategic objectives and goals aligned with overall strategic business and team goals. The processes are part of the everyday activity for everyone involved with the process, and include a continuous improvement focus as well.	5

The second component measures team virtuality on a simple scale. The tables below explain how the ratings should be applied for the teams.

Table E-2: Frequency category measures (F)

Frequency Category	Rating
None of the time	0
Hardly ever	1
Sometimes	2
Regularly / Often	3
Very Often / Most of the time	4
All of the time	5

Table E-3: Prevalence category measures (P)

Prevalence Category	Rating
Very Low	1
Low	2
Average	3
High	4
Very High	5

Table E-4: Team assessment framework

TEMPLATE	Weighting (out of 100)	Rating	Comment/ Motivation for score	Final (Weight x Rating)	
Collaboration - Schedules and Timing	20%	5PMF		1	PROCESS MATURITY
Collaboration - Process / Rules (Task approaches, document structures, milestones, governance, policies)	15%	5PMF		0.75	
Collaboration - Measure of Productivity and output. (Evaluate procedures relating to performance measures and deliverables specifically.)	15%	5PMF		0.75	
Socialisation - Group Norms (Implicit or explicit, expectations held by members regarding correct and incorrect behaviour)	25%	5PMF		1.25	
Communication – Technology (Availability and regulation from organisational point of view around technology.)	25%	5PMF		1.25	
Subtotal	**100%**				**5.00**
Collaboration - Collective Action (Combined decisions and deliverables)	20%	5P		1	TEAM VIRTUALITY
Socialisation - Participation (Feeling of Belonging, Ability to Influence, Learning, Amount of Sharing)	15%	5P		0.75	
Socialisation – "Teamness" (Communication of feelings, sensory information, roles & identities, sense of cohesion)	15%	5P		0.75	
Socialisation - How much time is spent working virtually? (Away from each other, different locations)	20%	5F		1	
Communication - Common Language / Understanding / Expression of emotions	15%	5P		0.75	
Communication - Use of Technology	15%	5P		0.75	
Subtotal	**100%**				**5.00**
TOTAL	**200%**	**55**	**Total**	**10**	***Ave 5.00***

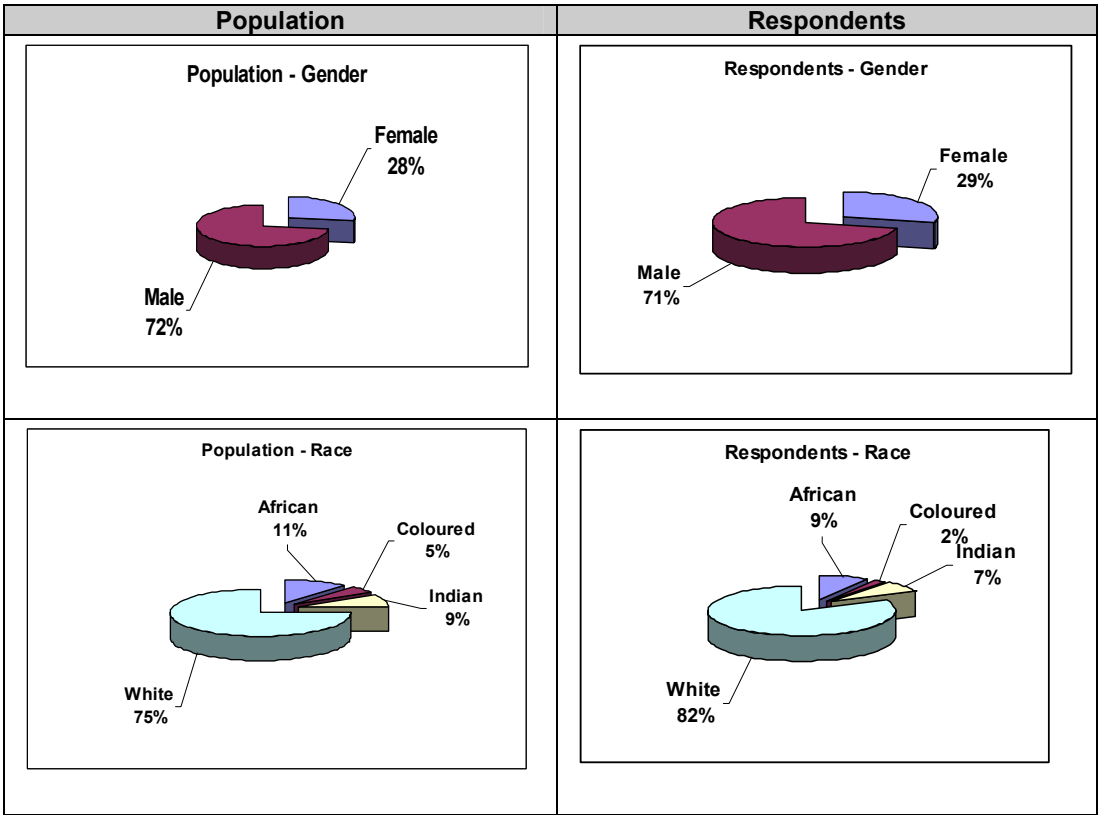
APPENDIX F

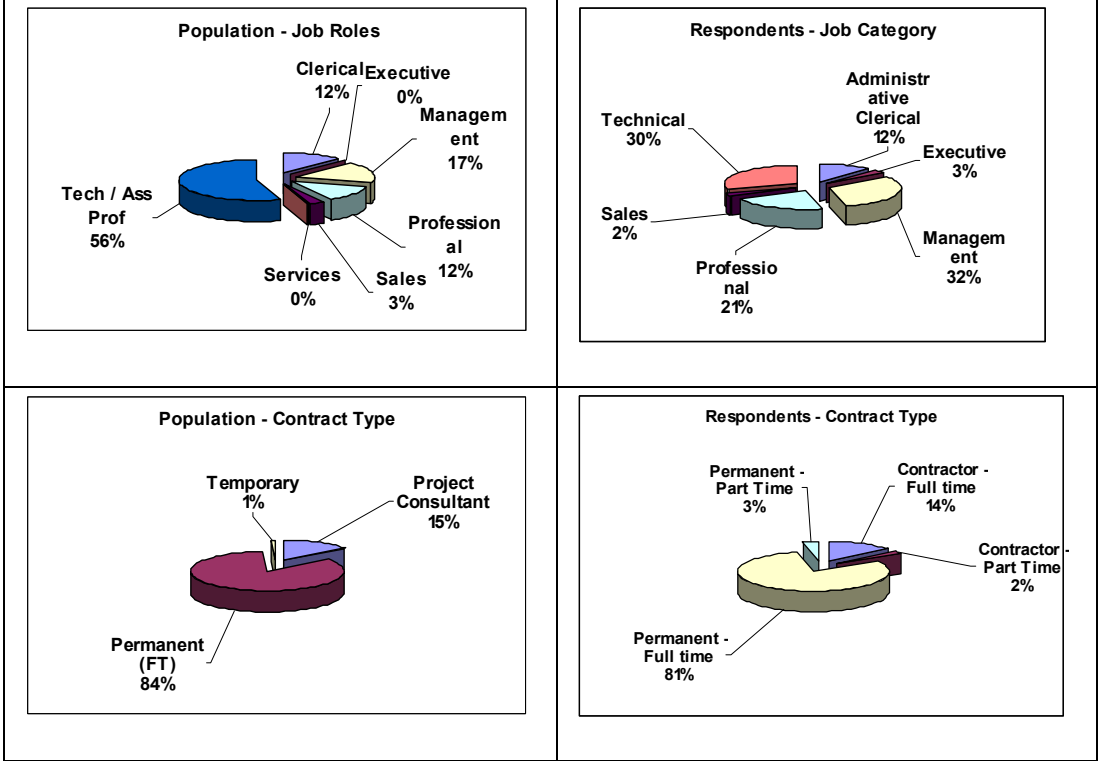
F – DETAILED SURVEY DATA

F1 - SURVEY RESPONDENTS VS POPULATION

In comparing the demographics of the respondents in the sample with those of the population, it was found that the respondents were representative of the population. This part of the comparison did not take the characteristic of "virtual work" into consideration. The results can be found in the figures below where the characteristics of gender, race, job category and contract type of the population are compared with the corresponding characteristics of the respondents.

Figure F-1: Survey: Population vs respondents





F2 - DATA TO SUPPORT P9-Q1

The transformed data from survey questions 14, 15, 17, 18, 19 and 20, was used to create a “virtual” vs “non-virtual” category. The data is presented below.

Table F-1: Virtual vs non-virtual worker split of respondents

Virtual Worker?	Number of Individuals	Percentage
YES	98	48%
NO	108	52%
TOTAL	**206**	**100%**

F3 - DATA TO SUPPORT P9-Q2

The data from survey questions 21 and 22 is used to calculate the answers for P9-Q2.

Table F-2: Number of reasons given to do virtual work

Count of number of reasons given per respondent (SQ21)	Virtual = Yes	Virtual = No	Total
0 Reasons given	2	5	7
Total (No Reasons)	**2**	**5**	**7**
1	12	22	34
2	18	15	33
3	26	24	50
4	17	17	34
5	12	15	27
6	10	6	16
7	1	1	2
8		1	1
9		1	1
10		1	1
Total (Reasons given)	**96**	**103**	**199**

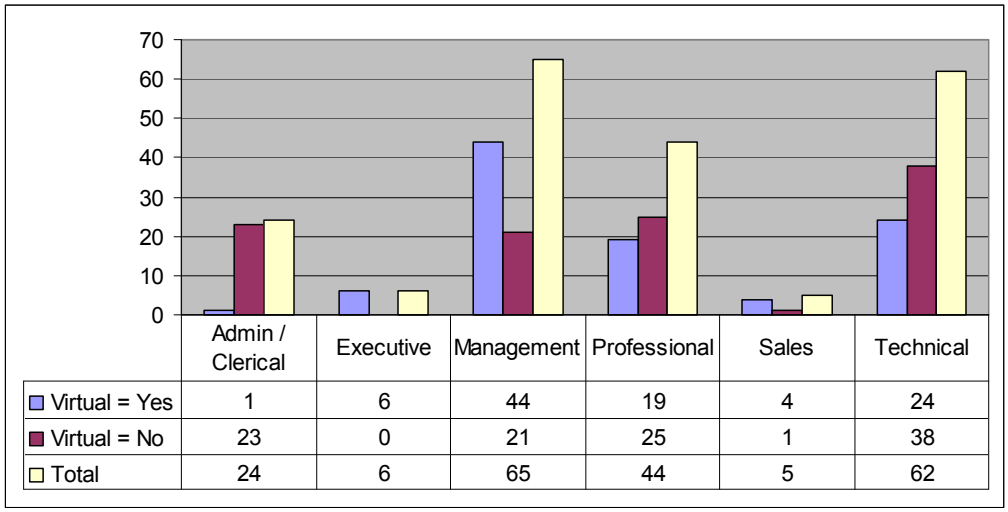
Table F-3: Number of individuals who do not want to do virtual work

Count of Respondent in SQ22j	Virtual Worker = No	Total
"I do not want to work virtual"	8	8

F4 - DATA TO SUPPORT P10

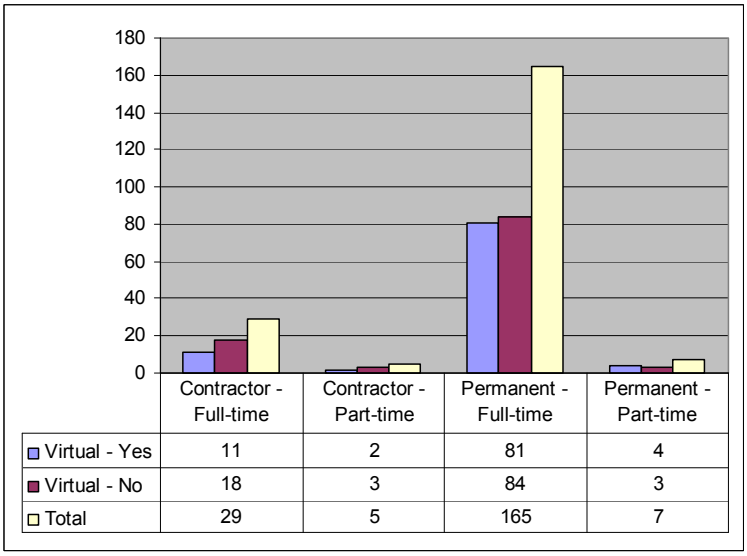
The profiles are shown for virtual workers, non-virtual workers and for the complete data set. Data from survey questions 1 to 13 is used for the calculations. In the graphs below, “Virtual = Yes” indicates a respondent classified as a virtual worker, and “Virtual = No” indicates a respondent who was not classified as a virtual worker.

Figure F-2: Job Category



	Admin / Clerical	Executive	Management	Professional	Sales	Technical
Virtual = Yes	1	6	44	19	4	24
Virtual = No	23	0	21	25	1	38
Total	24	6	65	44	5	62

Figure F-3: Type of contract



	Contractor - Full-time	Contractor - Part-time	Permanent - Full-time	Permanent - Part-time
Virtual - Yes	11	2	81	4
Virtual - No	18	3	84	3
Total	29	5	165	7

Table F-4: Responder

Age Group	Frequency	Cumulative %	Generation
17	0	0.00%	MILLENIAL
22	5	2.43%	
27	39	21.36%	
32	33	37.38%	
37	21	47.57%	XER
42	37	65.53%	
47	36	83.01%	
52	19	92.23%	
57	6	95.15%	BOOMER
62	8	99.03%	
67	2	100.00%	SILENT
More	0	100.00%	

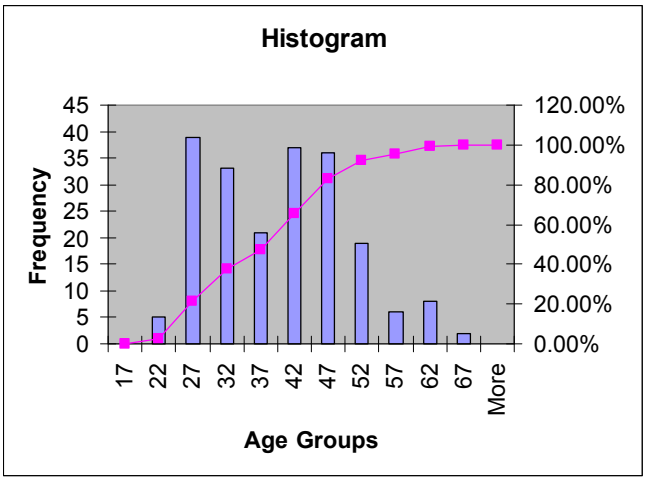


Table F-5: Generation (Transformed)

Generation	Virtual Worker = Yes	Virtual Worker = No	Total	Virtual %	Average Age
XER	45	53	98	46%	30
BOOMER	50	48	98	51%	45
SILENT	3	7	10	3%	60
Total	**98**	**108**	**206**	**of 98**	**39**

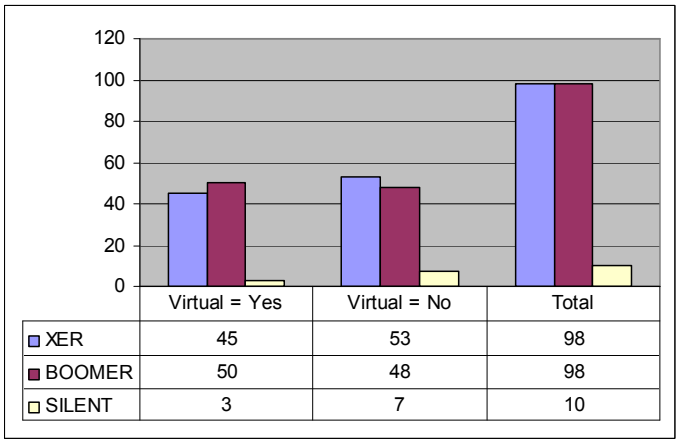
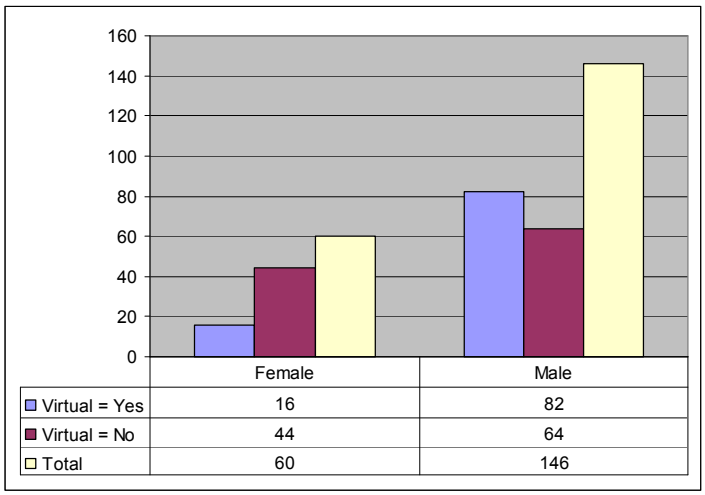
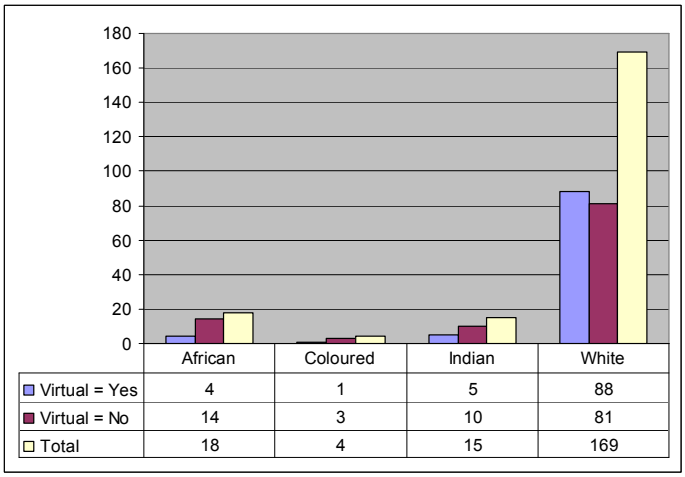


Figure F-4: Gender



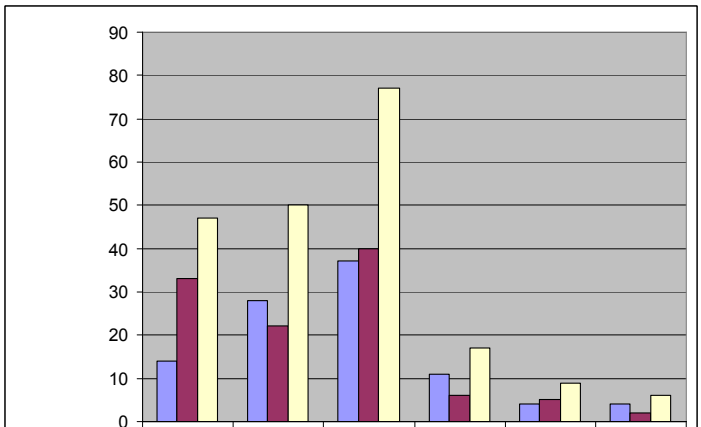
	Female	Male
Virtual = Yes	16	82
Virtual = No	44	64
Total	60	146

Figure F-5: Race



	African	Coloured	Indian	White
Virtual = Yes	4	1	5	88
Virtual = No	14	3	10	81
Total	18	4	15	169

Figure F-6: Highest qualification



	1-Matric	2-Certificate	3-Diploma	4-Degree	5-Honours	6-Masters
Virtual = Yes	14	28	37	11	4	4
Virtual = No	33	22	40	6	5	2
Total	47	50	77	17	9	6

Figure F-7: Children u

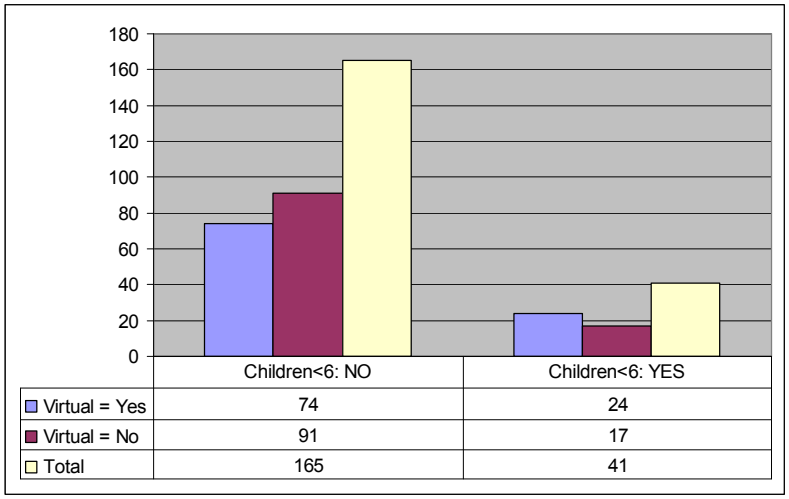


Figure F-8: Residence to primary work location: Distance

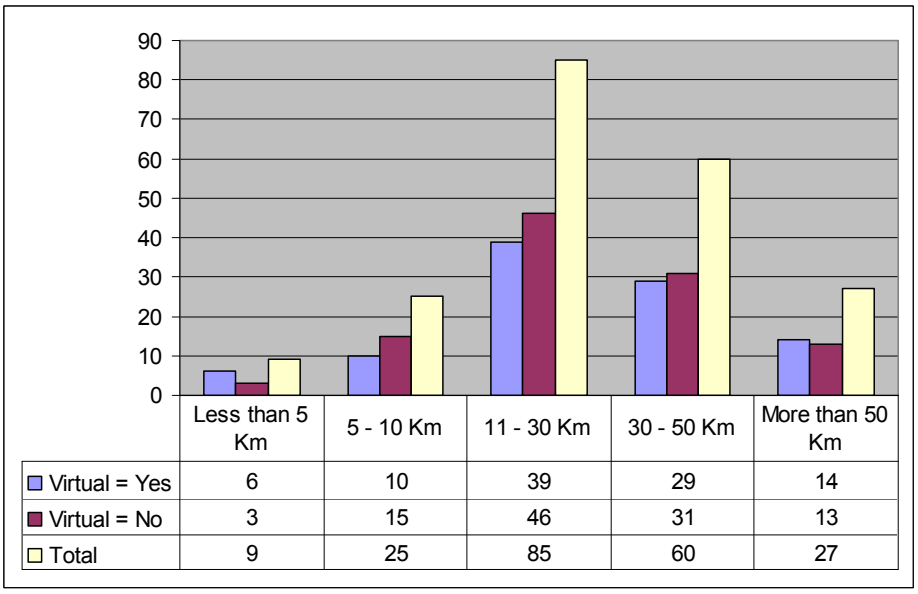


Table F-6: Hours away from Main Office Location

Virtual Worker?	Data	Number of hours
NO	Count of Respondent	108
	Average of Q15	10
	Max of Q15	60
	Min of Q15	-
YES	Count of Respondent	98
	Average of Q15	**24**
	Max of Q15	50
	Min of Q15	3
	Total Count of Respondent	206
	Total Average of Q15	17
	Total Max of Q15	60
	Total Min of Q15	-

Table F-7: %Time spe

% of time	*Freq*	*Cumulative %*	
10%	76	36.89%	37%
50%	69	70.39%	33%
74%	16	78.16%	8%
99%	13	84.47%	6%
100%	32	100.00%	16%
More	0	100.00%	0%
	206		100%

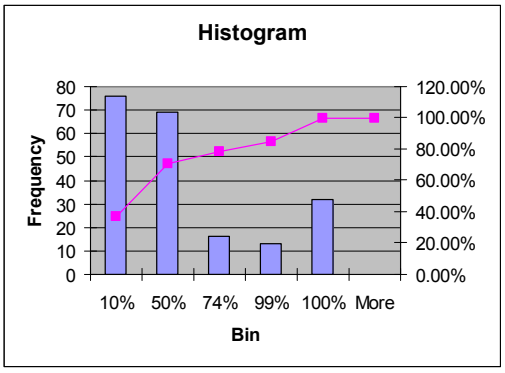
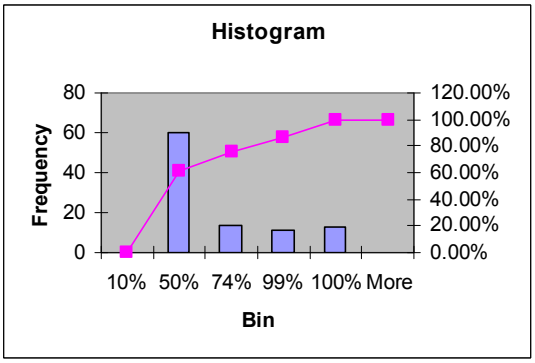


Table F-8: %Time spent working virtually (Virtual workers)

% of time	*Freq*	*Cumulative %*	*%*
10%	0	0.00%	0%
50%	60	61.22%	61%
74%	14	75.51%	14%
99%	11	86.73%	11%
100%	13	100.00%	13%
More	0	100.00%	0%
	98		



F5 - DATA TO SUPPORT P1-NH1A

The data of survey question 23 was used to check the related null hypothesis.

The linear regression excluded respondent 58, due to data inconsistency.

Table F-9: Data values for P1-NH1a

Variable	Values
Q23a	I proactively seek out and use new technologies.
Q23b	I like learning new ways to do things.
Q23c	I would like to see more technology in the workplace that allows online collaboration.
Q23d	I would like to choose the technology I use for work, and not be restricted by company policy.
Q23e	I should be paid for my outputs and not the hours I work.
Q23f	I should be able to choose my location of work.
Q23g	I prefer to interact and network simultaneously with many others.
Q23h	Social relationships (non-work related) are important to me.
Q23i	I find it easy to express myself while collaborating online.

Table F-10: Summary statistics for P1-NH1a

Variables	Observations	Obs. missing data	Obs. no missing data	Min	Max	Mean	StdDev
Q23a	205	0	205	1.000	5.000	2.010	0.834
Q23b	205	0	205	1.000	5.000	1.576	0.686
Q23c	205	0	205	1.000	5.000	1.590	0.713
Q23d	205	0	205	1.000	5.000	2.107	1.056
Q23e	205	0	205	1.000	5.000	2.151	1.094
Q23f	205	0	205	1.000	5.000	2.029	0.918
Q23g	205	0	205	1.000	5.000	2.141	0.770
Q23h	205	0	205	1.000	5.000	2.078	0.899
Q23i	205	0	205	1.000	5.000	2.156	0.789

Table F-11: Correlation matrix for P1-NHa

Variables	V-No	V-Yes	Q23a	Q23b	Q23c	Q23d	Q23e	Q23f	Q23g	Q23h	Q23i
VIRTUAL-No	**1.000**	-1.000	0.234	-0.008	0.231	0.236	0.079	0.095	-0.065	-0.004	0.053
VIRTUAL-Yes	-1.000	**1.000**	-0.234	0.008	-0.231	-0.236	-0.079	-0.095	0.065	0.004	-0.053
Q23a	0.234	-0.234	**1.000**	0.512	0.411	0.294	0.154	0.147	0.105	0.110	0.273
Q23b	-0.008	0.008	0.512	**1.000**	0.535	0.192	0.203	0.238	0.096	0.253	0.322
Q23c	0.231	-0.231	0.411	0.535	**1.000**	0.371	0.218	0.386	0.097	0.173	0.297
Q23d	0.236	-0.236	0.294	0.192	0.371	**1.000**	0.177	0.371	0.011	0.105	0.233
Q23e	0.079	-0.079	0.154	0.203	0.218	0.177	**1.000**	0.445	0.126	0.147	0.234
Q23f	0.095	-0.095	0.147	0.238	0.386	0.371	0.445	**1.000**	0.077	0.086	0.339
Q23g	-0.065	0.065	0.105	0.096	0.097	0.011	0.126	0.077	**1.000**	0.437	0.012
Q23h	-0.004	0.004	0.110	0.253	0.173	0.105	0.147	0.086	0.437	**1.000**	0.135
Q23i	0.053	-0.053	0.273	0.322	0.297	0.233	0.234	0.339	0.012	0.135	**1.000**

The highest correlation is between questions Q23b and Q23c at 0.535 which state “I like learning new ways to do things” and “I would like to see more technology in the workplace that allows online collaboration” respectively.

Table F-12: Analysis of variance: One-factor analysis (P1-NHa)

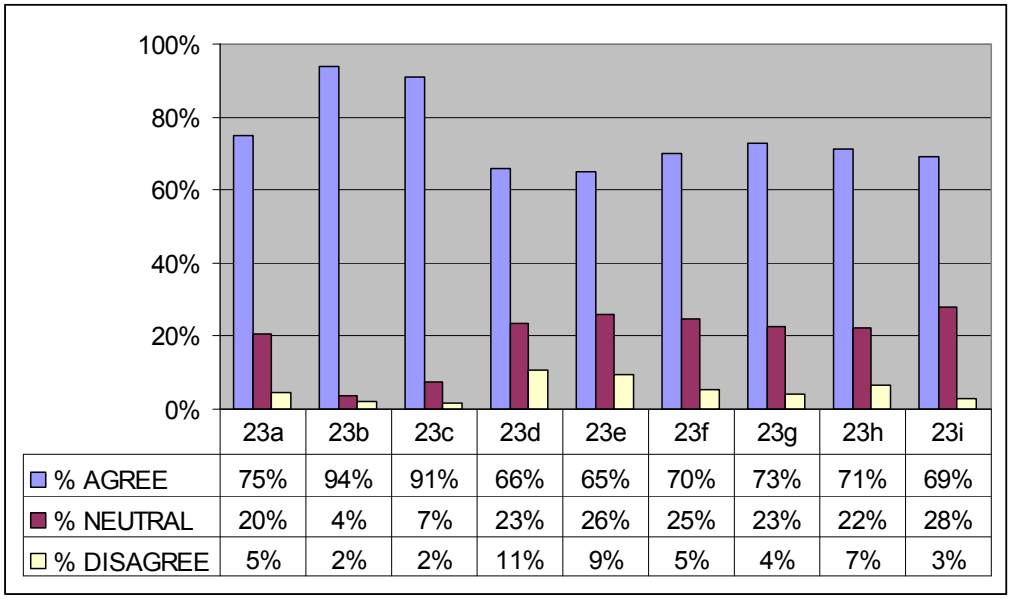
	Sum of Squares	Degrees of Freedom	Mean Square	F	P
Between Groups	127.4092683	9	14.15658537	19.9275775	2.15698E-32
Within Groups	1449.219512	2040	0.710401722		
Total	1576.62878	2049	0.769462558		

Bartlett-Test for homogeneity of variances			
	Chi-square	**Degrees of Freedom (DF)**	**P**
	173.023897	9	1.44604E-32

Table F-13: Histogram data for needs concerning virtual work

QUESTION	WORDING	% AGREE	% NEUTRAL	% DISAGREE
23a	I proactively seek out and use new technologies.	75%	20%	5%
23b	I like learning new ways to do things.	94%	4%	2%
23c	I would like to see more technology in the workplace that allows online collaboration.	91%	7%	2%
23d	I would like to choose the technology I use for work, and not be restricted by company policy.	66%	23%	11%
23e	I should be paid for my outputs and not the hours I work.	65%	26%	9%
23f	I should be able to choose my location of work.	70%	25%	5%
23g	I prefer to interact and network simultaneously with many others.	73%	23%	4%
23h	Social relationships (non-work related) are important to me.	71%	22%	7%
23i	I find it easy to express myself while collaborating online.	69%	28%	3%

Figure F-9: Histogram for needs concerning virtual work



F6 - DATA TO SUPPORT P1-NH1B

Data from survey question 23 was used to test this hypothesis, by linking it to the generational groupings. The data values for P1-NH1b are the same as the data values for P1-NH1a (refer to Table F-9: Data values for P1-NH1a).

Table F-14: Summary statistics for P1-NH1b

Variable	Obs	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. deviation
Q23a	205	0	205	1.000	5.000	2.010	0.834
Q23b	205	0	205	1.000	5.000	1.576	0.686
Q23c	205	0	205	1.000	5.000	1.590	0.713
Q23d	205	0	205	1.000	5.000	2.107	1.056
Q23e	205	0	205	1.000	5.000	2.151	1.094
Q23f	205	0	205	1.000	5.000	2.029	0.918
Q23g	205	0	205	1.000	5.000	2.141	0.770
Q23h	205	0	205	1.000	5.000	2.078	0.899
Q23i	205	0	205	1.000	5.000	2.156	0.789

Table F-15: Correlation matrix for P1-NHb

Variables	X	B	S	Q23a	Q23b	Q23c	Q23d	Q23e	Q23f	Q23g	Q23h	Q23i
XER	**1.000**	-0.907	-0.217	-0.070	-0.148	-0.135	-0.051	0.100	0.023	-0.125	-0.192	-0.078
BOOMER	-0.907	**1.000**	-0.215	0.095	0.159	0.120	0.024	-0.060	-0.073	0.118	0.125	0.035
SILENT	-0.217	-0.215	**1.000**	-0.057	-0.025	0.035	0.063	-0.094	0.116	0.017	0.157	0.099
Q23a	-0.070	0.095	-0.057	**1.000**	0.512	0.411	0.294	0.154	0.147	0.105	0.110	0.273
Q23b	-0.148	0.159	-0.025	0.512	**1.000**	0.535	0.192	0.203	0.238	0.096	0.253	0.322
Q23c	-0.135	0.120	0.035	0.411	0.535	**1.000**	0.371	0.218	0.386	0.097	0.173	0.297
Q23d	-0.051	0.024	0.063	0.294	0.192	0.371	**1.000**	0.177	0.371	0.011	0.105	0.233
Q23e	0.100	-0.060	-0.094	0.154	0.203	0.218	0.177	**1.000**	0.445	0.126	0.147	0.234
Q23f	0.023	-0.073	0.116	0.147	0.238	0.386	0.371	0.445	**1.000**	0.077	0.086	0.339
Q23g	-0.125	0.118	0.017	0.105	0.096	0.097	0.011	0.126	0.077	**1.000**	0.437	0.012
Q23h	-0.192	0.125	0.157	0.110	0.253	0.173	0.105	0.147	0.086	0.437	**1.000**	0.135
Q23i	-0.078	0.035	0.099	0.273	0.322	0.297	0.233	0.234	0.339	0.012	0.135	**1.000**

Table F-16: Comparis

Q4	Average of Q23a	Average of Q23b	Average of Q23c	Average of Q23d	Average of Q23e
XER	1.948979592	1.469387755	1.489795918	2.051020408	2.265306122
BOOMER	2.091836735	1.683673469	1.673469388	2.12244898	2.071428571
SILENT	1.8	1.5	1.7	2.4	1.7
Overall Average	**2.009708738**	**1.572815534**	**1.587378641**	**2.101941748**	**2.145631068**
	I proactively seek out and use new technologies.	*I like learning new ways to do things.*	*I would like to see more technology in the workplace that allows online collaboration.*	*I would like to choose the technology I use for work, and not be restricted by company policy.*	*I should be paid for my outputs and not the hours I work.*

Q4	Average of Q23f	Average of Q23g	Average of Q23h	Average of Q23i	Overall Average
XER	2.051020408	2.040816327	1.897959184	2.091836735	**1.922902**
BOOMER	1.969387755	2.234693878	2.193877551	2.183673469	**2.024943**
SILENT	2.5	2.2	2.7	2.5	**2.111111**
Overall Average	**2.033980583**	**2.140776699**	**2.077669903**	**2.155339806**	
	I should be able to choose my location of work.	*I prefer to interact and network simultaneously with many others.*	*Social relationships (non-work related) are important to me.*	*I find it easy to express myself while collaborating online.*	

F7 - DATA TO SUPPORT P1-Q1 TO P1-Q6

The data of survey questions 21 and 22 is used to calculate the answers for proposition 1 questions 1 to 6. In the tables and graphs below, “Virtual = Yes” indicates a respondent classified as a virtual worker, and “Virtual = No” indicates a respondent who was not classified as a virtual worker.

Table F-17: Number o irtual status)

Virtual Worker?	Numbers	Total
NO (108)	Total reasons selected by all respondents	337
	Average per respondent	3
	Max per respondent	10
	Min per respondent	0
YES (98)	Total reasons selected by all respondents	321
	Average per respondent	3
	Max per respondent	7
	Min per respondent	0
	Total Sum	**658**
	Total Average	**3**
	Total Max	**10**
	Total Min	**0**

Table F-18: Number of reasons to increase working virtually (Generation)

Generation	Reasons	Total
XER	Total reasons selected by all respondents	315
	Average per respondent	3
	Max per respondent	10
	Min per respondent	0
BOOMER	Total reasons selected by all respondents	320
	Average per respondent	3
	Max per respondent	9
	Min per respondent	0
SILENT	Total reasons selected by all respondents	23
	Average per respondent	2
	Max per respondent	6
	Min per respondent	1
	Total Sum	**658**
	Total Average	**3**
	Total Max	**10**
	Total Min	**0**

Table F-19: Reasons to increase working virtually (Virtual status)

Survey Question 21 List Items	VIRTUAL = YES	VIRTUAL = NO	Total
k) To cut down on travel time	79	83	162
b) To work without disruptions	65	51	116
i) To cut down on personal stress	43	45	88
h) In order to live where I want	38	36	74
g) For financial reasons	22	34	56
e) To find privacy when working	41	31	72
a) To accommodate child care	16	20	36
f) Because of personal emergencies	6	16	22
c) For ecological reasons	8	11	19
d) Because of company incentives	2	6	8
j) To accommodate a disability	1	4	5

Table F-20: Reasons t

QUESTION 21 - Reasons to do virtual work	XER	BOOMER	SILENT
To cut down on travel time	74	80	8
To work without disruptions	53	59	4
In order to live where I want	38	33	3
To cut down on personal stress	36	49	3
To find privacy when working	30	39	3
For financial reasons	29	25	2
To accommodate child care	24	12	
Because of personal emergencies	12	10	
For ecological reasons	7	12	
Because of company incentives	7	1	
To accommodate a disability	5		

Table F-21: Number of reasons preventing virtual work (Virtual status)

Virtual Worker	Numbers	Total
NO (108)	Total reasons selected by all respondents	228
	Average per respondent	2
	Max per respondent	7
	Min per respondent	0
YES (98)	Total reasons selected by all respondents	244
	Average per respondent	2
	Max per respondent	7
	Min per respondent	0
	Total Sum	**472**
	Total Average	**2**
	Total Max	**7**
	Total Min	**0**

Table F-22: Number of reasons preventing virtual work (Generation)

Generation	Reasons	Total
XER	Total reasons selected by all respondents	209
	Average per respondent	2
	Max per respondent	7
	Min per respondent	1
BOOMER	Total reasons selected by all respondents	242
	Average per respondent	2
	Max per respondent	7
	Min per respondent	0
SILENT	Total reasons selected by all respondents	21
	Average per respondent	2
	Max per respondent	7
	Min per respondent	1
	Total Sum	**472**
	Total Average	**2**
	Total Max	**7**
	Total Min	**0**

Table F-23: Reasons preventing virtual work (Virtual status)

Question 22 List Items	VIRTUAL = YES	VIRTUAL = NO	Total
c) Nature of job demands onsite presence	61	62	123
f) Interaction required with fellow-employees	42	40	82
d) Insufficient company policies	38	29	67
a) Technology not sufficient	26	23	49
g) Feelings of guilt when not "onsite"	20	16	36
b) Business applications not available	16	16	32
e) Immediate manager is not supportive	14	9	23
i) Feeling too isolated when working remotely	11	10	21
k) I work virtually often enough	11	8	19
h) Home conditions not suitable	4	7	11
j) I do not want to work virtually	1	8	9

Table F-24: Reasons preventing virtual work (Generation)

Survey Question 22 Detail	XER	BOOMER	SILENT
Nature of job demands onsite presence	59	59	5
Interaction required with fellow-employees	31	48	3
Technology not sufficient	27	18	4
Insufficient company policies	26	38	3
Feelings of guilt when not "onsite"	18	16	2
Business applications not available	12	20	
Feeling too isolated when working remotely	10	10	1
I work virtually often enough	10	8	1
Immediate manager is not supportive	9	13	1
Home conditions not suitable	4	6	1
I do not want to work virtually	3	6	

F8 - DATA TO SUPPORT P3-NH1

The data from survey question 26 was used to test this null hypothesis.

Table F-25: The generations of managers of virtual workers

Variable	Categories	Frequencies	%
Generational Age Groupings	XER	26	26.531
	BOOMER	72	73.469

Table F-26: Summary statistics (P3-NH1)

Variable	Obs	Obs. with missing data	Obs. without missing data	Min	Max	Mean	Std. deviation
(26a) I am given a considerable amount of freedom to adopt my own approach to my job.	98	0	98	1.000	5.000	1.929	0.933
(26b) I am allowed to work flexible hours.	98	0	98	1.000	5.000	2.286	1.015
(26c) I am allowed to select my location of work.	98	0	98	1.000	5.000	3.265	1.223
(26d) My job outcomes are clearly defined.	98	0	98	1.000	5.000	2.347	0.985
(26e) My manager trusts me.	98	0	98	1.000	5.000	1.969	0.818
(26f) My immediate manager uses technology for online collaboration.	98	0	98	1.000	5.000	2.459	1.095
(26g) My manager often works in a different location to where I work.	98	0	98	1.000	5.000	2.133	1.265

Table F-27: Correlation matrix (P3-NH1)

Variables	Q24b-1	Q24b-2	Q26a	Q26b	Q26c	Q26d	Q26e	Q26f	Q26g
Q24b-1 (Xer)	**1.000**	-1.000	0.046	-0.010	-0.093	0.047	-0.176	-0.062	0.010
Q24b-2 (Boomer)	-1.000	**1.000**	-0.046	0.010	0.093	-0.047	0.176	0.062	-0.010
(26a) I am given a considerable amount of freedom to adopt my own approach to my job.	0.046	-0.046	**1.000**	0.424	0.405	0.363	0.375	0.335	0.218
(26b) I am allowed to work flexible hours.	-0.010	0.010	0.424	**1.000**	0.478	0.230	0.333	0.317	0.387
(26c) I am allowed to select my location of work.	-0.093	0.093	0.405	0.478	**1.000**	0.333	0.245	0.177	0.290
(26d) My job outcomes are clearly defined.	0.047	-0.047	0.363	0.230	0.333	**1.000**	0.525	0.510	0.128
(26e) My manager trusts me.	-0.176	0.176	0.375	0.333	0.245	0.525	**1.000**	0.430	0.253
(26f) My immediate manager uses technology for online collaboration.	-0.062	0.062	0.335	0.317	0.177	0.510	0.430	**1.000**	0.417
(26g) My manager often works in a different location to where I work.	0.010	-0.010	0.218	0.387	0.290	0.128	0.253	0.417	**1.000**

Table F-28: Analysis of variance (P3-NH1)

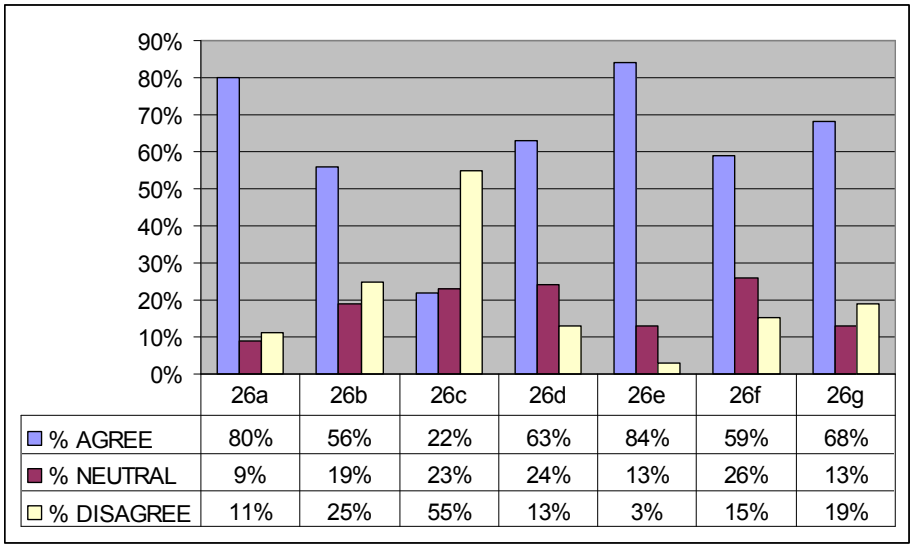
	Sum of Squares	Degrees of Freedom	Mean Square	F	P
Between Groups	151.3877551	7	21.62682216	21.53168951	1.2242E-26
Within Groups	779.4285714	776	1.004418262		
Total	930.8163265	783	1.188782026		

Bartlett-Test for homogeneity of variances			
	Chi-square	**Degrees of Freedom (DF)**	**P**
	110.5092624	7	7.19941E-21

Table F-29: Histogran 's

QUESTION	WORDING	% AGREE	% NEUTRAL	% DISAGREE
26a	I am given a considerable amount of freedom to adopt my own approach to my job.	80%	9%	11%
26b	I am allowed to work flexible hours.	56%	19%	25%
26c	I am allowed to select my location of work.	22%	23%	55%
26d	My job outcomes are clearly defined.	63%	24%	13%
26e	My immediate manager uses technology for online collaboration.	84%	13%	3%
26f	My manager often works in a different location to where I work.	59%	26%	15%
26g	My manager trusts me.	68%	13%	19%

Figure F-10: Histogram for perceptions regarding managers



	26a	26b	26c	26d	26e	26f	26g
% AGREE	80%	56%	22%	63%	84%	59%	68%
% NEUTRAL	9%	19%	23%	24%	13%	26%	13%
% DISAGREE	11%	25%	55%	13%	3%	15%	19%

F9 - DATA TO SUPPORT P4-NH1

The data from survey question 25 is used to test this null hypothesis. In the tables presented below, "Virtual = Yes" indicates a respondent classified as a virtual worker, and "Virtual = No" indicates a respondent who was not classified as a virtual worker.

Table F-30: Generation of managers of virtual workers

Variable	Categories	Frequencies	%
VIRTUAL WORKER	No	107	52.195
	Yes	98	47.805

Table F-31: Summary statistics (P4-NH1)

Variable	Observations	Obs. with missing data	Obs. without missing data	Minimum	Maximum	Mean	Std. deviation
Period as subordinate Immediate manager	205	0	205	1.000	5.000	1.634	0.740

Table F-32: Correlation matrix (P4-NH1)

Variables	VIRTUAL - No	VIRTUAL -Yes	Q25
VIRTUAL - No	**1.000**	-1.000	0.015
VIRTUAL - Yes	-1.000	**1.000**	-0.015
Period as subordinate of immediate manager	0.015	-0.015	**1.000**

Table F-33: Analysis of variance (P4-NH1)

	Sum of Squares	Degrees of Freedom	Mean Square	F	P
Between Groups	0.062789409	1	0.062789409	0.112999646	0.737100092
Within Groups	113.3546863	204	0.555660227		
Total	113.4174757	205	0.553255979		

Bartlett-Test for homogeneity of variances			
	Chi-square	Degrees of Freedom (DF)	P
	2.647649558	1	0.103703133

F10 - DATA TO [illegible]

The data from survey question 26e is used to test this null hypothesis. In the tables presented below, "Virtual = Yes" indicates a respondent classified as a virtual worker, and "Virtual = No" indicates a respondent who was not classified as a virtual worker.

Table F-34: Summary statistics (P4-NH2)

Variable	Obs	Obs. with missing data	Obs. Without missing data	Minimum	Maximum	Mean	Std. deviation
My manager trusts me	205	0	205	1.000	5.000	1.927	0.840

Table F-35: Correlation matrix (P4-NH2)

Variables	VIRTUAL = No	VIRTUAL = Yes	Q26e
VIRTUAL - No	**1.000**	-1.000	-0.049
VIRTUAL - Yes	-1.000	**1.000**	0.049
(26e) My manager trusts me.	-0.049	0.049	**1.000**

Table F-36: Analysis of variance (P4-NH2)

	Sum of Squares	Degrees of Freedom	Mean Square	F	P
Between Groups	0.332937058	1	0.332937058	0.473057568	0.492365172
Within Groups	143.5748299	204	0.703798186		
Total	143.907767	205	0.701989107		

Bartlett-Test for homogeneity of variances			
	Chi-square	**Degrees of Freedom (DF)**	**P**
	0.223860615	1	0.636113938

APPENDIX G

G - TEAM SCORES

The assessment framework, as based on the template in E3 - Team Assessment Framework was used to rate each team. The scorecard for each team has been documented below.

Table G-1: Team 1 scorecard

TEAM 1	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W*R)	
Collaboration - Schedules / Timing	20%	2	Schedules available via outlook, informal arrangement about which days for meetings.	0.4	Process Maturity
Collaboration - Process / Rules	15%	3	Procedures for incident management; rules for project management; No other explicit rules.	0.45	
Collaboration - Measure of Productivity / output	15%	4	High focus on definition of deliverables, key performance indicators and metrics.	0.6	
Socialisation - Group Norms	25%	2	Group norms have been recognised implicitly but not documented. Subconscious application of norms through individuals knowing each other.	0.5	
Communication - Technology	25%	4	Technology managed centrally.	1	**2.95**
Collaboration - Collective Action	20%	2	Focus on individual deliverables; less importance on collective action.	0.4	Team virtuality
Socialisation - Participation	15%	2	Recognise that knowledge sharing needs to happen, but no formalised procedures; sharing not always taking place in virtual environment.	0.3	
Socialisation - Teamness	15%	3	This is mainly attained via Face-to-Face interaction; written communication does include this information, sharing jokes, etc.	0.45	
Socialisation - How much time spent virtually?	20%	3	Some team members, work from home on selected days - 1 day a week, 1 day every 2 weeks. No regular arrangement. More supplementing than substituting. The team is virtual from the customer's point of view.	0.6	
Communication - Language / Understanding	15%	4	English used as business language; Common understanding based on prior knowledge - individuals have met face-to-face	0.6	
Communication - Use of Technology	15%	4	Using portal, collaboration tool, and others; accessing all work-related tools remotely.	0.6	**2.95**
TOTAL	**200%**	**33**	**Total**	**5.9**	

Table G-2: Team 2 sc

TEAM 2	Weight (W)	Rating (R)	Comment / Motivation for Rating	Final (W * R)	
Collaboration - Schedules / Timing	20%	2	Using Outlook to co-ordinate schedules and collaboration tool for presence information; no formal agreement on which days to work virtually; nothing formally documented.	0.4	Process Maturity
Collaboration - Process / Rules	15%	3	Working according to milestones; no specific rules or procedures, except for documented incident management procedures.	0.45	
Collaboration - Measure of Productivity / output	15%	3	Individuals have specified deliverables, and importance of deliverables is crucial, but not always documented in a performance agreement.	0.45	
Socialisation - Group Norms	25%	2	Group norms are implicit; no written rules, but there is a common understanding of what is acceptable, based on indiviudals knowing each other.	0.5	
Communication - Technology	25%	4	Various forms of technology available and managed centrally.	1	**2.80**
Collaboration - Collective Action	20%	2	Deliverables are completed by individuals most of the time.	0.4	Team virtuality
Socialisation - Participation	15%	3	Most of the sharing takes place via collaboration tool; or else in face-to-face sessions.	0.45	
Socialisation - Teamness	15%	3	A lot of communication takes place via text (email or collaboration tool). Use of emoticons prevalent. Good understanding of roles.	0.45	
Socialisation - How much time spent virtually?	20%	2	Most team members, work from home on various days. Actual support staff (not included in calc) work from the office. Not more than 1-2 days per week or 1 day in 2 weeks.	0.4	
Communication - Language / Understanding	15%	4	English used as business language; Common understanding based on prior knowledge - individuals have met face-to-face	0.6	
Communication - Use of Technology	15%	4	Various forms of technology available and actively used..	0.6	**2.90**
TOTAL	**200%**	**32**	**Total**	**5.7**	

Table G-3: Team 3 sc

TEAM 3	Weight (W)	Rating (R)	Comment / Motivation for Rating	Final (Weight * Rating)	
Collaboration - Schedules / Timing	20%	3	Quarterly meetings planned for face-to-face; using collaboration tool to determine presence	0.6	Process Maturity
Collaboration - Process / Rules	15%	2	No documented rules for the team; adhering to practices; no corporate policies; individuals are mature and self-driven; the team has been working together long enough to have established a common understanding of processes / rules. (The team feels they are more successful because there are fewer documented rules.)	0.3	
Collaboration - Measure of Productivity / output	15%	4	Deliverable driven; high level targets in performance appraisals; high importance on deliverables.	0.6	
Socialisation - Group Norms	25%	2	Group norms seem to be well established, but once again not formally documented; implicit understanding of what is acceptable, and what not.	0.5	
Communication - Technology	25%	4	Various forms of technology available; technology managed centrally.	1	**3.00**
Collaboration - Collective Action	20%	3	Collaborative work between individuals not always required, but need to ensure that similar direction is given between plants.	0.6	Team virtuality
Socialisation - Participation	15%	4	There is a sense of belonging in the team, but due to nature of work, do not always feel they belong in the division.	0.6	
Socialisation - Teamness	15%	5	High sense of “teamness”.	0.75	
Socialisation - How much time spent virtually?	20%	4	All team members work remotely from each other as they are geographically distributed; they are not traditional office workers but would spend most of the time at and office location; also supplementing. May spend 1 day per week at home.	0.8	
Communication - Language / Understanding	15%	4	English as the business language; feel comfortable in expressing emotions online.	0.6	
Communication - Use of Technology	15%	5	Various forms of technology is actively used; actively seeking out additional technology to improve productivity.	0.75	**4.10**
TOTAL	**200%**	**40**	**Total**	**7.1**	

Table G-4: Team 4 sc

TEAM 4	Weight (W)	Rating (R)	Comment / Motivation for Rating	Final (Weight * Rating)	
Collaboration - Schedules / Timing	20%	3	Little interaction required; quarterly meetings; formally agreed.	0.6	Process Maturity
Collaboration - Process / Rules	15%	5	Highly proceduralised environment due to occupational health regulations.	0.75	
Collaboration - Measure of Productivity / output	15%	5	If the team does not deliver, there are legal consequences.	0.75	
Socialisation - Group Norms	25%	3	Implicit group norms, code of conduct in the service environment e.g., must always be friendly.	0.75	
Communication - Technology	25%	4	Technology is managed centrally.	1	**3.85**
Collaboration - Collective Action	20%	3	Deliverables are documented, all must subscribe to the same rules; but output delivered on individual basis.	0.6	Team virtuality
Socialisation - Participation	15%	2	Feelings of isolation prevalent; Do share but on ad hoc basis.	0.3	
Socialisation - Teamness	15%	3	Due to the nature of individuals, they express their emotions quite vigorously.	0.45	
Socialisation - How much time spent virtually?	20%	2	All team members work remote from each other. One team member per site, and sometimes team members have more than one site. Fixed hours on site. Very limited work from home. Cannot work remotely from the customer.	0.4	
Communication - Language / Understanding	15%	3	English used as business language; use of medical terminology.	0.45	
Communication - Use of Technology	15%	2	Not so technology dependent; not using this as key means of team interaction.	0.3	**2.50**
TOTAL	**200%**	**35**	**Total**	**6.35**	

Table G-5: Team 5 sc

TEAM 5	Weight (W)	Rating (R)	Comment / Motivation for Rating	Final (Weight * Rating)	
Collaboration - Schedules / Timing	20%	2	No fixed schedules for contact; only contact if needed; timing differences between countries not a barrier.	0.4	Process Maturity
Collaboration - Process / Rules	15%	4	Processes have been defined, and are being executed within these frameworks.	0.6	
Collaboration - Measure of Productivity / output	15%	2	No formally documented performance measures, but clear understanding of output.	0.3	
Socialisation - Group Norms	25%	2	Implicit understanding of group norms based on the relationship between the individuals; nothing documented.	0.5	
Communication - Technology	25%	3	Mostly corporate infrastructure, establishing additional connectivity and tools.	0.75	**2.55**
Collaboration - Collective Action	20%	3	Collective action was required to establish the initial setup; combined decision on appointment of staff.	0.6	Team virtuality
Socialisation - Participation	15%	4	High participation amongst team members; learning from each other.	0.6	
Socialisation - Teamness	15%	4	Mature communication based on understanding of each other; good sense of cohesion	0.6	
Socialisation - How much time spent virtually?	20%	5	One team member in UK, other two in SA; SA team members sometimes work from home.	1	
Communication - Language / Understanding	15%	4	Common understanding, English as language.	0.6	
Communication - Use of Technology	15%	2	Only making use of telephone and emails; other systems not established yet, still issues with resource sharing.	0.3	**3.70**
TOTAL	**200%**	**35**	**Total**	**6.25**	

Table G-6: Team 6 sc

TEAM 6	Weight (W)	Rating (R)	Comment / Motivation for Rating	Final (Weight * Rating)	
Collaboration - Schedules / Timing	20%	3	Formally agreed meetings to get together; rest ad hoc - deliverable driven.	0.6	Process Maturity
Collaboration - Process / Rules	15%	5	High level of procedural definition, of critical importance to the organisation.	0.75	
Collaboration - Measure of Productivity / output	15%	4	Performance agreements are formally managed. (Overall deliverable is system stability and availability)	0.6	
Socialisation - Group Norms	25%	2	Implicit, but common understanding of what is acceptable; based on trust and respect.	0.5	
Communication - Technology	25%	3	The team feels that this is not where it should be - objective of team is to implement additional technologies and governance.	0.75	**3.20**
Collaboration - Collective Action	20%	4	Do find that collective action is required to make sure that the system is available; teams assist each other, although they have different areas of responsibility.	0.8	Team virtuality
Socialisation - Participation	15%	3	Learning from each other takes place; sharing of information and processes.	0.45	
Socialisation - Teamness	15%	4	Culture of dedication in the team; pride in work.	0.6	
Socialisation - How much time spent virtually?	20%	4	Teams spend time away from each other, individuals mainly work on site, but not necessarily; more junior members would spend more time on site, as customer interaction required.	0.8	
Communication - Language / Understanding	15%	3	English used as business language; common understanding due to individuals knowing each other.	0.45	
Communication - Use of Technology	15%	2	Could make use of technology more; no specific online collaboration tools used.	0.3	**3.40**
TOTAL	**200%**	**37**	**Total**	**6.6**	

Table G-7: Team 7 sc

TEAM 7	Weight (W)	Rating (R)	Comment / Motivation for Rating	Final (Weight * Rating)	
Collaboration - Schedules / Timing	20%	4	Documented rules about schedule availability	0.8	Process Maturity
Collaboration - Process / Rules	15%	5	Documented rules about home work, team work, etc	0.75	
Collaboration - Measure of Productivity / output	15%	4	High measure of deliverable definition, and measurement on output.	0.6	
Socialisation - Group Norms	25%	4	Group norms also prescribed by company standards for virtual work.	1	
Communication - Technology	25%	5	Very specific rules around technology and how to use it.	1.25	**4.40**
Collaboration - Collective Action	20%	3	Mostly individual deliverables	0.6	Team Virtuality
Socialisation - Participation	15%	3	Small team only	0.45	
Socialisation - Teamness	15%	3	Small team only	0.45	
Socialisation - How much time spent virtually?	20%	4	Most of time, if the type of work permits.	0.8	
Communication - Language / Understanding	15%	3	English as business language.	0.45	
Communication - Use of Technology	15%	4	Technology used as far as possible.	0.6	**3.35**
TOTAL	**200%**	**42**	**Total**	**7.75**	

APPENDIX H

H - ORGANISATIONAL SCORING

The organisations were all scored according to the template provided in Appendix D2 - Organisational Assessment Framework. The details for each company can be found below.

Table H-1: Organisation 1 scorecard

COMPANY 1	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W * R)
Need	20%	3	Seem to be getting many requests from IT-related areas, but not from organisation in general.	0.6
Practicality	20%	2	Manufacturing company; but do have knowledge workers; issue with unions	0.4
Readiness - Technology / Applications	30%	4	Various tools to support remote access and virtuality are in place, such as Citrix portal, LCS, Connectivity	1.2
Readiness - Policy	30%	3	Have policy for Europe; busy with POC	0.9
TOTAL	**100%**	**12**		**3.1**

Table H-2: Organisation 2 scorecard

COMPANY 2	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W * R)
Need	20%	3	Require this for Outsourcing; IT manager receives many requests in general; HR manager receives requests in cycles. Needs do not seem to be raised to the correct level. Prevalence deemed to be low.	0.6
Practicality	20%	4	Is practical, because of industry.	0.8
Readiness - Technology / Applications	30%	3	Most applications moving to central availability.	0.9
Readiness - Policy	30%	2	Only policies for remote connectivity and flexible hours; no specific other policies.	0.6
TOTAL	**100%**	**12**		**2.9**

Table H-3: Organisati

COMPANY 3	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W * R)
Need	20%	4	CIO perception is that there is a high need; HR manager receiving few requests; low prevalence but busy with project.	0.8
Practicality	20%	3	Would not be practical on shop floor, but various divisions will need it.	0.6
Readiness - Technology / Applications	30%	4	Most applications in place and additional applications / technology planned. From HR side, feel that everything not in place yet.	1.2
Readiness - Policy	30%	1	No specific policies in place yet. Only policy is related to maternity leave"	0.3
TOTAL	**100%**	**12**		**2.9**

Table H-4: Organisation 4 scorecard

COMPANY 4	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W * R)
Need	20%	4	Receiving many requests, especially in certain areas. Dependent on direct management support; 17% of organisation perceived as working virtual.	0.8
Practicality	20%	4	Would be practical as large component of product abstract, and also branches were "administrative" support required are dispersed.	0.8
Readiness - Technology / Applications	30%	4	Can access all systems remotely given correct equipment and software.	1.2
Readiness - Policy	30%	5	Policies in place for 8 years - not everybody aware of this or using it. Policy is very prescriptive and detailed. Lots of executive support	1.5
TOTAL	**100%**	**17**		**4.3**

Table H-5: Organisati

COMPANY 5	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W * R)
Need	20%	2	Do not seem to get many requests; driven by safety and dispersed geography of the organisation.	0.4
Practicality	20%	2	Only practical for knowledge workers and Sales, not necessarily on shop floor.	0.4
Readiness - Technology / Applications	30%	3	Do have technology supporting remote work; also video-conferencing.	0.9
Readiness - Policy	30%	1	No specific policies in place	0.3
TOTAL	**100%**	**8**		**2**

Table H-6: Organisation 6 scorecard

COMPANY 6	Weight (W)	Rating (R)	Comment / Motivation for score	Final (W * R)
Need	20%	2	Low number of requests both on HR and IT side; 50% of the 400 senior managers have ability to work remote via 3G	0.4
Practicality	20%	2	Manufacturing company; practical for execs and to enable remote connectivity	0.4
Readiness - Technology / Applications	30%	2	Do have basic applications and technology in place to enable remote work	0.9
Readiness - Policy	30%	1	No specific policies in place; HR not ready; leaders not deemed to be ready	0.6
TOTAL	**100%**	**8**		**2**

APPENDIX I

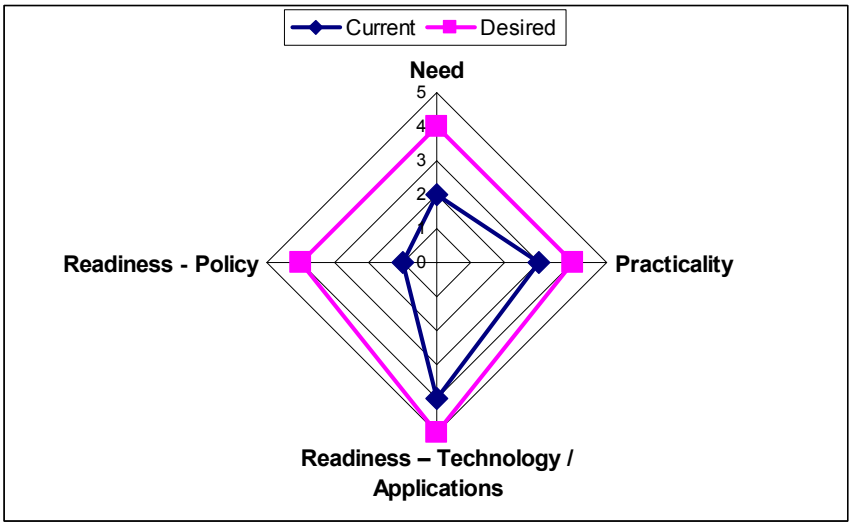
I - ORGANISATIONAL ASSESSMENT STEPS

I1 - ORGANISATIONAL ASSESSMENT PROCESS

To improve the chances of success for a virtual workplace, the organisation should complete the steps listed below.

1. Critically evaluate the organisation in terms of its virtuality status, by using the virtuality assessment framework to determine a current status or virtuality score.
2. Once the existing score has been determined, a desired status should be established, by taking the overall strategy of the organisation into account. This can be depicted on a spider diagram – see example below.
3. Design the organisational change intervention(s) required to move from the current to the desired level for each category.

Figure I-1: Organisational assessment example



I2 - IMPROVING THE ORGANISATIONAL SCORES

Table I-1: Improving the needs score

Issue Area	Recommendation
Organisation	1. The needs will be driven by the strategy of the organisation. First define the strategy, then the specific need will be apparent. 2. "Re-programme" management attitudes. This includes institutionalising the mindset that one does not have to see a person to be able to manage the person and that presence in the office does not constitute performance.
Technical	1. Make the tools available to all individuals, not only to certain job-levels.
Workforce	1. Evaluate the organisation by distributing the Virtual Workplace survey, to determine the extent of, and need for, virtual work.

Table I-2: Improving the practicality score

Issue Area	Recommendation
Organisation	1. Negotiate a full-time "contract" based on deliverables not hours, where deliverables will be negotiated from time to time. 2. Review the employment contract also in relation to the LRA. 3. Negotiate with unions in terms of who will fall under the new contract and who will not. 4. Retrain managers in new management styles so that they understand the benefits of virtual work and how they can manage relationships with their employees while they are not on site 5. Review type of employees employed as part of the recruitment strategies.
Technical	1. Review tools available that can be utilised to improve remote connectivity and collaboration, even in industries where historically mobile technologies were not utilised. 2. It is possible that by providing for more effective and efficient collaboration tools, individuals would feel more comfortable working remote from each other, and be able to perform remotely, tasks which seem to need onsite presence at the moment.
Workforce	1. Train employees in the use and benefits of technology 2. Train employees in the understanding of a virtual workplace. 3. Evaluate current employees to determine if they will make a success of virtual work - sufficient maturity, discipline and skill level.

Table I-3: Improving the readiness score for technology and applications

Issue Area	Recommendation
Organisation	1. Set targets for adoption rates of technologies / applications
Technical	1. Investigate technology to improve collaboration, communication and "teamness", such as application portals, document libraries and collaboration tools. This technology should allow for "presence information" (i.e., visibility of online availability), application sharing, knowledge sharing and voice conversations. 2. Implement technologies that will allow individuals to interact and network simultaneously with many others, both inside and outside the work situation.
Workforce	1. Allow employees to become more technology literate. 2. Teach employees how to communicate better using online tools. 3. Make sure that employees are familiar with security protocols.

Table I-4: Improving t

Issue Area	Recommendation
Organisation	1. Review retention and recruitment strategies to focus on how technology is used in the workplace, availability of virtual work arrangements and flexible hours, work arrangement for women during pregnancy. 2. Policy on equipment: Subsidise employees, but allow employee to use the equipment for personal work as well. 3. Policy on virtual work: Allow for output driven work, multiple locations, flexible hours. 4. Review all policies in relation to the virtual workplace policy. 5. Define a virtual workplace that encompasses the full definition suggested in this study, so that "workplace" does not only refer to the organisation's main office location.
Technical	1. Ensure that technology supports the business drivers. 2. Ensure that technology policies are not too restrictive.
Workforce	1. Obtain inputs from employees on needs and requirements.

APPENDIX J

J - TEAM ASSESSMENT STEPS

J1 - TEAM ASSESSMENT PROCESS

To improve the likelihood of a successful virtual team, the team should complete the steps listed below.

1. Critically evaluate the team in terms of virtuality status, by using the team virtuality assessment framework to determine a current status or virtuality score.
2. Once the existing score has been determined, a desired status should be established. This can be depicted by a spider diagram - see examples below.
3. Design the team and organisational change intervention(s) required to move from the current to the desired level for each category. (The change interventions should be elevated to organisational level, due to the interrelationship between the effectiveness of the team in their environment.)

Figure J-1: Team assessment example (Collaboration)

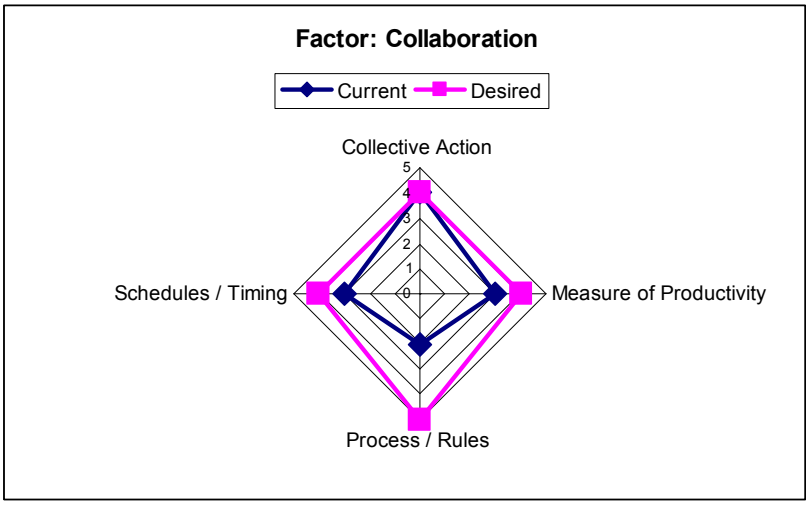


Figure J-2: Team ass

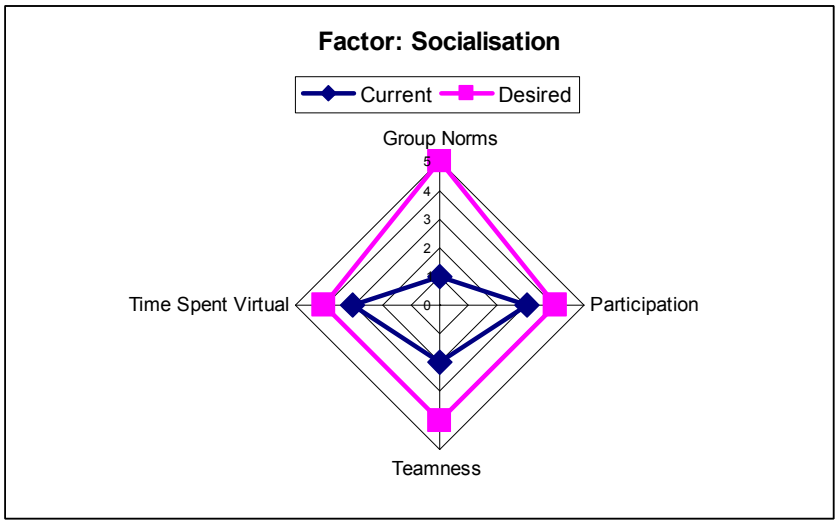
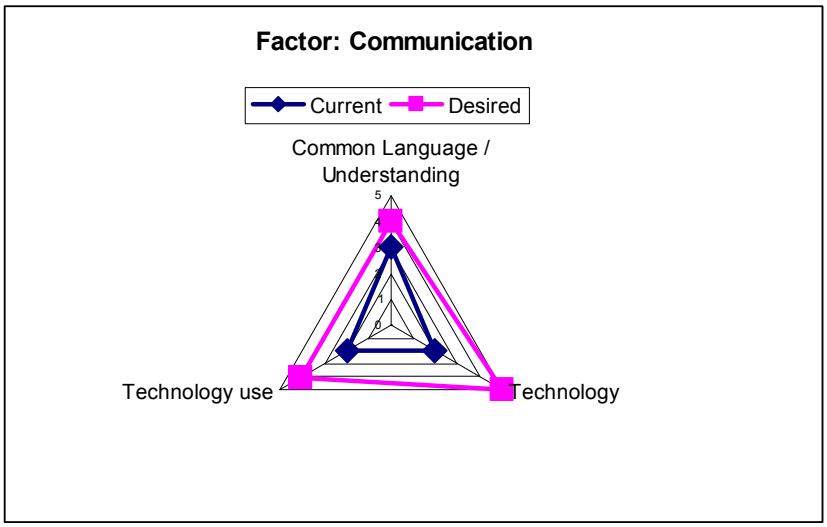


Figure J-3: Team assessment example (Communication)



J2 - IMPROVING THE TEAM SCORES

Table J-1: Improving the collaboration scores

Issue Area	Recommendation
Organisation	1. Improve intra-organisational communication: a. Make schedules available not only within the team, but outside the team (i.e., in the organisation), ensuring visibility of schedules and improving perceived availability. b. Make collaboration tools available outside of team. 2. Ensure that Manager-employee relationships prevent conflict by raising issues early. 3. Give inputs to organisational processes and rules.
Technical	1. Ensure that task is matched with the type of technology used.
Workforce	1. Make sure that specific deliverables are defined for work allocated. 2. Make sure that individuals stay in touch to facilitate collective action. 3. Establish metrics and key performance indicators as part of performance agreement. 4. Avoid conflict by giving constructive criticism immediately. 5. Give regular feedback to other team members and to the team manager. 6. Establish schedules and agree timing for online communications. 7. Respect the time of other team members - do not schedule meetings at random, make sure that they can talk when you contact them. 8. Formulate procedures and processes relating to deliverables (input methods, updates, marking of changes, etc.). 9. Document all procedures relating to schedules, timing, processes and rules. 10. Ensure these procedures align with the overall strategy for the team.

Table J-2: Improving the socialisation scores

Issue Area	Recommendation
Organisation	1. Ensure that there are sufficient meeting rooms and “hot”-desks that can be pre-booked where team members can meet face-to-face and socialise. 2. Ensure that online communication is established with all individuals, and that message delivery is reliable. 3. Set up a knowledge sharing tool which is administered centrally, and allows a network of individuals to interact, rather than just one-on-one interactions. 4. Ensure that there is a culture of trust in the organisation.
Technical	1. Use technology that matches the type of interaction required.
Workforce	1. Measure the time the team spends working virtually - decide if this needs to be increased or decreased. 2. Document all group norms or at least establish these verbally in the team. 3. Ensure these norms align with the overall strategy for the team. 4. Ensure that the communication method used facilitates the level of socialisation required, as well as the type of knowledge sharing that needs to take place. 5. Respect the time of other team members - do not schedule meetings at random, make sure that they can talk when you contact them. 6. Make sure that you understand the personalities, likes and dislikes of all other team members. 7. Be mature in handling criticism or direct feedback. 8. Discuss team roles and identities, this will facilitate improved “teamness”.

Table J-3: Improving the communication scores

Issue Area	Recommendation
Organisation	1. Ensure that intra-organisational communication, language and understanding is established by not only using team "jargon".
Technical	1. Give inputs to IT manager in terms of tools required to support communication and collaboration. 2. Make sure that communication options are used optimally (3G, ADSL, etc) and that all team members who need to collaborate have access to these technologies. 3. The communication option should support the type of communication - e.g. urgent messages should not be sent via email.
Workforce	1. Make sure that the type of humour is appreciated by all team members. 2. Use emoticons to improve understanding of the message. (Know how to use them appropriately) 3. Agree on a common language, especially in global teams, where English may not be the home language for all team members. 4. Ensure that all team members understand the technical jargon that is being used. 5. Document all formally agreed rules regarding communication, especially those that are of strategic importance to the success of the team.

End of Appendices